ISSN 1392-0340 (Print)
ISSN 2029-0551 (Online)
https://doi.org/10.15823/p.2023.152.1

**Pedagogika /** Pedagogy
2023, t. 152, Nr. 4, p. 5–27 / Vol. 152, No. 4, pp. 5–27, 2023

VYTAUTO DIDŽIOJO UNIVERSITETO ŠVIETIMO AKADEMIJA

# Project-Based Learning in Economics Learning: Can it Improve 21st Century Skills Through Online Learning?

**Muhammad Hasan[1*], Nur Arisah[2], Tuti Supatminingsih[3], Muhammad Imam Ma'ruf[4], Fayik Huril Aini[5], Nurdiana[6]**

1 State University of Makassar, Department of Economics Education, Faculty of Economics and Business, Jl. Raya Pendidikan, IDN-90222 Makassar, South Sulawesi, Indonesia, m.hasan@unm.ac.id
2 State University of Makassar, Department of Economics Education, Faculty of Economics and Business, Jl. Raya Pendidikan, IDN-90222 Makassar, South Sulawesi, Indonesia, nurarisah.fe@unm.ac.id
3 State University of Makassar, Department of Economics Education, Faculty of Economics and Business, Jl. Raya Pendidikan, IDN-90222 Makassar, South Sulawesi, Indonesia, tuti.supatminingsih@unm.ac.id
4 State University of Makassar, Department of Development Economics, Faculty of Economics and Business, Jl. Raya Pendidikan, IDN-90222 Makassar, South Sulawesi, Indonesia, muhammadimammaruf@unm.ac.id
5 State University of Malang, Department of Economics Education, Faculty of Economics and Business, Jl. Cakrawala, IDN-65145 Malang, East Java, Indonesia, aini.huril@gmail.com
6 State University of Makassar, Department of Economics Education, Faculty of Economics and Business, Jl. Raya Pendidikan, IDN-90222 Makassar, South Sulawesi, Indonesia, diana@unm.ac.id

**Annotation.** This study aims to examine the effect of PjBL in learning economics to improve 21st century skills through online learning in higher education. This research was conducted using a quantitative approach designed as explanatory research using structural equation modeling (SEM) as the analysis tool. The results showed that PjBL in learning economics can improve 21st century skills through online learning.

**Keywords:** *Project-Based Learning (PjBL), online learning, economics learning, 21st-century skills.*

## Introduction

The learning process is currently experiencing quite a challenge due to the COVID-19 outbreak that has hit almost the entire world (Pokhrel & Chhetri, 2021). Although various pieces of literature prior to the crisis showed that online learning was as good as offline

learning, the sudden transformation from a face-to-face context to online learning was fundamentally different from the planned online learning (Moser et al., 2021). The social restriction program to overcome the COVID-19 Pandemic requires changes in different social lives of the community, including in learning activities (Elzainy et al., 2020), including aspects of learning quality and student learning satisfaction (Saxena et al., 2021). Through its official circular letter, the Indonesian government provides instructions to educational institutions, so that teaching and learning activities carried out offline become online learning or distance learning. This pandemic condition demands making changes and adjustments quickly to implement distance learning with various obstacles and problems in the field (Cicha et al., 2021; Chao et al., 2022). The Dhawan study (2020) results in a state that despite the advantages of distance learning, there are problems that need to be resolved, including the quality of learning, cost-effectiveness, misuse of technology, and the attitudes of instructors, students, and administrators. Each affects the overall quality of distance learning as a product.

Furthermore, Rizaldi and Fatimah (2020) revealed the problems that occur in distance learning in Indonesia. If only issues relevant to distance learning in Indonesia were selected, they would include lack of multimedia instruction, learning insecurity, lack of feedback or contact with teachers, lack of support and services, lack of social interaction between students, lack of student training, teacher absence, and the rigidity of the regulations imposed by the University. As the main facilitator, the teacher has the most crucial role in the success or failure of the expected learning objectives (Brinkley-Etzkorn, 2020). Therefore, teachers must be responsive in making these adjustments amid various weaknesses and existing problems so that the desired learning objectives can be achieved, where current learning activities are directed so that students have 21st-century skills (Stehle & Peters-Burton, 2019; Valtonen et al., 2021).

The set of skills required for education and employment in the 21st century is called 21st century skills. Various experts and organizations have defined and systematized these skills within a framework. The Partnership for 21st Century Skills (P21, 2007) formulates three types of skills: learning skills (creativity and innovation; critical thinking and problem solving; communication and collaboration); literacy skills (information literacy; media literacy; ICT literacy); and life skills (flexibility and adaptability; initiative and self-direction; social and cross-cultural skills; productivity and accountability; leadership and responsibility). Meanwhile, the international Assessment and Teaching of 21st Century Skills (ATC21S) formulates ten skills that are grouped into four categories: ways of thinking (creativity and innovation; critical thinking, problem solving, and decision making; learning to learn and metacognition); ways of working (communication; collaboration); tools for work (information literacy; ICT literacy); and living in the world (citizenship; life and career skills; personal and social responsibility) (van Laar et al., 2020). The Organization for Economic Co-operation and Development (OECD) categorizes 21st century skills as information, communication, ethics, and social impact (Yoo,

2021). However, due to different definitions, numbers, and performance indicators, in this research, 21st century skills refer to communication, collaboration, critical thinking, and creativity because they show similarities in the conceptualization of 21st century skills among all those formulated by experts as well as organizations.

21st-century skills are skills needed in the 21st century in line with the development of digital technology, which is increasingly massive from year to year. Some research studies and reports have emerged in the last few decades that seek to identify the life, career, and learning skills that determine the skills needed to succeed in the 21st century (Greiff et al., 2015; Abualrob, 2019). 21st-century skills are categorized into several skills called the "Four Cs", namely critical thinking and solving problems, creativity, communicating well, and working collaboratively (van Laar, 2017; Çevik & Şentürk, 2019; Şentürk, 2021).

Considering effectiveness and efficiency, most Indonesian educational institutions conduct distance learning online (Asvial et al., 2021). When viewed from the educator's perspective, online learning provides new challenges for teachers to the whole process of teaching and learning activities seen from how to plan, implement, and complete (Amir et al., 2020). Teachers must make adjustments, including making appropriate plans by combining various techniques, models, and methods with online media to understand and evaluate whether the learning process applied is good enough to achieve the desired results (Huilcapi-Collantes, 2020).

In reality, both teachers and students have problems with distance learning. Many students complain because one of the reasons is that the internet network used to access online learning is very minimal. Many students are constrained by the poor network, so that they cannot access learning on time. At the same time, the obstacles experienced by teachers are that they have to use learning methods that are under online learning so that students can still learn as with offline teaching. The materials taught can be understood by students. Therefore, the teacher must act quickly with a limited time rather than the teaching continues, and students continue to learn and understand the material being taught. It is supported by research conducted by Uz and Uzun (2018), which states that teachers are required to minimize the weaknesses that exist in online learning and maximize their strengths by choosing the proper learning techniques and models to cultivate 21st-century skills.

