



Technology-Based Project-Based Learning in Teaching Content Subjects in University: A Study of Need Analysis

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis kerangka konseptual implementasi pembelajaran berbasis proyek berbasis teknologi yang dibutuhkan dalam mengajar mata kuliah muatan di perguruan tinggi. Subjek penelitian ini adalah beberapa dosen di STKIP Agama Hindu Singaraja yang meliputi empat dosen yang diampu mata kuliah konten. Penelitian ini menggunakan paradigma pendekatan metode campuran dengan desain metode campuran eksplanatori, dimana desain penelitian kualitatif lebih dominan digunakan. Instrumen yang digunakan dalam proses pengumpulan data adalah angket untuk penelitian kuantitatif. Sedangkan penelitian kualitatif menggunakan pedoman wawancara yang dimana pertanyaan yang akan ditanyakan sudah disiapkan dan ada juga analisis dokumen seperti silabus, rencana pembelajaran semester, dan kontrak kuliah. Dalam menganalisis data, peneliti juga menggunakan model OEM (Organizational Elements Model) dan CIPP yang dimana menganalisis berdasarkan dari kondisi saat ini dengan kondisi yang diharapkan, sehingga diketahui kebutuhan dari masing-masing dosen saat mengajar mata kuliah konten. Hasil dari penelitian yang telah dikumpulkan ini adalah kurangnya kesiapan antara dosen maupun siswa dalam menerapkan pembelajaran berbasis proyek di dalam kelas. Oleh karena itu, lembaga membutuhkan kerangka konseptual mengenai implementasi pembelajaran berbasis proyek berbasis teknologi sehingga konten yang diberikan harus sesuai dengan keterampilan abad ke 21 yang dimana fokus dari pembelajaran ini adalah siswa.

ABSTRACT

Technology plays an important role in the 21st century. Technology-based project-based learning is needed by lecturers in teaching content courses and analyzing learning characteristics. Therefore this study aims to analyze the conceptual framework for implementing technology-based project-based learning needed in teaching content courses in tertiary institutions. The subjects of this study were several lecturers at the STKIP Agama Hindu Singaraja which included four lecturers who taught content courses. This study used a mixed methods approach paradigm with a mixed methods explanatory design, in which the qualitative research design was more dominant. The instrument used in the data collection process is a questionnaire for quantitative research. Whereas qualitative research uses interview guidelines in which the questions to be asked have been prepared and there is also an analysis of documents such as syllabus, semester lesson plans, and lecture contracts. In analyzing the data, the researcher also uses the OEM (Organizational Elements Model) and CIPP models which analyze data based on context, input, process, and product. Researchers analyze based on current conditions and expected conditions so that the needs of each lecturer are known when teaching content courses. The results of the research that has been collected are the lack of readiness between lecturers and students in implementing project-based learning in the classroom. Therefore, institutions need a conceptual framework regarding the implementation of technology-based project-based learning so that the content provided must be in accordance with 21st century skills where the focus of this learning is students.

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1. INTRODUCTION

Project-based learning is a learning model that can train students to create new ideas, also allowing students to explore and be able to develop projects actively. That is the reason lectures have started implementing this project-based learning model to help students to have the skills needed in real-life situations (Kusadi et al., 2020; Sumarno, 2019; Wakid et al., 2020). Therefore, students as the young generation must have the skills required for the 21st century, especially in this digital era that requires people who understand using or developing their abilities in technology (Lawrence et al., 2019; Malik, 2018; Norahmi, 2017). Not only for students, but 21st century learning also pushes lectures to be more innovative, which can help students to prepare

their skills for work in the future which are creativity, communication, collaboration, and critical thinking. Along with the policy of the Indonesian Ministry of Education and culture, stated that in the next 5 years, the main priority in college is the one who has 6 competencies which are creativity, communication, collaboration, critical thinking, computation logic, and compassion (Makarova & Makarova, 2018; Scheopner Torres et al., 2018). Therefore, students who are especially in the English Language Education study program are required to have those 6 competencies (Inganah et al., 2023; Karim et al., 2020). Students who study in the English Language Education study program must have these competencies so that in the future they can become good teachers who can teach in an innovative way to their students, to produce students who have the 6 competencies, lectures especially those who teach in the content subject matter must using an innovative way to teach their students to hone their skills (Fikri et al., 2020; Shah & Kamaruddin, 2022).

Due to the spread of COVID-19, the government issued a social distancing regulation and stated that all students are required to start learning at home to avoid over-spreading. Therefore, schools and lectures are carried out online accompanied by the use of technology. The use of technology in online learning has the educational impact of the industrial revolution in the 21st century (Adriana et al., 2020; Haryadi & Selviani, 2021; Nitiasih et al., 2021). However, unfortunately, until now there are still lecturers who do not use technology properly so they could not produce students that have 6 competencies. Usually, the lecturer only provides material and questions so that no interaction or activity can develop students' skills. That is because students can only answer questions without being able to develop their skills caused to monotonous learning. Therefore, this research was carried out because it realized how important the use of technology in this learning model. Technology-based project-based learning will help improve lecturers and students in terms of technology where this learning model will use technology as a learning tool (Garba et al., 2015; Lasamahu et al., 2021; Sumarno, 2019). Indirectly this learning model will introduce people who are still minimal in technology, especially English Language Education students who will later become teachers, so introducing and getting used to using technology to students has many positive things. The era will be more advanced, including technology that will continue to develop, knowing using technology will be very helpful in life in the future.

