International Journal of Research and Review
Vol. 10; Issue: 1; January 2023
Website: www.ijrrjournal.com
Short Communication *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Application of the Project Based Learning Model to Improve 21st Century Competence 4C

Mochamad Muchson

Masters of Economic Education, University of Nusantara PGRI Kediri, Indonesia

DOI: https://doi.org/10.52403/ijrr.20230173

ABSTRACT

The purpose of this research was to analyze the Project Based Learning (PjBL) model in the Economics Learning Strategy and Innovation course to improve the abilities or competencies of 21st century 4C of the students. The research method was descriptive, the research sample was 16 students who were divided into 5 groups, the research instrument used were project assessment (group) and 4C observation assessment (individual), data collection techniques used were project performance (group) and 4C observation guidelines (individual assessment rubric).
The results found that the project score was 95 and the 21st century competency value was an average of 95. The stages of project based learning were able to improve 21st century 4C skills, as the followings: 1) The big question: Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration , 2) Designed a plan for project: Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration, 3) Created a schedule: Communication, Collaboration, 4) Monitored the students and the progress of the project: Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration, 5) Assessed the outcome: Communication, Collaboration, 6) Evaluated the experience: Communication.

Keywords: [Project Based Learning, 21st Century Skills 4C]

INTRODUCTION

The learning approach is the point of view or starting point for the learning process which refers to the view of the occurrence of a process that is still very general in common which it accommodates, inspires, strengthens and underlies learning methods with a certain theoretical scope. There are two learning approaches; the first is a teacher-centered learning approach and the second is a student-centered learning approach.
Learning strategy is a plan that contains a series of activities designed to achieve certain educational goals. Examples of learning strategies are expository learning strategies, inquiry learning strategies and others.
The learning method can be interpreted as the way chosen to implement the plans that have been prepared in the form of real and practical activities to achieve learning objectives. The activity plans that are arranged in the learning strategy are carried out with certain learning methods such as the lecture method, question and answer, discussion and others. While the learning technique can be interpreted as the way someone does in implementing a specific method like lecture methods using power point visualization, pictures, videos and others.
The learning model is a package of learning approaches, learning strategies, learning methods and learning techniques. So, if we apply a learning model that we apply what learning approach, whether teacher centered approach or student centered approach. Implementing a learning strategy which plan contains a series of activities inside is designed to achieve certain educational goals. Applying learning methods chosen is

to implement plans that have been prepared in the form of real and practical activities to achieve learning objectives. Applying learning techniques is a way for someone to implement a specific method.

There are various kinds of learning models such as the PAIKEM learning model (Active, Innovative, Creative, Effective and Fun Learning), Quantum Teaching and Learning models, contextual learning models, Contextual Teaching and Learning (CTL), cooperative learning models, problem-based learning models- Problem Based Learning (PBL), case-based learning (CBL) learning models, Project Based Learning (PjBL) learning models and others.

Grant (2002) defines Project Based Learning as a learner-centered learning model to conduct an in-depth investigation of a topic. Students constructively carry out deepening learning with a research-based approach to problems or questions that are weighty, real and relevant. Weight means that the problem is of quality and benefits the community, it is clear that the problem is related to everyday life and is relevant to the knowledge possessed by students

Goodman and Stivers (2010) define Project Based Learning as a teaching approach that is built on learning activities with real tasks that challenge students to solve problems related to everyday life in groups.

Saefudin (2014) states that Project Based Learning is a learning method uses problems as the first step in collecting and integrating new knowledge based on experience in real activities.

Afrina (2015) defines Project-Based Learning as a student-centered learning model by providing meaningful learning experiences for students where learning experiences and concepts are built based on the resulting product.

Fathurrohman (2016) defines project-based learning as a learning model that uses projects or activities as learning mean to achieve attitude, knowledge and skill competencies.

From the various quotations above, Project Based Learning-PjBL is a learning model that uses projects or real activities as the core of learning, using problems as the first step to achieve attitude, knowledge and skill competencies. In Project Based Learning, students will explore, assess, interpret, synthesize and provide information to produce various forms of learning outcomes that are very close to real work in the field. Project Based Learning is a learner-centered learning model to conduct an in-depth investigation of a topic. Students constructively carry out deepening learning with a research-based approach to problems with weighty, real and relevant questions.