The selection of a suitable learning model to grow 21st-century skills supported by media or platforms in online learning is a must (Kokotsaki et al., 2016). In this case, PjBL is a learning model that can be applied (Bell, 2010). This model is commonly used by teachers because being able to support practical learning activities and affects strengthens higher mastery (Grossman, 2019; Revelle, 2019). This model can also be applied using several media or applications and platforms that are increasingly sophisticated and easy to adapt to the need for the desired learning activity (Tsybulsky & Muchnik-Rozanov, 2019). PjBL provides opportunities for students to gain meaningful experience from assignments or projects given during the learning process (Younis et al., 2021). Students

have the opportunity to share ideas and explore themselves in an effort to solve their problems (Pan et al., 2021). In addition, PjBL can be designed for individual or group work that produces presentations or products as a result of learning activities (Gómez-Pablos et al., 2017). Learners participate actively in the learning process because the proposed project involves investigation to achieve it (Morales et al., 2013). PjBL encourages the practice of 21st century skills by investigating and solving complex challenges and problems (Bell, 2010). Therefore, PjBL can be effectively implemented as an effort to improve 21st-century skills. Several previous studies found that PjBL can develop students' 21st century skills, as found by Chiang and Lee (2016) and Changwong et al. (2018). More specifically, Papanikolaou and Boubouka (2010) found that PjBL was able to improve learning by means of students helping each other overcome difficulties.

Heo et al. (2010) found that the interactive process through online PjBL allows educators and students to share ideas and access information and resources with the wider community. Interactive activities through online learning allow educators and students to share ideas and access teaching material information in a wider environment. Kivunja (2015) illustrates that online learning provides a way to communicate with students who have grown up in a different digital technology environment than face-to-face learning in the classroom. There are various information technology-based media or platforms supporting PjBL that can support online learning activities, such as Zoom meetings, Google Meet, Learning Management Systems (LMS), and various other platforms.

PjBL can also support developing 21st-century skills for students, as Guo et al. (2020) explained that PjBL gives students time to learn science specifically or externally in the 21st century. The application of PjBL varies, and depending on the material, the project must be feasible according to the level of student opinion and choice and must be carefully planned, managed, and assessed to relate to 21st-century skills so that students are of good quality.

Based on the assumption that PjBL can help students form 21st century skills through online learning, we ask the research question: *How can PjBL in economics learning improve 21st century skills through online learning?* The results of the research will expand educators' understanding of the impact of implementing online PjBL in economic learning so that they can improve 21st century skills.

## Literature Review

### *Project-Based Learning* (PjBL)

PjBL is designed to assist students in learning concepts of knowledge and problem-solving skills by connecting problem situations in the real world (Oguz-Unver

& Arabacioglu, 2014). It is a unique feature as well as a differentiator between PjBL and other approaches. Meanwhile, according to the Directorate General of Higher Education (Du et al., 2013), PjBL is learning that utilizes problems so that students must disburse/extract information to solve the problem. So it can be concluded that the PjBL learning model is a model that focuses on real experience to be able to solve problems and connects problem situations that exist in the real world to start learning (Zwaal, 2015).

The PjBL learning model makes students actively involved in the learning process (Ball et al., 2016). The PjBL learning model is a learning process that uses a systematic approach to solve problems or face challenges that will be needed in real life (Amir et al., 2020). PjBL is also interpreted as a learning model that challenges students to learn, work together, and find solutions to real problems (Kim et al., 2019). Student development occurs in cognitive aspects and affective and psychomotor aspects through internal appreciation and problems faced (Parrado-Martínez & Sánchez-Andújar, 2020). It is in line with Amir (2020) that PjBL learning has learning characteristics starting from giving problems, usually problems related to the real world, learning in groups actively formulating problems and identifying their knowledge gaps, studying and finding their own material related to problems, and reporting the solution to the problem.

The PjBL learning model is formed based on very innovative learning theories (e.g., constructivism and experiential learning) (Oguz-Unver & Arabacioglu, 2014) by managing problems involving various disciplines to get the right solution. PjBL is one way that lecturers can help students become competent in solving problems and facing future challenges so that PjBL can equip students with 21st-century skills (Gürsoy, 2021). The responsibility of the teachers in PjBL comprises the following: encouraging critical thinking, fostering self-directed learning, monitoring group processes, and creating a learning environment that stimulates group members, generates thorough understanding, and promotes teamwork (Kłeczek, 2020).

Based on previous research, the PjBL model can improve critical thinking, communication, creativity, and collaboration skills in the learning process. The PjBL model supports students' creative abilities because it provides new ideas and applies them to solving problems based on the results of critical and creative thinking, and it can create effective collaboration and communication in learning by producing products from the projects carried out.

Almulla (2020) states that PjBL can develop students' 21st-century skills because PjBL can connect theory and practice and develop competencies such as problem-solving, communication, collaboration skills both online and offline learning. This online-based PjBL is implemented according to PjBL steps but is based online. Learning is carried out using Google Classroom and Google Meet and WhatsApp Groups. Through PjBL, students have a positive perception of their learning environment, are more confident and skilled in problem-solving, have a positive attitude towards lifelong learning, and have better processing skills.

**$H_1$** = PjBL in economics learning has a direct and significant effect on 21st-century skills.

**$H_2$** = PjBL in economics learning has a direct and significant effect on online learning.

### *Online Learning*

Online learning uses the internet network with accessibility, connectivity, flexibility, and the ability to bring up various learning interactions (Valverde-Berrocoso et al., 2020). Research conducted by Al-Rahmi et al. (2019) shows that using the internet and multimedia technology can change how knowledge is delivered and can be an alternative to learning carried out in traditional classrooms. Comi et al. (2017) stated that students must learn several technical skills, such as posting discussions, attaching documents, and accessing online whiteboards in online classes. Building online learning communities has online community building has become an important element of innovation in higher education (Guo et al., 2020), it can teach independence and basic computer skills regardless of what course they take. Through online courses, students learn more than just the curriculum. They know other valuable things related to skills that can prepare them for the 21st century.

**$H_3$** = Online learning has a direct and significant effect on 21st-century skills.

### *21st Century Skills*

The characteristics of the 21st century will produce the character of 21st-century learning. In the learning process, 21st-century skills are known as the "Four C's" skills, namely critical thinking and solving problems, creativity, being able to communicate well, and working collaboratively entirely through a virtual environment.

Several previous studies argue that PjBL can improve 21st century skills through online learning (Uz & Uzun, 2018; Huilcapi-Collantes, 2020). PjBL through online learning can train students to think at a higher level, be independent in their learning, and master the latest information technology. Heo et al. (2010) found that the interactive process through online PjBL allows educators and students to share ideas and access information and resources with the wider community. Interactive activities through online learning allow educators and students to share ideas and access teaching material information in a wider environment. Kivunja (2015) illustrates that online learning provides a way to communicate with students who have grown up in a different digital technology environment than face-to-face learning in the classroom.

Kivunja (2015) PjBL mediated through online learning allows educators and students to have an interactive process by sharing ideas and accessing information. Interactive activities through online learning enable educators and students to share ideas and access information on teaching materials in a wider environment, so that there is a process of exploring knowledge and being directly involved in acquiring knowledge that forms 21st century skills.

Analysis carried out on several previous studies found that PjBL has an influence on improving 21st century skills through online learning mediation. Some of these findings show that PjBL through online learning can improve students' creative thinking abilities (Chen et al., 2022), students' metacognitive behavior (Yilmaz & Baydas, 2017), and students' problem-solving abilities (Zhang & Hwang, 2023).

$\mathbf{H_4}$ = PjBL in economics learning has indirect and significant effects on 21st-century skills through online learning.