Implementing a project-based learning model when teaching can help students to be more active and improve their abilities in real task problems. Not only students, but lecturers also get the benefit of trying to be creative when delivering material in class so that students don't feel bored while learning (Abuhmaid, 2020; Jalinus et al., 2019; Tesi Muskania & Wilujeng, 2017). Using this learning model is an effective way for students to understand the material by using examples that have to do with everyday life, it can be said that this learning model is very suitable for young students, because of their curiosity about learning something so that they will find their answers to solve the problem. In carrying out this learning model, the teacher has an important role in teaching material. Teachers must be able to design material that is easy for students to understand and also excitingly convey material so that students do not feel bored in carrying out learning activities, so that the purpose of applying this learning model is fulfilled, namely to meet student needs and improve students' abilities in 6C skills (Aghayani & Hajmohammadi, 2019; Akharraz, 2021; Arnaz & Adnan, 2021). Previous study stated that in this learning model, the teacher's role is a facilitator who helps students in deciding the best way they can do when dealing with problems they get when doing a task (Haniah et al., 2021). The teacher can help students from the side without any intervention from the teacher, the teacher only gives the best advice to students when working on a project. Developing something in the project is the responsibility of the student, so skills such as critical thinking, creativity, and cooperation are needed in this learning model. Those are the benefits that can be obtained when implementing project-based learning in the class (Asfihana, 2022; Gai et al., 2018; Yusri, 2018).

Project-based learning can be done in a synchronous or asynchronous manner. Therefore technology plays an important role in implementing project-based learning. Teachers are forced to use technology well so that learning could still achieve the students' needs (Alotaibi, 2020; Chu et al., 2017; Khoiriyah, 2021). The existence of this online learning requires teachers to think about ways to teach their students, such as using various types of learning platforms, providing material through YouTube and journals, and making conclusions in the material in an interesting way so that students can learn well and understand the material that has been explained (Khatoony & Nezhadmehr, 2020; Majid & Shamsudin, 2019; Yildirim, 2017). The success in using technology during learning mostly depends on the quality of teachers (especially in terms of their pedagogical and understanding) who use technology in their teaching activities. The results are positive if students can understand the material that has been taught, and negative if students do not understand what is being taught that they have studied. To fulfill 21st-century skills, English education students learn many things including content subjects such as basic English, assessment, classroom management, and linguistics. In content subjects, theory and practice are needed to make students understand the learning (Huertas-Abril, 2021; Siregar, 2020; Yu & Wan Mohammad, 2019). It is related to curriculum development, educational content, and designing or building educational programs. So, in this learning, there are theories as well as practices that are carried out in teaching content subjects. This course can help students in improving their 6C skills, all subjects content lessons that have been studied will be very useful in the future when students in English education become teachers. They will

know how the process is in making lesson plans, how to make students actively participate in learning, liven up the atmosphere so students have an interest in learning the material, and make students understand what they have learned (Fansury et al., 2020; Ješková et al., 2018). Students also could design material based on the knowledge they have learned before. Implementing this type of model teaching will help students to understand the material well, even better if students could participate actively while learning something. This type of teaching could make students prioritize their learning based on problems that are made by students themselves, they will learn naturally through the characteristics (Nurbianta & Dahlia, 2018; Rahmawati et al., 2020; Rillero & Camposeco, 2018).

Based on the regulation from Permendikbud number 3 stated that every university is required to implement project-based learning in the classroom. Considering that technology also plays an important role in the 21st century, this research was conducted at STKIP Agama Hindu Singaraja to analyze what kind of technology-based project-based learning is needed by lecturers in teaching content subjects and to analyze the characteristics of technology-based project-based learning needed for teaching content subjects by the lecturers in STKIP Agama Hindu Singaraja. By doing this research, this needs analysis is like figuring out what needs are important and how to address them to meet those needs. Find out about the needs to be achieved can be done by comparing the current condition with the desired condition, such as defining a problem, understanding the behavior and mechanisms that occur in the current condition, determining whether these conditions can achieve the desired condition, and finding out how the way it can change.

2. METHOD

This study used a mixed-methods approach paradigm with an explanatory mixed-method design to increase the knowledge of the phenomenon and to discover new information (Creswell, 2008; Samiei & Ebadi, 2021). However, in this study, a qualitative research design was used dominantly. Qualitative research was conducted to gain insight into people's construction of the world that aimed to understand the subject's experience phenomena, where this information can be obtained through narratives that are carried out by communicating to understand the phenomenon, it will involve interviews to get information about subject's usual activity and document analysis to know about the learning plan that have been used in STKIP Agama Hindu Singaraja. For the diagram of the model used, the researcher used a customized OEM (Organizational Elements Model) where needs analysis and strategic planning were carried out by connecting and explaining the desired external results and internal results obtained. Elements in OEM relate to context, input, processes, and products generated from within the organization which is used in the needs analysis of the project-based learning.

Methods and techniques of data collection carried out in this study using questionnaire, interview methods and document analysis. The interview method was carried out using ten questions related to CIPP and the OEM model, namely context, input, process and product. Interviews were conducted with four English teaching lecturers. The document analysis method used was to analyze the syllabus, lesson plans and course contract provided by the STKIP Agama Hindu Singaraja. In this analysis document, an analysis is carried out to find out whether the method used by STKIP Agama Hindu Singaraja in teaching and whether Project-Based Learning is carried out on the campus. Researchers used Pearson Correlation to determine the validity of the questionnaire to ensure that the instrument was valid and reliable by using the SPSS IBM Statistics 26 program. The number of respondents (N) in this study were 30 people, so $r_{table} = 0.361$. There are two variables, namely current conditions and desired conditions in each question, so this questionnaire requires two validity tests to answer the current conditions and desired conditions.