In the Project Based Learning model, students not only understand the content but also develop skills in how to play a role in society. Skills that are grown include communication and presentation skills, organizational and time management skills, research and inquiry skills, self-assessment and reflection skills, group participation and leadership and critical thinking.

The objectives of Project Based Learning are: 1) increasing students' ability in problem solving, 2) acquiring new knowledge and skills in learning, 3) making students more active in solving complex problems with real product results, 4) developing and improving students' skills in managing materials or tools to complete assignments or projects, 5) increasing student collaboration (Academy, 2020).

LITERATURE REVIEW

Daryanto and Rahardjo (2012) the characteristics of Project Based Learning are: 1) students make decisions about a framework, 2) there are problems or challenges proposed to students, 3) students design processes to determine solutions to the problems or challenges proposed. , 4) students are collaboratively responsible for accessing and managing information to solve problems, 5) the evaluation process is carried out continuously, 6) students periodically reflect on the activities that have been carried out, 7) the final product of

learning activities will be evaluated qualitatively , 8) learning situations are very tolerant of mistakes and changes.

The principles in Project Based Learning are: 1) Starting from a problem or question: project-based learning always comes from a problem or question whose level of difficulty is adjusted to the student's level, 2) authentic and relevant: projects carried out by students must include questions in the real world and relevant to students' knowledge, 3) freedom of choice: giving students the freedom to determine problem solving strategies, what products will be produced and also how to produce these products, 4) self reflection: students are expected to be able to reflect on all experiences obtained during working on the project, 5) feedback: teaches students to be able to give and receive input on the project they are doing so that students not only learn from the teacher but can learn from each other with other students, 6) presentation: at the end of the project-based learning process students must be able to present their inventions or products produced in front of their classmates or even in front of the society. Besides discussing the project, it is hoped that all students will be able to draw conclusions about what has been learnt and practiced.

The stages or steps in Project Based Learning are: 1) preparing questions related to a topic of material to be studied (essential question), 2) making a project plan (plan), 3) making a project implementation schedule (schedule), 4) monitoring implementation (monitor), 5) conduct an assessment and evaluation.

According to Rais in Lestari (2015) the steps of the Project Based Learning model are: 1) start with the big question: the activity starts from a challenging question or problem that is in accordance with the reality of the real world and begins with an in-depth investigation, 2) design a plan for project: planning is done collaboratively between the teacher team and the student team. Planning contains role play, selection of activities and required resources, 3) create a schedule: arrange an activity schedule. Teachers and students arrange activity schedules to complete projects, time allocation (timeline), deadlines (deadline). Usually the project will take a long time so that students can complete the project in groups outside of school class, 4) monitor the students and the progress of the project: the teacher monitors student activities while completing the project by facilitating each process, 5) assessing the outcome: the assessment is carried out to measure the achievement of standards, play a role in evaluating the progress of each student, provide feedback on the level of understanding that has been achieved by students, and assist teachers in developing the next learning strategy. Product assessment is carried out when each group presents their products in front of other groups in turn, 6) evaluate the experience: at the end of the learning process the teacher and students reflect on the activities and project results that have been implemented. The reflection process is carried out both individually and in groups. At this stage students are asked to express their experiences while completing the project.

Isriani and Puspitasari (2015) the role of teachers in guiding Project Based Learning are: 1) authenticity: ensuring that problems, processes and products produced are original and valid by encouraging the meaning of the tasks performed, designing tasks according to abilities so that projects can be completed on time, produce products from the work done, 2) adherence to academic values: ensure students learn optimally and have value based on directed learning by applying various knowledge/disciplines in completing assignments, challenging students to use various methods in problem solving , encouraging higher order thinking, 3) learning in the real world: encouraging students to be able to work in the context of real problems in society, able to work in organizational situations that use high technology, able to manage their personal skills, 4) being active independently: project

based learning is a student-centered learning so that the teacher must be able to encourage students to be able to complete their assignments according to the schedule, conduct research with various methods, media and learning resources, be able to communicate with others through presentations and other media, 5) relationship with experts: able to improve relationships expertly by encouraging learning from other people who have relevant knowledge, working and discussing with other people/friends in solving problems, inviting/asking outsiders to be involved in assessing the results of the project, 6) assessment: assessment through the process and products produced, assessments are also carried out on individuals and groups. The strategy that can be done is to be able to self-evaluate its performance, invite external parties to be involved in developing project standards.