## Methods

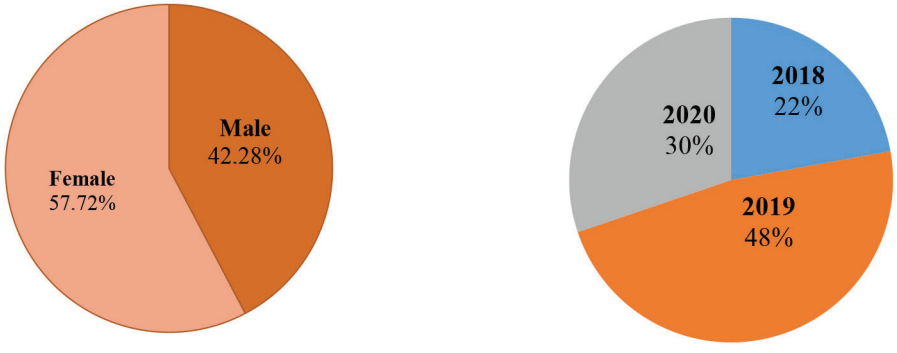
### *Research Design*

This study uses a quantitative approach to describe research results on how the PjBL model's influence on economic learning improves 21st-century skills through online learning. Based on these objectives, this study is focused on explanatory research. Then the data is processed using SEM because it can measure variables that cannot be measured directly but through indicators. Based on these research variables, a research paradigm model related to PjBL, online learning, and 21st century skills can be seen in the appendix.

### *Population and Sample*

The population in this study is all students who are active in the Economics Education Study Program FEB UNM starting from 2018, 2019, and 2020 classes registered in the odd semester of the 2020/2021 academic year, totaling 353 students. While the sample is millennial generation students spread across the 2018 and 2020 batches, the Economic Education Study Program FEB UNM has as many as 149 students using proportional random sampling using the Slovin formula in determining the sample. In detail, the research respondents are as follows.

**Figure 1**
*Respondent Based on Gender and Batch Year*



Based on Figure 1, the respondents based on gender are divided into 2, namely, male, with as many as 63 students, amounting to 42.28%, and female, with as many as 86 students, amounting to 57.72%. Meanwhile, the respondents based on the batch year were divided into 3, namely, the 2018 batch of 33 students by 22%, the 2019 batch of 71 students by 48%, and the 2020 batch of 45 students by 30%.

### *Instrument*

The instrument used in this research was developed based on theoretical indicators from several previous studies related to the variables studied. Indicators of PjBL variables according to Bell (2010) are (1) constructive learning, (2) independent learning, (3) collaborative learning, and (4) contextual learning. Online learning that is supported by media or platforms, namely teaching and learning activities centered on technology with measurement standards: (1) familiar, (2) easy to use and used as a communication tool, and (3) free (Dhawan, 2020). Meanwhile, 21st-century skills are categorized into several skills called the "Four Cs", namely critical thinking and solving problems, creativity, being able to inform well, and working collaboratively (van Laar, 2017; Çevik & Şentürk, 2019). This study uses a closed questionnaire that has prepared four answer choices with a weighted score of each measured on an interval scale (value 4 = Strongly agree, value 3 = Agree, value 2 = disagree, and value 1 = Strongly disagree). These answer choices represent students' experiences taking PjBL online.

### *Validity Test and Reliability Test of Instrument*

To ensure that the instruments in this study can be used in data collection, validity and reliability tests were carried out on the instruments used. Tests were carried out using the SPSS 20.0 for Windows program. The rule of decision for the validity test is that if the result of $t_{\text{statistic}}$ has a value equal to or greater than the value of t table (t statistic ≥ t table), then the instrument is declared valid, and vice versa. The results of the item validity test of the PjBL instrument are as follows:

**Table 1**
*Result of Validity Test of PjBL Instrument*

| Item Number | r statistic | r table | Result |
|---|---|---|---|
| 1. | 0.451 | 0.324 | Valid |
| 2. | 0.652 | 0.324 | Valid |
| 3. | 0.742 | 0.324 | Valid |
| 4. | 0.736 | 0.324 | Valid |
| 5. | 0.784 | 0.324 | Valid |
| 6. | 0.854 | 0.324 | Valid |
| 7. | 0.729 | 0.324 | Valid |
| 8. | 0.435 | 0.324 | Valid |

| Item Number | r statistic | r table | Result |
|---|---|---|---|
| 9. | 0.865 | 0.324 | Valid |
| 10. | 0.541 | 0.324 | Valid |
| 11. | 0.743 | 0.324 | Valid |
| 12. | 0.793 | 0.324 | Valid |
| 13. | 0.421 | 0.324 | Valid |
| 14. | 0.693 | 0.324 | Valid |
| 15. | 0.911 | 0.324 | Valid |
| 16. | 0.524 | 0.324 | Valid |
| 17. | 0.419 | 0.324 | Valid |
| 18. | 0.666 | 0.324 | Valid |
| 19. | 0.463 | 0.324 | Valid |
| 20. | 0.851 | 0.324 | Valid |

Source: Computed Data (2021)

In the calculation of the validity of the PjBL instrument, it was found that all instrument items were included in the valid category, and all items deserved to be used as instrument questions in the study. The results of the item validity test of the online learning instrument are as follows:

**Table 2**

*Result of Validity Test of Online Learning*

| Item Number | r statistic | r table | Result |
|---|---|---|---|
| 1. | 0.842 | 0.324 | Valid |
| 2. | 0.693 | 0.324 | Valid |
| 3. | 0.359 | 0.324 | Valid |
| 4. | 0.525 | 0.324 | Valid |
| 5. | 0.754 | 0.324 | Valid |
| 6. | 0.856 | 0.324 | Valid |
| 7. | 0.723 | 0.324 | Valid |
| 8. | 0.581 | 0.324 | Valid |
| 9. | 0.742 | 0.324 | Valid |
| 10. | 0.843 | 0.324 | Valid |
| 11. | 0.837 | 0.324 | Valid |
| 12. | 0.871 | 0.324 | Valid |
| 13. | 0.740 | 0.324 | Valid |
| 14. | 0.811 | 0.324 | Valid |
| 15. | 0.690 | 0.324 | Valid |

Source: Computed Data (2021)

The calculation of the online learning instrument validity test showed that all instrument items were included in the valid category, and all items deserved to be used as instrument questions in research. The results of the test of the validity of the 21st-century skill instrument items are as follows.

**Table 3**
*Result of Validity Test of 21st Skills*

| Item Number | r statistic | r table | Result |
|---|---|---|---|
| 1. | 0.701 | 0.324 | Valid |
| 2. | 0.592 | 0.324 | Valid |
| 3. | 0.711 | 0.324 | Valid |
| 4. | 0.563 | 0.324 | Valid |
| 5. | 0.782 | 0.324 | Valid |
| 6. | 0.854 | 0.324 | Valid |
| 7. | 0.393 | 0.324 | Valid |
| 8. | 0.832 | 0.324 | Valid |
| 9. | 0.751 | 0.324 | Valid |
| 10. | 0.771 | 0.324 | Valid |
| 11. | 0.792 | 0.324 | Valid |
| 12. | 0.840 | 0.324 | Valid |
| 13. | 0.392 | 0.324 | Valid |
| 14. | 0.732 | 0.324 | Valid |
| 15. | 0.901 | 0.324 | Valid |
| 16. | 0.922 | 0.324 | Valid |
| 17. | 0.400 | 0.324 | Valid |
| 18. | 0.419 | 0.324 | Valid |
| 19. | 0.832 | 0.324 | Valid |
| 20. | 0.933 | 0.324 | Valid |

Source: Computed Data (2021)

In the results of the calculation of the validity test of the 21st-century skill instrument, it was found that all instrument items were included in the valid category, and all items deserved to be used as instrument questions in the study. The next step is to perform a reliability test to measure the reliability of the questionnaire used, and the Cronbach Alpha coefficient is used to analyze the instrument's reliability. The test results showed that all statement items for each variable used in this study were reliable.