3. RESULT AND DISCUSSION

Result

This study aims to analyze the kind and characteristics of technology-based project-based learning needed by lecturers in teaching content subject at the STKIP Agama Hindu Singaraja. The results reached in this paper are regarding the needs when lecturers use technology-based project-based learning in the English department. These data were collected through interviews, document analysis to find out the learning methods used at STKIP Agama Hindu Singaraja, and giving questionnaires to participants, which are four English lecturers, especially those who teach content subjects regarding the kind and characteristics of technology-based project-based learning needed in teaching content subjects. Qualification of empirical validity is show in Table 1.

Table 1. Qualification of Empirical Validity

Comparison of Rcount and Rtable	Categories
Rcount > rtable	Valid
Rcount < rtable	Invalid

The researcher also used the Alpha-Cronbach test to determine the degree of dependency. Sample test scores were entered into SPSS and checked for reliability purposes. This reliability test aims to determine the level of trust of an object. The result is show in [Table 2](#).

Table 2. Ratio Used in Measuring Reliability

Range of Cronbach's Coefficient	Qualification
> 0.90	Very High
0.80 – 0.90	High
0.70 – 0.79	Sufficient
0.60 – 0.69	Low
< 0.60	Very Low

Researchers used SPSS IBM Statistics 26 to test the reliability of the test, the formula used to access the reliability of the questionnaire was the Alpha-CronBach formula. The result of reliability questionnaire is show in [Table 3](#).

Table 3. Reliability Questionnaire (Current Condition)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.995	29

Base on [Table 3](#), the findings of this study can be trusted because the reliability of the questionnaire was found to be 0.994 in the current condition variable which indicating that the level of dependence on the questionnaire was very high. The result of reliability of questionnaire is show in [Table 4](#).

Table 4. Reliability Questionnaire (Desired Condition)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.994	29

Base on [Table 4](#), this shows that the level of dependence of the questionnaire is very high, because the reliability of the questionnaire was found to be 0.995 for the desired condition variable. So, the research findings can be trusted. In the process of collecting data to do need analysis in STKIP Agama Hindu Singaraja, the researcher request a letter for permission to conduct research in the English Language Education study program. After permission is granted, the researcher recruited lecturers who teach content subjects to give the questionnaire and interview the lecturers about implementation of project-based learning in their courses. The researcher also requested documents such as syllabus, semester learning plans and syllabus to obtain the data needed for analysis. After completing the analysis, the researcher concludes the final results obtained from the data that has been collected Based on research using CIPP and the OEM model namely Context, Input, Process, Product. The following are the results of data findings from STKIP which have been carried out using quantitative which is quistionnaire and qualitative analysis methods, which are the interview and document analysis methods:

Context aspect

Context is a needs analysis in project-based learning. Within the context, the researcher analyzed based on the rules of national education standards in underlying the application of project-based learning that has been used by lecturers when teaching content subjects at STKIP Agama Hindu Singaraja. The following are the results of data findings and analysis regarding context through three methods, which are questionnaires, interviews, and document analysis:

Table 5. Context aspect

Present Situation	Expected Situation
There are several English lecturers who teach content subjects who do not yet have a juridical foundation and conceptual framework for implementing project-based learning.	Lecturers expect their institutions to have a juridical foundation and a conceptual framework based on project-based learning in teaching content subjects.

Based on a comparison of current conditions and expected conditions of [Table 5](#), it can be said that in general lecturers already know the context of project-based learning, but the implementation of learning models using technology has not been implemented properly because based on syllabus analysis, there is no project-based learning method applied to content subjects. So for the desired conditions, the lecturers want the implementation of project-based learning to be carried out in accordance with existing national education standard regulations.

Input Aspect

Input focuses on planning and strategies implemented by lecturers, so researchers analyze the readiness of lecturers and students to implement project-based learning using technology in the classroom when studying content subjects. The following is the data that has been obtained show in [Table 6](#).

Table 6. Input Aspect

Present Situation	Expected Situation
Lecturers who teach content subjects do not yet have pedagogical readiness in preparing for the application of technology-based project-based learning. Meanwhile, the students were also not ready to apply technology-based project-based learning because the students only studied using the CLT method.	Lecturers who teach content courses expected to have pedagogical readiness in preparing the application of technology-based project-based learning which is capable of making students use technology as a learning medium. Thus, students also feel ready to apply technology-based project-based learning learning.

Based on a comparison of current conditions and expected conditions of [Table 6](#), it can be said that in the current conditions, in general, lecturers feel ready to implement technology-based project-based learning but are not fully ready because of the lack of learning media. In instructing students, the lecturer will provide an initial description of the subjects they will teach, and gives a guideline to their students before starting class as a preparation for students in the learning process such as saying that there will be a project later. However, they would also monitor and see if it would go smoothly or not if they used that method until the end of the semester because lecturers can only use technology in a limited way so the impact it is not carried out properly.

Process Aspect

The process focuses on program implementation in knowing how project-based learning is carried out. In this aspect of the process, there are three stages that researchers analyze starting from planning, implementation, and assessment in implementing technology-based project-based learning in teaching content subjects. In the planning stage, lecturers are asked about the learning media used when teaching content courses and see how prepared the tools are in implementing project-based learning. This tool should accommodate current issues and policies. At the implementation stage, lecturers were asked about how to design learning tools, whether the implementation of project-based learning can be carried out synchronously or asynchronously, and whether the learning already has guidelines that accommodate 6C skills and 21st-century skills. Last, at the assessment stage, the lecturers were asked about the assessment approach used also various forms of assessment, whether using authentic assessment and ensuring the achievement of the stated outcome/CP. The data that has been obtained is show in [Table 7](#).