Daryanto and Rahardjo (2012) the Project Based Learning model has the following advantages: 1) increasing students' motivation to learn and encouraging their ability to do important work and they need to be appreciated, 2) improving problem solving skills, 3) making students become more actively and successfully solve complex problems, 4) increase collaboration, 5) encourage students to develop and practice communication skills, 6) improve students' skills in managing resources, 7) provide students with learning experiences and practices in organizing projects and making allocations time and other resources such as equipment to complete assignments, 8) provide learning experiences that involve students in a complex and designed way to develop in accordance with the real world, 9) make the learning atmosphere fun so that students and teachers enjoy the learning process.

The Project Based Learning model can be applied if the teacher plans to design an active and student-centered learning process where students will get a more interesting learning experience and produce a work or product based on real (contextual) problems that occur in everyday life. This learning model can be used if the teacher emphasizes more on science skills like observing activities, asking questions, planning projects, using tools and materials, interpreting. In addition, teachers can develop creative thinking skills in designing and making projects that can be used to systematically solve problems so that they invite students to think at a high level (HOTS-High Order Thinking Skill) and encourage the achievement of 21st century competencies called 4C (Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration). 4C of 21st century skills are skills that students must have in order to survive in the era of the industrial revolution 4.0.

Hermananis (2021) creativity thinking skill is the ability to develop, implement and convey new ideas to other parties, open and responsive to new and different perspectives. Students are encouraged to think outside the existing habits, involve new ways of thinking, have the opportunity to convey new ideas and solutions, ask unusual questions and try to propose alleged answers. With creativity, it is hoped that students will be able to produce new discoveries which are often called innovations and implement them both individually and in groups.

Critical thinking and problem solving is the ability to understand a complex problem, connect information with other information so that various perspectives will emerge and find solutions to a problem. Students need to have the ability to select relevant sources and information, find quality sources and evaluate sources from the aspects of objectivity, reliability and up-to-date while problem solving skills or problem solving is the ability to find solutions from different perspectives in solving complex problems. Problem solving cannot be separated from critical thinking skills because these skills are fundamental skills in solving problems. Students must be able to apply the right

tools and techniques effectively and efficiently to solve problems.

Communication is the ability includes skills in conveying thoughts clearly and persuasively, orally and in writing, the ability to express opinions in clear sentences, convey orders clearly and be able to motivate others through the ability to speak. Students are expected to be able to communicate ideas effectively orally, written and technological media.

Hermananis (2021) collaboration is arranged so that students can work together collaboratively on authentic project-based tasks and develop their skills through peer tutoring in groups. It is hoped that through these skills students can work together in a group in solving the problems found.

Nurfitriyanti (2016) concluded that the learning model based on learning had an influence on the ability to solve mathematical problems. From the results of data analysis, the value of the mathematical problem solving ability of the experimental group was an average of 85.19 while for the control group the average was 77.93. This shows that the average mathematical problem solving ability of the experimental class was higher than the average value of the control class. The higher problem solving ability of the experimental group could also be seen from the learning process and from the individual attitude and skill assessment sheets because students were enthusiastic about completing projects both individually and in groups. Students were also more daring to interact with the teacher and their friends.

Sari and Angreni (2018) student creativity through the Project Base Learning model was in the very high category with an average of 92. The high category was shown in the report aspect with an average of 87.5. The indicator for the assessment of the report aspect was the performance and suitability of the resulting product. Meanwhile, the planning aspect had a very high average with an average of 93.75. Assessment indicators on planning aspects were tools and materials as well as working drawings. The implementation aspect had an average of 93.75 with a very high category. The indicators assessed in this implementation aspect were work attitude, use of tools, materials, workmanship, assembly and finishing. From the results of the product observation assessment with the Creative Thinking Scale (CTS) students were very high. This indicates that the PjBL learning model could increase student creativity. Student creativity through PjBL learning in processing organic and inorganic waste was more focused and clear.