**Table 4**

*Summary of Reliability Test of Instrument*

| No. | Variables | Cronbach's Alpha | Result |
|---|---|---|---|
| 1. | Project-Based Learning | 0.892 | Reliable |
| 2. | Online Learning | 0.846 | Reliable |
| 3. | 21st Century Skills | 0.819 | Reliable |

Source: Computed Data (2021)

### *Data Analysis*

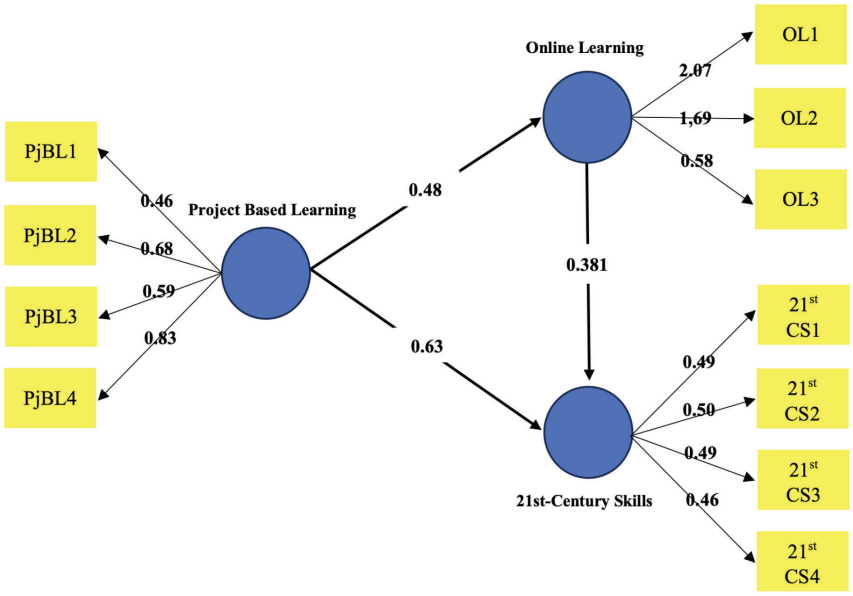
The data analyzed in this study are descriptive. Data were analyzed using Structural Equation Modeling (SEM) to analyze a series of relationships between latent variables and manifest variables simultaneously.

## Result and Discussion

After processing the data using Structural Equation Modeling (SEM), the structural model that shows the relationship between the three latent variables, namely PjBL, online learning, and 21st-century skills in this study, which is equipped with the manifests that construct it, is as follows:

**Figure 2**

*Structural Model Fit*



The picture of the structural model fit shows that the suitability requirements have been met according to the criteria. It can be shown by the significance of the effect of the independent variable on the dependent variable. The fulfillment of the structural model criteria can be seen as follows.

**Table 5**
*Structural Model Fit*

| GOF | Coefficient | Criteria | Result |
|---|---|---|---|
| Chi-square ($X^2$) | 62.58 | Small (nonsignificant) | Fit |
| P-Value | 0.63 | ≥0.05 | Fit |
| Df | 67 | - | |
| Cmin ($X^2$/Df) | 0.954 | ≤2.00 | Fit |
| RMR (standardized) | 0.05 | ≤0.08 | Fit |
| RMSEA | 0.00 | ≤0.08 | Fit |
| GFI | 0.99 | ≥0.90 | Fit |
| AGFI | 0.99 | ≥0.90 | Fit |
| CFI | 0.99 | ≥0.94 | Fit |
| IFI | 0.99 | ≥0.94 | Fit |
| NNFI or TLI | 0.99 | ≥0.94 | Fit |
| AIC (Model) | 97.26 | Small, relative | Fit |

Source: Computed Data (2021)

Based on Table 5, it states that the suitability of the structural model has met the criteria and can be seen in the coefficient values and in the information that has been met. Based on the table of coefficients that have met the standard criteria. The lambda coefficient (λ), Composite Reliability (CR), and Average Variance Extracted (AVE) of each manifest variable that constructs the independent, dependent, and intervening variables are as follows.

**Table 6**
*Manifest Based on Structural Model Construct*

| No. | Variables | Manifest | λ | CR | AVE |
|---|---|---|---|---|---|
| 1 | PjBL | X1 | 0.46 | 0.792 | 0.623 |
| | | X2 | 0.68 | | |
| | | X3 | 0.59 | | |
| | | X4 | 0.83 | | |

| No. | Variables | Manifest | λ | CR | AVE |
|---|---|---|---|---|---|
| 2 | OL | Z1 | 0.87 | 0.870 | 0.689 |
| | | Z2 | 0.88 | | |
| | | Z3 | 0.98 | | |
| 3 | 21st CS | Y1 | 0.49 | 0.749 | 0.593 |
| | | Y2 | 0.50 | | |
| | | Y3 | 0.49 | | |
| | | Y4 | 0.46 | | |

Source: Computed Data (2021)

Based on Table 6, it shows that the manifest based on the structural model construct has met the standard criteria as seen in the lambda coefficient (λ), composite reliability (CR), and average variance extracted (AVE) of each manifest variable that constructs the independent, dependent, and intervening variables. The variable indicators that construct the three latent variables meet the validity criteria; this can be shown by the nominal standard loading (λ 0.40) and nominal R2.

Following the analysis and structural model results in Table 7, the coefficients of direct and indirect effects between variables can be described.

**Table 7**

*Result of Direct and Indirect Effect Between Variables*

| No. | Test | Coefficients | | | t-value | Result |
|---|---|---|---|---|---|---|
| | | Direct | Indirect | Total | | |
| 1. | PjBL → 21st CS | 0.485 | - | 0.485 | 6.01 | Significant |
| 2. | PjBL → OL | 0.639 | - | 0.639 | 12.26 | Significant |
| 3. | OL → 21st CS | 0.381 | - | 0.381 | 4.37 | Significant |
| 4. | PjBL → OL → 21st CS | 0.000 | 0.185 | 0.185 | 2.29 | Significant |

Source: Computed Data (2021)

Based on Table 7, the results on the total direct and indirect effects explain that in hypothesis 1, PjBL in economics learning has a direct effect on 21st century skills with a value of 0.485, or 48.5%. Hypothesis 2 states that PjBL in economics learning has a direct effect on online learning with a value of 0.639, or 63.9%. Hypothesis 3 states that online learning has a direct effect on 21st century skills with a value of 0.381, or 38.1%. Finally, hypothesis 4 states that PjBL in economics learning has an indirect effect on 21st century skills through online learning with a value of 0.185, or 18.5%.