Table7. Process Aspect

Present Situation	Expected Situation
Lecturers who teach content subjects have limitations in using learning media when teaching, so that the design of learning tools most of the time refers to group discussions.	The lecturers expected to be able to make learning tools properly according to the project-based learning method, so that teaching content subjects can be implemented properly and be able to improve student skills.

Based on a comparison of current conditions and expected conditions of [Table 7](#) in the process stage, the lecturer said that there was the use of technology in each course, but for the Basic English course, it had been proven that there was no use of technology listed in the syllabus. Meanwhile, the use of technology in Classroom Management courses is only limited to instructing students to make teaching videos which will later be collected as a result of a project. In the process evaluation stage, there is no technology used to implement Basic English. Because in Basic English learning only uses ALM and CLT where students will read a dialogue and imitate it and then display the dialogue later, so students know how to use a language.

Product Aspect

Products focus on the results of learning that has been applied. In this aspect, researchers analyze the improvements experienced by students when implementing technology-based project-based learning. The data that has been is show in [Table 8](#).

Table 8. Product Aspect

Present Situation	Expected Situation
Students have reached the target of passing 80% so that they successfully pass the content course, but regarding skills improvement, there has not been an increase in student skills.	It is expected that by implementing technology-based project-based learning it can increase students' knowledge and skills that will be needed in the future, so that students have experience while doing project-based learning.

Based on a comparison of current conditions and expected conditions of [Table 8](#), the lecturers who teach content courses agree with the influence of project-based learning in increasing students' grades and skills. However, ideally, it is still far from improving 6C skills because the input from these institutions cannot be equated with other institutions. But still, the project-based learning that the lecturer had done had a good influence on the students because students could gain experience. In other courses such as Basic English lessons do not include project-based methods in their learning, it can be said that the lecturers do not yet know the results of implementing actual project-based learning. Based on the needs analysis that has been carried out and referring to existing regulations, the Minister of Education and Culture Regulation Number 3 of 2020 which discusses the implementation of learning in tertiary institutions states that all learning methods can be implemented to achieve student graduation which includes all learning methods including Project-Based Learning , so that it is known that technology-based project-based learning is required to have a learning foundation in its implementation referring to existing regulations. Technology-Based Project-Based Learning must also be adapted to the readiness of institutions, lecturers and students. The readiness referred to in this context is technological readiness at STKIP Agama Hindu Singaraja because for the current conditions STKIP Agama Hindu Singaraja only uses video in technology for its learning, there is no technology such as E-learning or other media. Furthermore, there is the readiness of the lecturer, namely the lecturer's understanding of project-based learning, such as the steps needed, preparation for implementing project-based learning before starting class, and learning objectives that must be achieved when implementing technology-based project-based learning. Based on the answers of lecturers who teach content courses who have been interviewed, it can be concluded that most of them think project-based learning is learning that essentially produces a product. In fact, project-based learning has steps such as readiness, student processes accompanied by teachers, and will eventually produce a project that can be used as value (Eliyasni et al., 2019). Then, there is the readiness of students to accept technology-based project-based learning as their learning method. In this case, lecturers have an important role in preparing technology-based project-based learning, because it must be explained beforehand so that students understand the technology that will be used during learning. Thus, the pedagogical readiness of lecturers and students must be adjusted to implement technology-based project-based learning so that it can run properly.

After conducting a needs analysis, it can be concluded that the technology-based project-based learning method can be incorporated into STKIP Agama Hindu Singaraja's learning tools such as syllabus and semester lesson plans. This needs to be done so that lecturers can prepare teaching materials according to the project-based learning method. In preparing appropriate teaching materials, it is necessary to prepare project-based learning which must be considered and adapted to the abilities of students at STKIP Agama Hindu Singaraja so that there are no obstacles in implementing project-based learning. Adapting learning to student abilities can be done by adjusting project-based learning to student majors, knowing the focus of skills and abilities that will be improved through technology-based project-based learning methods.

Discussion

At the STKIP Agama Hindu Singaraja, the institution still applies online learning where students study remotely. This distance learning attempts to create learning in an online environment where technology is used as a means of communicating with students and checking whether learning objectives have been met during learning activities (Khatoony & Nezhadmehr, 2020; Rigo & Mikuš, 2021; Salam & Mudinillah, 2021). Thus, technology has an important role in helping students learn activities so that they can be carried out properly even though they do not meet face to face. Because STKIP Agama Hindu Singaraja is still conducting distance learning where learning uses technology, in this section the author would like to describe some of the findings obtained at STKIP Agama Hindu Singaraja, especially the use of technology-based project-based learning in content subject learning. In this study, researchers collected data by conducting questionnaires and interviews with lecturers who taught content subjects and also analyzing documents such as syllabus, semester learning plans (RPS), and course contracts that had been given by the lecturer. The needs analysis model used in this research is to combine the CIPP Evaluation concept (context, input, process, and product) with the OEM (Organizational Element Model) so that it has an overview of current conditions and desired conditions related to the use of project-based learning technology (Purwaningsih & Dardjito, 2021; Tokmak et al., 2013; Warju, 2016).