The Master of Economic Education Study Program at the University of Nusantara PGRI Kediri has implemented a Project Based Learning model through courses both economics and pedagogic subjects such as strategies and innovations in economics learning. It is hoped that with the implementation of the Project Based Learning model, students are able to improve 21st century skills or competencies, namely 4C (Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration).

This study analyzes whether the Project Based Learning model in the Economics Learning Strategy and Innovation course is able to improve the abilities or competencies of 21st century 4C students?

The purpose of this study was to analyze the Project Based Learning model in the Economics Learning Strategy and Innovation course to improve the abilities or competencies of 21st century 4C students.

MATERIALS & METHODS

The method or type of this research was descriptive. Rianse (2009:30) explained that the purpose of descriptive research was "to describe/solve problems systematically, factually and accurately regarding the facts and characteristics of a particular population or area". Descriptive method was used to describe the syntax or stages of the project-based learning model as the followings: (29

1) start with the big question
2) design a plan for project
3) create a schedule

4) monitor the students and the progress of the project
5) assess the outcome
6) evaluate the experience

Population and Sample

The population in this study was all students of the Master of Economics Education study program who took the economic learning strategy and innovation course in the odd semester 2021/2022, totaling 16 students. The sample was 16 students with saturated sampling technique because all members of the population were members of the sample where the sample was divided into 5 groups.

Research Instruments

Research instrument was a tool to take research data or measure variables. The research instruments in this study were:

1. Project assessment (group)
   a. Assessment rubric of the big question
   b. Assessment rubric of design a plan for project
   c. Assessment of rubriccreate scedule
   d. Assessment rubric of progres of the project
   e. Assessment rubric of assess the outcome
   f. Assessment rubric of evaluate the experience
2. 21st century 4C (individual) competency assessment rubric with indicators:
   a. Critical thinking and problem solving
   b. Creativity thinking and innovation
   c. Communication
   d. Collaboration
3. Scoring criteria
   4 Very good
   3 Good
   2 Fair
   1 Deficient
   Individual and group score
   91 – 100 Very good
   81 - 90 Good
   71 – 80 Fair
   ≤ 70 Deficient

Data collection technique

Data collection techniques used in this study were:

1. Group project presentation
2. Observation (individual assessment rubric)

Data analysis technique

The data analysis technique used the following scoring formula:

$$\text{Score} = \frac{\sum \text{achievement score}}{\sum \text{maximum score}} \times 100$$

(Muchson, 2020)

RESULT

Group 1: The best group

Group Assessment (project)

No.	Score Aspect	Rate	Score	Notes
1	The big question: Waste Bank	4	100	Waste Bank Topic/Theme: Very Good
2	Design a plan for project: 1. Research and data collection: a. Needs analysis (problems faced by location) b. Study of literature c. Small scale research (product benefits) 2. Research planning: a. Research purposes b. Research needs c. Form of participation 3. Design development a. Product design b. Infrastructure c. Design testing phase in the field 4. Initial field trial a. Product design preliminary testing b. Testing is limited	4 4 4 4	100 100 100 100	Research and data collection: Very Good Research Planning: Very Good Design development: Very Good Initial field trial: Very Good

	c. Repeatable Field trials (collection of information through observation, interviews, filling out questionnaires) 5. Revise the test results a. Improvements to the results of initial field trials b. Product improvement (product quality) 6. Field trial: Extensive product trial a. Testing the effectiveness of product design b. Using the repetition model experiment technique c. Effective design trial results (substance and methodological) 7. Revising the results of field trials a. Second fixing b. Perfect product in terms of quality and quantity 8. Feasibility test a. Testing the effectiveness and adaptability of product designs to users b. Conducted using interviews, observations and questionnaires 9. Final product revision a. Input from the feasibility test b. Effective and accountable products 10. Product dissemination and implementation a. Product publications are generally implemented in a broad scope	4 3 3 4 4 4	100 75 75 100 100 100	Revise the test results: Very Good The stages have not been fully carried out No fixing Model eligibility: Very Good No Fixing Model implementation: Very Good
3	Create a schedule: Saturday every week for one semester	4	100	schedule of activities: Very Good
4	Monitor the students and the progress of the project: Using project assessment rubrics (groups) and individual assessment rubrics (21st century skills 4C)	4	100	Project presentation: Very Good
5	Assess the outcome: Results of Monitor the students and the progress of the project	4	100	Results of Monitor: Very Good
6	evaluate the experience: express feelings and experiences while working on projects	4	100	Reflection: Very Good
			95	