### *PjBL in Economics Learning Effects 21st Century Skills*

PjBL in economics learning directly and significantly affects 21st-century skills by 48.5% in Economic Education Study Program students, FEB UNM. A study conducted by Grossman (2019) proves that project-based learning facilitates student growth in 21st-century skills. This finding is also supported by other research, such as Du et al. (2013), Parrado-Martínez and Sánchez-Andújar (2020), and Gürsoy (2021).

The learning steps in the PjBL model, which consist of selecting questions or giving assignments, designing assignments, and determining the time, are definite steps from an assignment, testing results to evaluating activities or experiences that strongly support students to develop the skills needed in the 21st century. In this model, students are encouraged to think critically in solving problems, work together, and communicate with peers to produce good projects. They can provide challenges for student creativity to innovate to produce a project by the criteria or standards required by the teacher to master or understand a concept or material in learning and solve the problems that exist in it (Guo et al., 2020).

Learning outcomes in PjBL are not always the result of the student's own thinking, but there is a process involved in planning, processing, and completing a task. PjBL provides students with experience, how students can play an active role and can work together in the learning process, and provides skills that they can apply in the outside world or the world of work (Dauletova, 2014).

### *PjBL in Online Learning*

PjBL in economics learning has a direct and significant effect on online learning by 63.9% for students of the Economic Education Study Program FEB UNM. This finding is also supported by other research, such as Almulla (2020) and Kłeczek (2020). During the COVID-19 Pandemic, teachers need to use a meaningful learning model that is effective if applied using online learning media during the learning period from home. PjBL is a learning that is widely applied. The reason is that the PjBL model is an innovative learning model linked to students; they are required to act more actively and independently in learning activities while the teacher is tasked with directing or assisting students. Limitations in learning activities that use online media make greater demands on students in terms of activeness and learning independence when compared to face-to-face learning. PjBL is one model of learning activities that can support learning from home or online because students can be encouraged to collaborate, be independent, explore, and innovate (Mohamadi, 2018).

Many media or online platforms are suitable and can be used to support teaching and learning activities based on giving assignments to students while learning is still being done at home. The media or platform must meet the criteria, including being familiar, having a low level of difficulty, as being a free liaison between teachers and students, free of charge, and being able to review networks, the state of the economy, and the location

of the understanding ability of students and teachers in using technology in learning activities. Facilities or devices are used because PjBL in learning activities is a method of teaching and learning activities that have a complex period, and each task between students and teachers has been divided, where students focus on completing the final project while the teacher is tasked with assisting students in completing the task in the form of a project. Various applications support online learning activities that can be used, such as Google Drive, Google Form, Google Site, Google Classroom, Gmail, and Video Conferencing Media (Tsybulsky & Muchnik-Rozanov, 2019).

### *The Effect of Online Learning on 21st Century Skills*

Online learning directly and significantly affects 21st-century skills by 38.1% in Economic Education Study Program students, FEB UNM. This finding is also supported by other research, such as Comi et al. (2017), Al-Rahmi et al. (2019), and Guo et al. (2020). Online learning can familiarize students with independence in learning. Through this habit of learning independence, students can further improve and develop communication, collaboration, critical thinking, and creative skills. Comi et al. (2017) stated that students must learn technical skills such as posting discussions, attaching documents, and accessing online whiteboards in online classes. It can teach independence and basic computer skills regardless of what class they take. Through online classes, students learn more than just the curriculum. They learn other valuable things related to skills that can prepare them for the 21st century.

In a global society, there is an innate need for students to become proficient in each of the "Four C's" areas, namely critical thinking and problem-solving, creativity, being able to inform well, and working collaboratively entirely through a virtual environment. Thanks to extensive innovations in technology, it is now easier to embed and incorporate 21st-century skills. Online learning participants can leverage technology to become effective problem solvers, collaborators, communicators, and creators (Francese et al., 2015) in their current field of study and the challenges that lie beyond. The use of such technology suggests that not only can students learn from anywhere without losing the aspect of the classroom with seating, but the virtual classroom experience may have more to offer in terms of achieving and retaining essential skills in the 21st century (Riegel & Kozen, 2016).

Francese et al. (2015) state that virtual educational institutions provide access to an online, collaborative, and independent learning environment that is a unified system setting to facilitate 21st-century skills. Today's students must be able to combine these skills with the effective use of technology to succeed in current and future jobs. In this case, an important issue that must be considered is the unity of the system or factors that significantly influence success in training 21st-century skills through online learning. Many factors or systems influence, but the ones that have the most influence are three things: the level of mastery of knowledge and skills of teachers regarding the latest online

learning technology and innovations that can be done and appropriate online learning techniques and media. If teachers have good mastery and innovation in online learning technology supported by appropriate learning techniques and media, then success in 21st-century skills can be achieved.

### *PjBL in Economics Learning can Effect 21st Century Skills Through Online Learning*

PjBL in economics learning has an indirect effect on 21st Century Skills through online learning for 18.5% of students of the Economic Education Study Program FEB UNM. This finding is also supported by other research, such as Uz & Uzun (2018), Huilcapi-Collantes (2020), Chen et al. (2022), and Zhang and Hwang (2023).

An effective learning model in order to advance 21st century skills, one of which is PjBL. PjBL is a constructive learning model that is also suitable if applied using online learning media (Francese et al., 2015; Pan et al., 2021; Beneroso & Robinson, 2022).

PjBL measures that are flexible and require students' independence and active learning can be effectively carried out through various applications or platforms available in online learning. Technological advances in this era are directly proportional to the number of applications and platforms that are increasingly sophisticated and easy to adapt to the needs of the desired learning activities. The stages of preparing questions or project assignments to test and evaluating can be done quickly with synchronous or asynchronous communication technology. Synchronous communication technology is a collaborative technology that involves students and teachers who can participate simultaneously (real-time). In contrast, asynchronous communication can support working relationships and communication between students and teachers, even when students cannot reach applications simultaneously with other students (Kokotsaki et al., 2016; Platz, 2022*).* Thus, students will get a meaningful learning experience in PjBL learning and get convenience in learning activities wherever and whenever.

PjBL learning through online learning can improve students' 21st-century skills. Several previous reviewers who have conducted research argue that PjBL can improve students' 21st century skills. This is because PjBL can connect several theories and practices to enhance their competencies, such as being able to solve various problems, communicate, and collaborate (Uz & Uzun, 2018; Huilcapi-Collantes, 2020).

PjBL through online learning can train students in higher-order thinking and independence in learning, and mastery of the latest information technology. In this case, the skills to communicate, collaborate, think critically, be creative through the resulting project can be adequately and effectively trained. So that the skills needed by students in the 21st century can develop and improve effectiveness.

## Conclusion

The findings of this research show that PjBL in economics learning has a direct and significant effect on 21st century skills. Other results also show that PjBL in economics learning has a direct and significant effect on online learning. Online learning also has a direct and significant effect on the formation of 21st century skills, and PjBL in economics learning has an indirect and significant effect on 21st century skills through online learning.

These results show that economics learning carried out online can form 21st-century skills. This has implications for the importance of educators' understanding and mastery in implementing PjBL because PjBL can be used as one of the most effective alternative models of teaching and learning activities for improving students' 21st century skills, even though it is implemented through online learning. It is hoped that future researchers will use a more diverse sample to further enrich future research findings related to online learning and 21st century skills.