Researcher use context, input, process, and product evaluation to analyze the current and desired condition in response to the first research question about the kind of technology-based project-based learning required in teaching content subjects at STKIP Agama Hindu Singaraja. For context evaluation leads to an assessment of the entire situation of an organization, identifying weaknesses and strengths, and finding solutions to a problem faced by the organization (Adellia & Prajawinanti, 2021; Kurniawati, 2021; Mubai et al., 2021). Problems that researchers can encounter in STKIP Agama Hindu Singaraja are the content subject courses that have a juridical basis and conceptual framework are Assessment and Classroom Management, while the Basic English and Linguistics courses do not have a juridical basis and a conceptual framework. However, for the context in the desired conditions, all content subject lecturers expect the institution to have a juridical basis and a conceptual framework in order to know the actual project-based learning method (Chu et al., 2017; Haniah et al., 2021). The characteristics of technology-based project-based learning needed in teaching content subjects, the researcher also use context, input, process, and product evaluation to analyze the current condition. In the context variable, the findings show that there are several lecturers who teach content subjects at STKIP Agama Hindu Singaraja who do not apply the steps in the project-based learning method properly in class, especially in the Basic English course and Linguistics. This is due to the absence of a juridical basis and conceptual framework owned by the lecturer. Meanwhile, there are also two lecturers who already have a conceptual framework, namely in the Assessment and Classroom Management courses (Hadi et al., 2022; Kang, 2022). In the input variable, the two lecturers did not have good readiness due to the absence of a juridical basis and conceptual framework for the subjects they taught. Thus, project-based learning has not been able to implement properly (Mustapha et al., 2020; Pawar et al., 2020). However, the other two lecturers are well prepared because they have a juridical basis and conceptual framework so that these lecturers understand the context of project-based learning. In the process, the learning methods used by the four lecturers are lecture, discussion, group work, and individual learning assignments. Whereas specifically for Basic English, this can be seen from the semester lesson plan used in the course, namely using the integrated learning and ALM methods which focus on students to actively participate because students are instructed to do planning, exploration, and brain storming (Nilsook et al., 2021; Widiastuti et al., 2022).

According to the lecturer's view of the achievement of 6C skills in students, it is classified as good with a minimum requirement of 80% passing the courses taught. The form of assessment used by lecturers is by assessing the midterm and final semester exams. The learning process can also be assessed by looking at it from a creative, critical, active, collaborating, computational thinking, and compassionate perspective. So it can be said that there are limitations in the Basic English and Linguistics courses in giving assignments to students because they do not have a juridical basis and conceptual framework for project-based learning, so it is necessary for institutions to have a legal basis and conceptual framework in order to implement project-based learning properly (Abidin et al., 2020; Syahputri & Elfrianto., 2018).

The implications of this research are the results of the needs analysis on technology-based project-based learning that has been implemented at STKIP Agama Hindu Singaraja. Through the methods developed by the researchers, the implications of this research can be concluded that this research will be beneficial for developing the application of project-based learning in teaching content subjects using technology in the classroom because it can help students improve 21st-century skills such as 6C, namely communication, compassion, computational thinking, collaboration, creativity, and critical thinking if the institution has a juridical basis as well as a conceptual framework regarding project-based learning. The second implication of this study is to obtain opinions and responses from English lecturers regarding the need for using technology-based project-based learning in their institutions. For the expected conditions, it is hoped that the use of this technology-based

project-based learning method can be carried out both synchronously and asynchronously, so as to be able to provide students with an experience that can improve their skills in the future. The last implication is regarding the assessment used in teaching content subjects by implementing project-based learning, this assessment must have planning, development, and resulting solutions, so that learning objectives are achieved properly. Based on the results that have been obtained by researchers, there are several suggestions that researchers want to give to lecturers, other readers and researchers. Lecturers are advised to understand how to apply project-based learning, so that it can be implemented properly and not only provide projects for students, but provide assignments that can increase student knowledge and skills. This research focuses on analysing the kind and characteristics of technology-based project-based learning needed by lecturers in teaching content subjects in STKIP Agama Hindu Singaraja, with this research, researcher hope that readers will get additional information about the use of technology-based project-based learning in the classroom and it is hoped that this research can be used as a reference for developing the application of project-based learning in teaching content subjects through technology.

4. CONCLUSION

Based on the results of the data that has been analysed, the researcher found that not all English lecturers, especially those teaching content subjects, implemented project-based learning correctly because they did not have a legal basis that supports the use of project-based learning. However, the lecturers use learning methods that are similar to project-based learning, such as by instructing students to collaborate and giving project assignments such as making dialogues or monologues and videos. The assessment used by lecturers to assess students is in an authentic way of assessment which is assessed from the process of solving a problem which can produce an overview of student development. In the future, it is hoped that institutions will have a conceptual framework for planning teaching materials that use project-based learning based on technology and content must be adapted to the ability of students.

5. REFERENCES

- Abidin, Z., Utomo, A. C., Pratiwi, V., & Farokhah, L. (2020). Project based learning - literacy in improving students' mathematical reasoning abilities in elementary schools. *JMIE (Journal of Madrasah Ibtidaiyah Education)*, 4(1), 39. <https://doi.org/10.32934/jmie.v4i1.170>.
- Abuhmaid, A. M. (2020). The Efficiency of Online Learning Environment for Implementing Project-Based Learning: Students' Perceptions. *International Journal of Higher Education*, 9(5), 76–83. <https://doi.org/10.5430/ijhe.v9n5p76>.
- Adellia, Y., & Prajawinanti, A. (2021). Implementasi Model Evaluasi CIPP Pada Pelaksanaan Program Kelompok Belajar TBM Leshutama Era Pandemi Covid-19. *Pustaka Karya: Jurnal Ilmiah Ilmu Perpustakaan Dan Informasi*, 9(2), 14–28. <https://doi.org/http://dx.doi.org/10.18592/pk.v9i2.5516>.
- Adriana, O. :, Ditjen, D., Katolik, B., & Agama, K. (2020). Efektivitas Pembelajaran Daring Di Masa Pandemi Covid-19 Pada Perguruan Tinggi Keagamaan Katolik. *Edutech*, 19(3), 241–262. <https://doi.org/10.33319/sos.v21i2.61>.
- Aghayani, B., & Hajmohammadi, E. (2019). Project-based learning: promoting EFL learners' writing skills. *A Journal on Language and Language Teaching*, 22(1). <https://doi.org/10.24071/ilt.2019.220108>.
- Akharraz, M. (2021). The Impact of Project-Based Learning on Students' Cultural Awareness. *International Journal of Language and Literary Studies*, 3(2), 54–80. <https://doi.org/10.36892/ijlls.v3i2.601>.
- Alotaibi, M. G. (2020). The Effect of Project-Based Learning Model on Persuasive Writing Skills of Saudi EFL Secondary School Students. *English Language Teaching*, 13(7), 19–26. <https://doi.org/10.5539/elt.v13n7p19>.
- Arnaz, Y., & Adnan, A. (2021). Students' Perception of Project - Based learning in Microteaching Class. *Journal of English Language Teaching*, 10(3), 449–461. <https://doi.org/10.24036/jelt.v10i3.113871>.
- Asfihana, R. (2022). Students' English Learning Experiences on Virtual Project -Based Learning Instruction. *International Journal of Language Education*, 6(2), 196–209. <https://doi.org/10.26858/ijole.v6i2.20506>.
- Chu, S. K. W., Zhang, Y., Chen, K., Chan, C. K., Lee, C. W. Y., Zou, E., & Lau, W. (2017). The effectiveness of wikis for project-based learning in different disciplines in higher education. *Internet and Higher Education*, 33, 49–60. <https://doi.org/10.1016/j.iheduc.2017.01.005>.
- Creswell, J. (2008). *Research design, qualitative, quantitative, and mixed methods approaches* (third ed.). In *California: Sage Publication*. Sage Publication.
- Fansury, A. H., Januarty, R., Rahman, A. W., & Syawal. (2020). Digital Content for Millennial Generations: Teaching the English Foreign Language Learner on COVID-19 Pandemic. *Journal of Southwest Jiaotong University*, 55(3). <https://doi.org/10.35741/issn.0258-2724.55.3.40>.