## References


Abualrob, M. M. (2019). The role of science teachers in developing the 21st century skills for the elementary school students. *Interdisciplinary Journal of Environmental and Science Education*, *15*(1), e02206. https://doi.org/10.29333/ijese/6368

Al-Rahmi, W., Aldraiweesh, A., Yahaya, N., Kamin, Y. B., & Zeki, A. M. (2019). Massive open online courses (MOOCs): Data on higher education. *Data in Brief*, *22*, 118–125. https://doi.org/10.1016/j.dib.2018.11.139

Almulla, M. A. (2020). The effectiveness of the project-based learning (PBL) approach as a way to engage students in learning. *SAGE Open*, *10*(3). https://doi.org/10.1177/2158244020938702

Amir, L. R., Tanti, I., Maharani, D. A., Wimardhani, Y. S., Julia, V., Sulijaya, B., & Puspitawati, R. (2020). Student perspective of classroom and distance learning during COVID-19 pandemic in the fundergraduate dental study Program Universitas Indonesia. *BMC Medical Education*, *20*(392), 1–8. https://doi.org/10.1186/s12909-020-02312-0

Asvial, M., Mayangsari, J., & Yudistriansyah, A. (2021). Behavioral intention of e-learning: A case study of distance learning at a junior high school in Indonesia due to the COVID-19 pandemic. *International Journal of Technology*, *12*(1), 54–64. https://doi.org/10.14716/ijtech.v12i1.4281

Chao, C. T., Tsai, C. L., Lin, M. W., Yang, C. W., Ho, C. C., Chen, H. L., Hsu, C., & Sheu, B. C. (2022). Fully digital problem-based learning for undergraduate medical students during the COVID-19 period: Practical considerations. *Journal of the Formosan Medical Association = Taiwan yi zhi*, *121*(10), 2130–2134. https://doi.org/10.1016/j.jfma.2021.11.011

Ball, A., Joyce, H. D., & Anderson-Butcher, D. (2016). Exploring 21st century skills and learning environments for middle school youth. *International Journal of School Social Work*, *1*(1), 1–15. https://doi.org/10.4148/2161-4148.1012

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House*, *83*(2), 39–43. http://www.jstor.org/stable/20697896

Beneroso, D., & Robinson, J. (2022). Online project-based learning in engineering design: Supporting the acquisition of design skills. *Education for Chemical Engineers*, *38*(2022), 38–47. https://doi.org/10.1016/j.ece.2021.09.002

Brinkley-Etzkorn, K. E. (2020). The effects of training on instructor beliefs and attitudes toward online teaching. *American Journal of Distance Education*, *34*(1), 19–35. https://doi.org/10.1080/08923647.2020.1692553

Çevik, M., & Şentürk, C. (2019). Multidimensional 21st century skills scale: Validity and reliability study. *Cypriot Journal of Educational Science*, *14*(1), 11–28. https://doi.org/10.18844/cjes.v14i1.3506

Changwong, K., Sukkamart, A., & Sisan, B. (2018). Critical thinking skill development: Analysis of a new learning management model for Thai high schools. *Journal of International Studies*, *11*(2), 37–48. https://doi.org/10.14254/2071-8330.2018/11-2/3

Chen, S. Y., Lai, C. F., Lai, Y. H., & Su, Y. S. (2022). Effect of project-based learning on development of students' creative thinking. *International Journal of Electrical Engineering and Education*, *59*(3), 232–250. https://doi.org/10.1177/0020720919846808

Chiang, C. L., & Lee, H. (2016). The effect of project-based learning on learning motivation and problem-solving ability of vocational high school students. *International Journal of Information and Education Technology, 6(*9), 709–712. https://doi.org/10.7763/ijiet.2016.v6.779

Cicha, K., Rizun, M., Rutecka, P., & Strzelecki, A. (2021). COVID-19 and higher education: First-year students' expectations toward distance learning. *Sustainability*, *13*(4), 1–20. https://doi.org/10.3390/su13041889

Comi, S. L., Argentin, G., Gui, M., Origo, F., & Pagani, L. (2017). Is it the way they use it? Teachers, ICT and student achievement. *Economics of Education Review*, *56*(1), 24–39. https://doi.org/10.1016/j.econedurev.2016.11.007

Dauletova, V. (2014). Expanding Omani learners' horizons through project-based learning: A case study. *Business and Professional Communication Quarterly*, *77*(2), 183–203. https://doi.org/10.1177/2329490614530553

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, *49*(1), 5–22. https://doi.org/10.1177/0047239520934018

Du, X., Su, L., & Liu, J. (2013). Developing sustainability curriculausing the PBL method in a Chinese context. *Journal of Cleaner Production*, *61*(2013), 80e88. http://dx.doi.org/10.1016/j.jclepro.2013.01.012

Elzainy, M. D. A., El Sadik, M. D. A., & Al Abdulmonem, W. (2020). Experience of e-learning and online assessment during the COVID-19 pandemic at the College of Medicine, Qassim

University. *Journal of Taibah University Medical Sciences*, *15*(6), 456–462. https://doi.org/10.1016/j.jtumed.2020.09.005

Francese, R., Gravino, C., Risi, M., Scanniello, G., & Tortora, G. (2015). Using project-based-learning in a mobile application development course an experience report. *Journal of Visual Languages & Computing*, *31*(1), 196–205. https://doi.org/10.1016/j.jvlc.2015.10.019

Gómez-Pablos, V. B., del Pozo, M. M., & Muñoz-Repiso, A. G. V. (2017). Project-based learning (PBL) through the incorporation of digital technologies: An evaluation based on the experience of serving teachers. *Computers in Human Behavior*, *68*, 501–512. https://doi.org/10.1016/j.chb.2016.11.056

Greiff, S., Niepel, C., & Wüstenberg, S. (2015). 21st century skills: International advancements and recent developments. *Thinking Skills and Creativity*, *18*(1), 1–3. https://doi.org/10.1016/j.tsc.2015.04.007

Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International Journal of Educational Research*, *102*(1), 101586. https://doi.org/10.1016/j.ijer.2020.101586

Grossman, P., Dean, C. G. P., Kavanagh, S. S., & Herrmann, Z. (2019). Preparing teachers for project-based teaching. *Phi Delta Kappan*, *100*(7), 43–48. https://doi.org/10.1177/0031721719841338

Gürsoy, G. (2021). Digital storytelling: Developing 21st century skills in science education. *European Journal of Educational Research*, *10*(1), 97–113. https://doi.org/10.12973/eu-jer.10.1.97

Heo, H., Lim, K. Y., & Kim, Y. (2010). Exploratory study on the patterns of online interaction and knowledge co-construction in project-based learning. *Computers and Education*, *55*(3), 1383–1392. https://doi.org/10.1016/j.compedu.2010.06.012

Huilcapi-Collantes, C., Hernández Martín, A., & Hernández-Ramos, J. P. (2020). The effect of a blended learning course of visual literacy for inservice teachers. *Journal of Information Technology Education: Research*, *19*(1), 131–166. https://doi.org/10.28945/4533

Kim, S., Raza, M., & Seidman, E. (2019). Improving 21st-century teaching skills: The key to effective 21st-century learners. *Research in Comparative and International Education*, *14*(1), 99–117. https://doi.org/10.1177/1745499919829214

Kivunja, C. (2015). Exploring the pedagogical meaning and implications of the 4Cs "super skills" for the 21st century through Bruner's 5E lenses of knowledge construction to improve pedagogies of the new learning paradigm. *Creative Education*, *6*(2), 224–239. https://doi.org/10.4236/ce.2015.62021