- Fikri, A., Rahmawati, A., & Hidayati, N. (2020). Persepsi Calon Guru Pai Terhadap Kompetensi 6C Dalam Menghadapi Era 4.0. *AT-TA'DIB: Jurnal Ilmiah Prodi Pendidikan Agama Islma*, 12(1), 89–96. <https://doi.org/10.47498/tadib.v12i01.331>.
- Gai, M., Yustinus, C., & Timotius, A. I. (2018). Project Based Activities In A Call Classroom: Efl Students' Experiences. *International Journal of Education*, 11(1). <https://doi.org/10.17509/ije.v11i1.10177>.
- Garba, S. A., Byabazaire, Y., & Busthami, A. H. (2015). Toward the use of 21st century teaching-learning approaches: The trend of development in Malaysian schools within the context of Asia Pacific. *International Journal of Emerging Technologies in Learning*, 10(4), 72–79. <https://doi.org/10.3991/ijet.v10i4.4717>.
- Hadi, S., Haryanto, H., & AM, M. A. (2022). Classroom Assessment Tool using Learning Management System-based Computerized Adaptive Test in Vocational High Schools. *Journal of Educational Research and Evaluation*, 6(1), 143–155. <https://doi.org/10.23887/jere.v6i1.35630>.
- Haniah, A., Ngadiso, U., & Setyaningsih, E. (2021). Students' Perception on the Implementation of Online Project-Based Learning in Teaching 4Cs. *Indonesian Journal of English Language Teaching and Applied Linguistics*, 6(1), 123–140. <https://doi.org/10.21093/ijetal.v6i1.895>.
- Haryadi, R., & Selviani, F. (2021). Problematika Pembelajaran Daring Di Masa Pandemi Covid-19. *Academy of Education Journal*, 12(2), 254–261. <https://doi.org/10.47200/aoej.v12i2.447>.
- Huertas-Abril, C. A. (2021). Developing speaking with 21st Century digital tools in the English as a foreign language classroom: New literacies and oral skills in primary education. *Aula Abierta*, 50(2), 625–634. <https://doi.org/10.17811/RIFIE.50.2.2021.625-634>.
- Inganah, S., Darmayanti, R., & Rizki, N. (2023). Problems, Solutions, and Expectations: 6C Integration of 21 st Century Education into Learning Mathematics. *JEMS: Jurnal Edukasi Matematika Dan Sains*, 11(1), 220–238. <https://doi.org/10.25273/jems.v11i1.14646>.
- Jalinus, N., Syahril, & Nabawi, R. A. (2019). A comparison of the problem-solving skills of students in pjBL versus CPjBL model: An experimental study. *Journal of Technical Education and Training*, 11(1), 36–43. <https://doi.org/10.30880/jtet.2019.11.01.005>.
- Ješková, Z., Balogová, B., & Kireš, M. (2018). Assessing inquiry skills of upper secondary school students. *Journal of Physics: Conference Series*, 1076(1). <https://doi.org/10.1088/1742-6596/1076/1/012022>.
- Kang, J. (2022). Interrelationship Between Inquiry-Based Learning and Instructional Quality in Predicting Science Literacy. *Research in Science Education*, 52(1), 339–355. <https://doi.org/10.1007/s11165-020-09946-6>.
- Karim, E., Azah, N., Safran, A., Shuib, H., Hamzah, H., Hashim, N., & Salleh, P. (2020). 6C Levels among trainee teachers upon the implementation of npdl in a teacher training institute. *International Journal of Innovation, Creativity and Change*, 11(11). https://www.academia.edu/download/64568814/111106_Karim_2020_E_R.pdf.
- Khatoony, S., & Nezhadmehr, M. (2020). EFL teachers' challenges in integration of technology for online classrooms during Coronavirus (COVID-19) pandemic in Iran. *AJELP: Asian Journal of English Language and Pedagogy*, 8(2), 1–16. <https://doi.org/10.37134/ajelp.vol8.sp.1.2020>.
- Khoiriyah. (2021). Content and language integrated learning (clil) in indonesian. *Jurnal Pendidikan Progresif*, 11(3), 587–601. <https://doi.org/10.23960/jpp.v11.i3.202110>.
- Kurniawati, E. W. (2021). Evaluasi Program Pendidikan Perspektif Model Cipp (Context, Input, Process, Product). *GHAITSA : Islamic Education Journal*, 2(1), 19–25. <https://siducat.org/index.php/ghaitsa/article/view/168>.
- Kusadi, N. M. R., Sriartha, I. P., & Kertih, I. W. (2020). Model pembelajaran project based learning terhadap keterampilan sosial dan berpikir kreatif. *Thinking Skills and Creativity Journal*, 3(1), 18–27. <https://doi.org/10.23887/tscj.v3i1.24661>.
- Lasamahu, B., Siregar, E., & Sukardjo, M. (2021). Online Learning with Project Based Learning Approach in the Human Performance Technology Course. *Journal of Education Research and Evaluation*, 5(2), 208. <https://doi.org/10.23887/jere.v5i2.32387>.
- Lawrence, R., Ching, L. F., & Abdullah, H. (2019). Strengths and Weaknesses of Education 4.0 in the Higher Education Institution. *International Journal of Innovative Technology and Exploring Engineering*, 9(2S3), 511–519. <https://doi.org/10.35940/ijtee.B1122.1292S319>.
- Majid, F. A., & Shamsudin, N. M. (2019). Identifying factors affecting acceptance of virtual reality in classrooms based on Technology Acceptance Model (TAM). *Asian Journal of University Education*, 15(2), 52–60. <https://doi.org/10.24191/ajue.v15i2.7556>.
- Makarova, E. A., & Makarova, E. L. (2018). Blending pedagogy and digital technology to transform educational environment. *International Journal of Cognitive Research in Science, Engineering and Education*, 6(2), 57–65. <https://doi.org/10.5937/ijcrsee1802057M>.
- Malik, R. S. (2018). Educational challenges in 21st century and sustainable development. *Journal of Sustainable*