Kłeczek, R., Hajdas, M., & Wrona, S. (2020). Wicked problems and project-based learning: Value-in-use approach. *The International Journal of Management Education, 18*(2020), 100324. https://doi.org/10.1016/j.ijme.2019.100324

Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, *19*(3), 267–277. https://doi.org/10.1177/1365480216659733

Mohamadi, Z. (2018). Comparative effect of project-based learning and electronic project-based learning on the development and sustained development of english idiom knowledge. *Journal of Computing in Higher Education*, *30*(1), 363–385. https://doi.org/10.1007/s12528-018-9169-1

Morales, T. M., Bang, E., & Andre, T. (2013). A one-year case study: Understanding the rich potential of project-based learning in a virtual reality class for high school students. *Journal of Science Education and Technology*, *22*, 791–806. https://doi.org/10.1007/s10956-012-9431-7

Moser, K. M., Wei, T., & Brenner, D. (2021). Remote teaching during COVID-19: Implications from a national survey of language educators. *System, 97*(1), 102431. https://doi.org/10.1016/j.system.2020.102431

Oguz-Unver, A., & Arabacioglu, S. (2014). A comparison of inquiry-based learning (IBL), problem-based learning (PBL) and project-based learning (PJBL) in science education. *Academia Journal Educational Research*, *2*, 120–128. https://doi.org/10.15413/ajer.2014.0129

Pan, G., Shankararaman, V., Koh, K., & Gan, S. (2021). Students' evaluation of teaching in the project-based learning programme: An instrument and a development process. *International Journal of Management Education*, *19*(2), 100501. https://doi.org/10.1016/j.ijme.2021.100501

Papanikolaou, K., & Boubouka, M. (2010). Promoting collaboration in a project-based e-learning context. *Journal of Research on Technology in Education*, *43*(2), 135–155. https://doi.org/10.1080/15391523.2010.10782566

Parrado-Martínez, P., & Sánchez-Andújar, S. (2020). Development of competences in postgraduate studies offinance: A project-based learning (PBL) case study. *International Review of Economics Education*, *35*(2020), 100192. https://doi.org/10.1016/j.iree.2020.100192

Platz, L. (2022). Learning with serious games in economics education a systematic review of the effectiveness of game-based learning in upper secondary and higher education. *International Journal of Educational Research*, *11*, 10203. https://doi.org/10.1016/j.ijer.2022.102031

Pokhrel, S., & Chhetri, R. (2021). A literature review on impact of COVID-19 pandemic on teaching and learning. *Higher Education for the Future*, *8*(1), 133–141. https://doi.org/10.1177/2347631120983481

Revelle, K., Z. (2019). Teacher perceptions of a project-based approach to social studies and literacy instruction. *Teaching and Teacher Education*, *84*(2019), 95e105. https://doi.org/10.1016/j.tate.2019.04.016

Riegel, C., & Kozen, A. (2016). Attaining 21st century skills in a virtual classroom. *Educational Planning*, *23*(1), 41–55. http://isep.info/educational-planning-journal

Rizaldi, D. R., & Fatimah, Z. (2020). How the distance learning can be a solution during the COVID-19 pandemic. *International Journal of Asian Education*, *1*(3), 117–124. https://doi.org/10.46966/ijae.v1i3.42

Saxena, C., Baber, H., & Kumar, P. (2021). Examining the moderating effect of perceived benefits of maintaining social distance on e-learning quality during COVID-19 pandemic. *Journal of Educational Technology Systems*, *49*(4), 532–554. https://doi.org/10.1177/0047239520977798

Şentürk, C. (2021). Effects of the blended learning model on preservice teachers' academic achievements and twenty-first century skills. *Education and Information Technologies*, *26*(1), 35–48. https://doi.org/10.1007/s10639-020-10340-y

Stehle, S. M., & Peters-Burton, E. E. (2019). Developing student 21st Century skills in selected exemplary inclusive STEM high schools. *International Journal of STEM Education*, *6*(39). 1–15. https://doi.org/10.1186/s40594-019-0192-1

Tsybulsky, D., & Muchnik-Rozanov, Y. (2019). The development of student-teachers' professional identity while team-teaching science classes using a project-based learning approach: A multi-level analysis. *Teaching and Teacher Education*, *79*(1), 48–59. https://doi.org/10.1016/j.tate.2018.12.006

Uz, R., & Uzun, A. (2018). The influence of blended learning environment on self-regulated and self-directed learning skills of learners. *European Journal of Educational Research*, *7*(4), 877–886. https://doi.org/10.12973/eu-jer.7.4.877

van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in Human Behavior*, *72*(1), 577–588. https://doi.org/10.1016/j.chb.2017.03.010

van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2020). Determinants of 21st-century skills and 21st-century digital skills for workers: A systematic literature review. *SAGE Open*, *10*(1). https://doi.org/10.1177/2158244019900176

Valtonen, T., Hoang, N., Sointu, E., Näykki, P., Virtanen, A., Pöysä-Tarhonen, J., Häkkinen, P., Järvelä, S., Mäkitalo, K., & Kukkonen, J. (2021). How pre-service teachers perceive their 21st-century skills and dispositions: A longitudinal perspective. *Computers in Human Behavior*, *116*(1), 106643. https://doi.org/10.1016/j.chb.2020.106643

Valverde-Berrocoso, J., Garrido-Arroyo, M. D. C., Burgos-Videla, C., & Morales-Cevallos, M. B. (2020). Trends in educational research about e-learning: A systematic literature review (2009-2018). *Sustainability*, *12*(1), 5153. https://doi.org/10.3390/su12125153

Yilmaz, R. M., & Baydas, O. (2017). An examination of undergraduates' metacognitive strategies in pre-class asynchronous activity in a flipped classroom. *Educational Technology Research and Development*, *65*, 1547–1567. http://www.jstor.org/stable/45018617

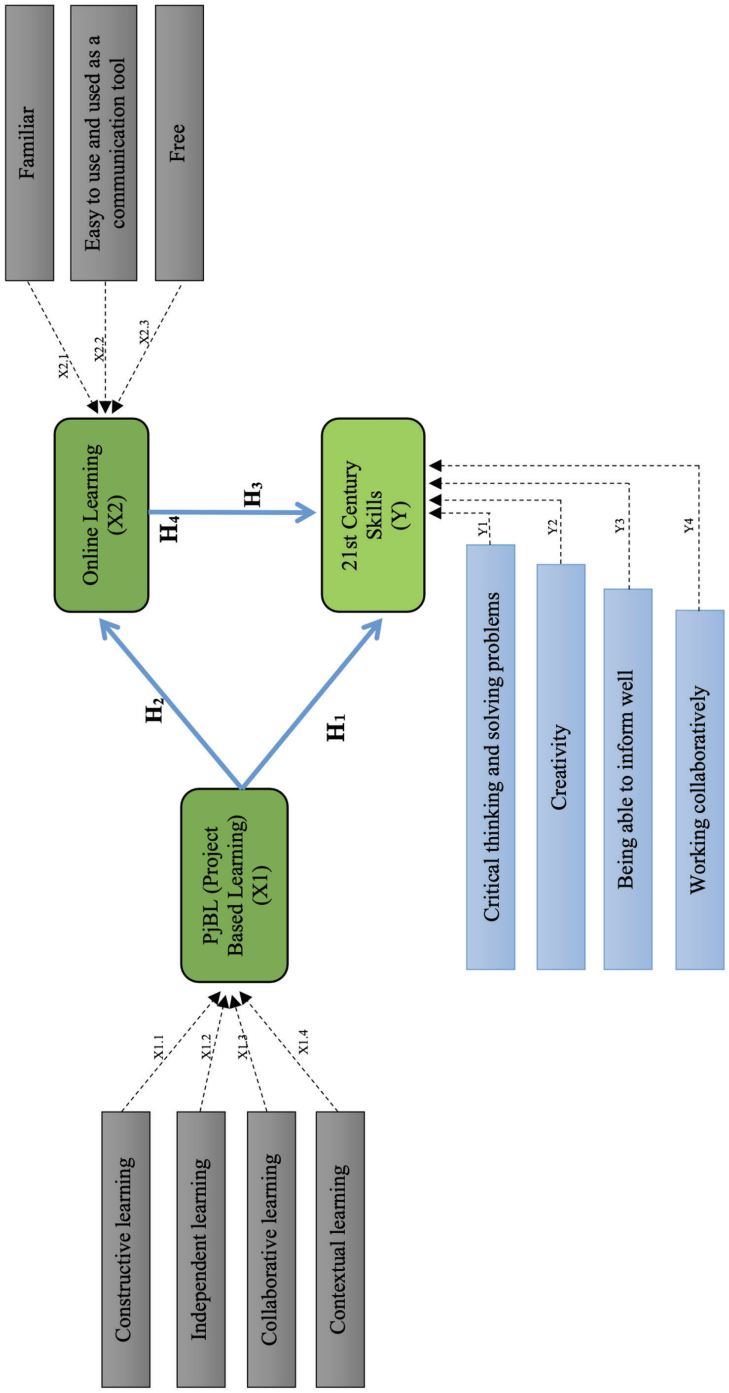
Yoo, H. (2021). Research-to-resource: Use of technology to support 21st century skills in a performing ensemble program. *Update: Applications of Research in Music Education*, *39*(2), 10–14. https://doi.org/10.1177/8755123320953435

Younis, A. A., Sunderraman, R., Metzler, M., & Bourgeois, A. G. (2021). Developing parallel programming and soft skills: A project-based learning approach. *Journal of Parallel and Distributed Computing*, *158*, 151–163. https://doi.org/10.1016/j.jpdc.2021.07.015

Zhang, D., & Hwang, G.-J. (2023). Effects of Interaction between peer assessment and problem-solving tendencies on students' learning achievements and collaboration in mobile technology-supported project-based learning. *Journal of Educational Computing Research*, *61*(1), 208–234. https://doi.org/10.1177/07356331221094250

Zwaal, W., & Otting, H. (2015). Aligning principles and practice in problem-based hospitality management education. *Journal of Hospitality, Leisure, Sport & Tourism Education*, *16*(2015), 22–29. http://dx.doi.org/10.1016/j.jhlste.2015.01.00

# Appendix


Familiar
Easy to use and used as a communication tool
Free
X2.1
X2.2
X2.3
Online Learning (X2)
H4
H3
21st Century Skills (Y)
Y1
Y2
Y3
Y4
Critical thinking and solving problems
Creativity
Being able to inform well
Working collaboratively
H2
H1
PjBL (Project Based Learning) (X1)
X1.1
X1.2
X1.3
X1.4
Constructive learning
Independent learning
Collaborative learning
Contextual learning

# Projektinis ekonomikos mokymasis: ar mokymasis internetu gali pagerinti XXI a. įgūdžius?

**Muhammad Hasan[1*], Nur Arisah[2], Tuti Supatminingsih[3], Muhammad Imam Ma'ruf[4], Fayik Huril Aini[5], Nurdiana[6]**

[1] Makasaro valstybinis universitetas, Ekonomikos ir verslo fakultetas, Ekonomikos ugdymo katedra, Jl. Raya Pendidikan, IDN-90222 Makasaras, Pietų Sulavesis, Indonezija, m.hasan@unm.ac.id
[2] Makasaro valstybinis universitetas, Ekonomikos ir verslo fakultetas, Ekonomikos ugdymo katedra, Jl. Raya Pendidikan, IDN-90222 Makasaras, Pietų Sulavesis, Indonezija, nurarisah.fe@unm.ac.id
[3] Makasaro valstybinis universitetas, Ekonomikos ir verslo fakultetas, Ekonomikos ugdymo katedra, Jl. Raya Pendidikan, IDN-90222 Makasaras, Pietų Sulavesis, Indonezija, tuti.supatminingsih@unm.ac.id
[4] Makasaro valstybinis universitetas, Ekonomikos ir verslo fakultetas, Ekonomikos ugdymo katedra, Jl. Raya Pendidikan, IDN-90222 Makasaras, Pietų Sulavesis, Indonezija, muhammadimammaruf@unm.ac.id
[5] Malango valstybinis universitetas, Ekonomikos ir verslo fakultetas, Ekonomikos ugdymo katedra, Jl. Cakrawala, IDN- 65145 Malangas, Rytų Java, Indonezija, aini.huril@gmail.com
[6] Makasaro valstybinis universitetas, Ekonomikos ir verslo fakultetas, Ekonomikos ugdymo katedra, Jl. Raya Pendidikan, IDN-90222 Makasaras, Pietų Sulavesis, Indonezija, diana@unm.ac.id

## Santrauka

Šio tyrimo tikslas – nuodugniai apibūdinti projektinio mokymosi (angl. PjBL) modelio poveikį siekiant pagerinti XXI amžiaus įgūdžius ekonomikos ugdymo studijų programos FEB UNM studentams mokantis ekonomikos internetu. Šis tyrimas buvo atliktas taikant kiekybinį tyrimo metodą. Tiriamieji atrinkti taikant proporcingą atsitiktinę atranką. Dalyvavo 149 ekonominio ugdymo studijų programos FEB UNM 2018, 2019 ir 2020 metų grupių studentai. Duomenims rinkti buvo naudojamas uždaro tipo klausimynas su keturiais galimais atsakymų variantais, o kiekvieno iš jų svertinis balas matuojamas intervaline skale. Siekiant užtikrinti naudojamų instrumentų validumą ir patikimumą buvo atlikti instrumentų validumo ir patikimumo testai. Duomenys buvo analizuojami taikant struktūrinių lygčių modeliavimą (angl. SEM), kad vienu metu būtų galima analizuoti latentinių kintamųjų ir pasireiškiančių kintamųjų ryšius.

Tyrimu buvo nustatyta, kad projektinis ekonomikos mokymasis turi tiesioginį ir reikšmingą poveikį XXI amžiaus įgūdžiams; projektinis ekonomikos mokymasis turi tiesioginį ir reikšmingą poveikį mokymuisi internetu; mokymasis internetu turi tiesioginį ir reikšmingą poveikį XXI amžiaus įgūdžiams; projektinis ekonomikos mokymasis internetu turi netiesioginį ir reikšmingą poveikį XXI amžiaus įgūdžiams.

**Esminiai žodžiai:** *projektinis mokymasis (angl. PjBL), mokymasis internetu, ekonomikos mokymasis, XXI amžiaus įgūdžiai.*

Gauta 2022 11 18 / Received 18 11 2022
Priimta 2023 11 22 / Accepted 22 11 2023