- Development Education and Research*, 2(1), 9–20. <https://doi.org/10.17509/jsder.v2i1.12266>.
- Mubai, A., Jalinus, N., Ambiyar, A., Wakhinuddin, W., Abdullah, R., Rizal, F., & Waskito, W. (2021). Implementasi Model Cipp Dalam Evaluasi Kurikulum Pendidikan Teknik Informatika. *Edukatif: Jurnal Ilmu Pendidikan*, 3(4), 1383–1394. <https://doi.org/10.31004/edukatif.v3i4.549>.
- Mustapha, R., Sadrina, Nashir, I. M., Azman, M. N. A., & Hasnan, K. A. (2020). Assessing the implementation of the project-based learning (PJBL) in the department of mechanical engineering at a Malaysian polytechnic. *Journal of Technical Education and Training*, 12(1 Special Issue), 100–118. <https://doi.org/10.30880/jtet.2020.12.01.011>.
- Nilsook, P., Chatwattana, P., & Seechaliao, T. (2021). The Project-based Learning Management Process for Vocational and Technical Education. *Higher Education Studies*, 11(2), 20–29. <https://doi.org/10.5539/hes.v11n2p20>.
- Nitiasih, P. K., Budiarta, L. G., Adnyayanti, N. L., & Erinaryani, N. N. (2021). Dealing with Project Based Learning during COVID-19: Teacher's Perception Using Educational Video as ELT Media. *LANGUAGE CIRCLE: Journal of Language and Literature*, 16(1), 118–124. <https://doi.org/10.15294/lc.v16i1.30209>.
- Norahmi, M. (2017). 21st-century teachers: The students' perspectives. *Journal on English as a Foreign Language*, 7(1), 77. <https://doi.org/10.23971/jefl.v7i1.538>.
- Nurbianta, N., & Dahlia, H. (2018). The Effectiveness of Jigsaw Method in Improving Students Reading Comprehension. *ETERNAL (English Teaching Journal)*, 9(1), 70–86. <https://doi.org/10.26877/eternal.v9i1.2416>.
- Pawar, R., Kulkarni, S., & Patil, S. (2020). Project based learning: An innovative approach for integrating 21st century skills. *Journal of Engineering Education Transformations*, 33(4), 58–63. <https://doi.org/10.16920/jeet/2020/v33i4/139423>.
- Purwaningsih, H., & Dardjito, H. (2021). Implementation of Cipp Model for Online Learning Evaluation During Covid-19 Pandemic. *Getsempera English Education Journal*, 8(2), 294–309. <https://doi.org/10.46244/geej.v8i2.1394>.
- Rahmawati, A., Suryani, N., Akhyar, M., & Sukarmin. (2020). Technology-Integrated Project-Based Learning for Pre-Service Teacher Education: A Systematic Literature Review. *Journal Open Engineering*, 10(1), 621–629. <https://doi.org/10.1515/eng-2020-0069>.
- Rigo, F., & Mikuš, J. (2021). Asynchronous and synchronous distance learning of English as a foreign language. *Media Literacy and Academic Research*, 4(1), 89–106. <http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.desklight-817e667f-71c4-4fda-8f1c-187c82669197>.
- Rillero, P., & Camposeco, L. (2018). The iterative development and use of an online problem-based learning module for preservice and inservice teachers. *Interdisciplinary Journal of Problem-Based Learning*, 12(1). <https://doi.org/10.7771/1541-5015.1729>.
- Salam, M. Y., & Mudinillah, A. (2021). Canva Application Development for Distance Learning on Arabic Language Learning in MTs Thawalib Tanjung Limau Tanah Datar. *Jurnal Teknologi Pendidikan*, 23(2), 101–111. <https://doi.org/10.21009/jtp.v23i2.20650>.
- Samiei, F., & Ebadi, S. (2021). Exploring EFL learners' inferential reading comprehension skills through a flipped classroom. *Research and Practice in Technology Enhanced Learning*, 16(1). <https://doi.org/10.1186/s41039-021-00157-9>.
- Scheopner Torres, A., Brett, J., Cox, J., & Greller, S. (2018). Competency Education Implementation: Examining the Influence of Contextual Forces in Three New Hampshire Secondary Schools. *AERA Open*, 4(2). <https://doi.org/10.1177/2332858418782883>.
- Shah, M. M., & Kamaruddin, M. (2022). Kompetensi 6C siswa guru dalam pelaksanaan 'inovasi digital dalam pengajaran dan pembelajaran': 6C's competencies of pre-service teacher in implementation of 'digital innovation in teaching and learning.' *Journal of ICT in Education*, 9(2), 87–102. <https://doi.org/10.37134/jictie.vol9.2.7.2022>.
- Siregar, R. A. (2020). The Effective 21st-century Pedagogical Competence as Perceived by Pre-service English Teachers. *Pedagogy: Journal of English Language Teaching*, 8(1), 1. <https://doi.org/10.32332/pedagogy.v8i1.1953>.
- Sumarno. (2019). Pembelajaran kompetensi abad 21 menghadapi era Society 5.0. *Prosiding SEMDIKJAR (Seminar Nasional Pendidikan Dan Pembelajaran)*, 3, 272–287. <http://ojs.semdikjar.fkip.unpkediri.ac.id/index.php/SEMDIKJAR/article/view/28>.
- Syahputri, D., & Elfrianto. (2018). The Integrated Learning Model Type of "Connected" in Increasing The Students' Learning Creativity and Ability. *IJLRES - International Journal on Language, Research and Education Studies*, 2(1), 73–85. <https://doi.org/10.30575/2017/IJLRES-2018010406>.
- Tesi Muskania, R., & Wilujeng, I. (2017). Pengembangan Perangkat Pembelajaran Project-Based Learning

- Untuk Membekali Foundational Knowledge Dan Meningkatkan scientific literacy. *Jurnal Cakrawala Pendidikan*, 36(1), 34–43. <https://doi.org/10.21831/cp.v36i1.8830>.
- Tokmak, H. S., Baturay, H. M., & Fadde, P. (2013). Applying the context, input, process, product evaluation model for evaluation, research, and redesign of an online master's program. *International Review of Research in Open and Distance Learning*, 14(3), 273–293. <https://doi.org/10.19173/irrodl.v14i3.1485>.
- Wakid, M., Usman, T., & Sulistyono, B. (2020). Project based learning model to increase the competency of automotive engineering teachers candidates. *Journal of Physics: Conference Series*, 1700(1), 1–8. <https://doi.org/10.1088/1742-6596/1700/1/012063>.
- Warju. (2016). Educational Program Evaluation using CIPP Model. *Innovation of Vocational Technology Education*, 12(1), 36–42. <https://doi.org/10.17509/invotec.v12i1.4502>.
- Widiastuti, I. A. M. S., Murtini, N. M. W., & Anto, R. (2022). Brainstorming as an Effective Learning Strategy to Promote Students' Critical Thinking Skills. *Jurnal Pendidikan Progresif*, 12(2), 960–971. <https://doi.org/10.23960/jpp.v12.i2.202243>.
- Yildirim, S. (2017). Approaches of Designers in the Developed Educational Purposes of Infographics ' Design Processes. *European Journal of Education Studies*, 3(1), 248–284. <https://doi.org/10.5281/zenodo.231283>.
- Yu, T. X., & Wan Mohammad, W. M. R. (2019). Integration of 21st Century Learning Skills (4C Elements) in Interventions to Improve English Writing Skill Among 3K Class Students. *International Journal of Contemporary Education*, 2(2), 100. <https://doi.org/10.11114/ijce.v2i2.4498>.
- Yusri. (2018). The Effects of Problem Solving, Project-Based Learning, Linguistic Intelligence and Critical Thinking on the Students' Report Writing. *Advances in Language and Literary Studies*, 9(6), 21–26. <https://doi.org/http://dx.doi.org/10.7575/aiac.all.v.9n.6p.21>.