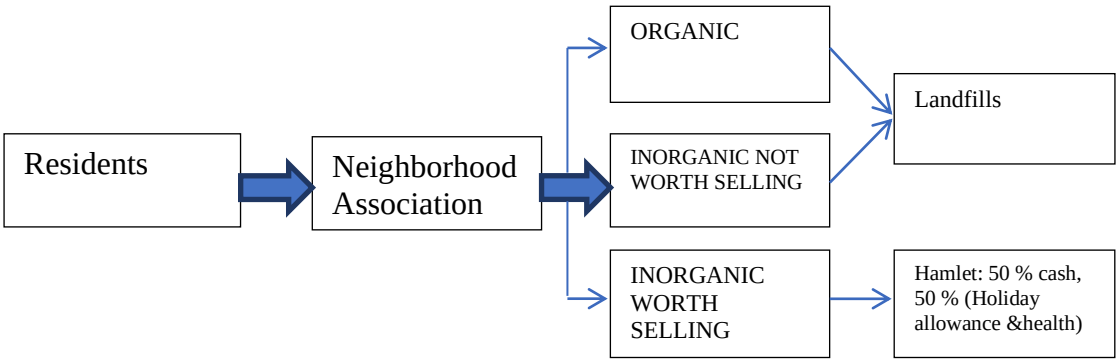
Individual assessment (21st century skills 4C)

No.	Rated aspect	Rate			Score		
		Tri	Sri	Sifa	Tri	Sri	Sifa
1	Critical thinking	4	4	4	100	100	100
2	Problem solving	4	4	4	100	100	100
3	Creativity thinking	4	4	4	100	100	100
4	Innovation	3	3	3	75	75	75
5	Communication	4	4	4	100	100	100
6	Collaboration	4	4	4	100	100	100
					95	95	95
	Average					95	

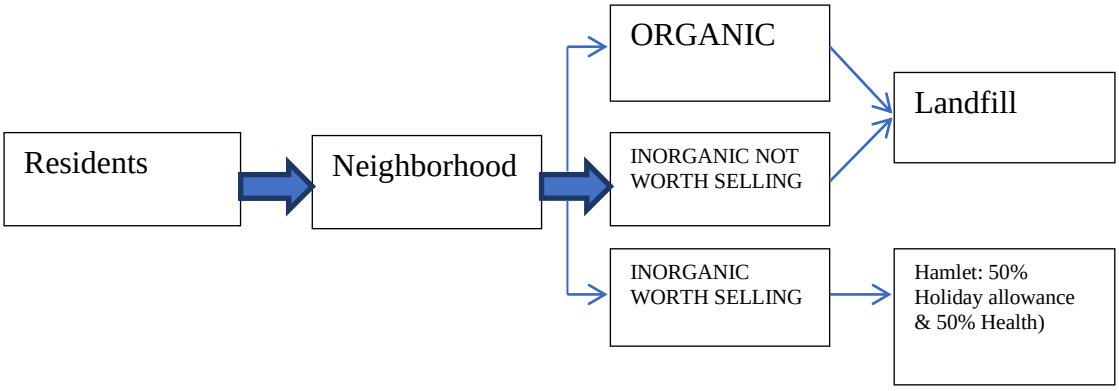
Design development:

1. Product design (model): The waste handling model was called the Waste Bank where waste management involves community members in one hamlet (RW), each neighborhood (RT) had a waste collection coordinator, and means that waste was collected in every RT. At the neighborhood level, waste was separated into organic waste and inorganic waste. For organic waste, it was taken to the landfill (TPA) and for inorganic waste it was sorted into items that were worth selling such as cardboard, unused books, plastic, bottles and others and items that were not worth selling. Goods that were suitable for sale brought to the hamlet level by residents and it was exchanged for money and inorganic goods that were not suitable for sale will be combined with organic waste to be taken to the landfill as much as 50 % and the remaining 50% was given in cash. 50% savings was used for THR (Holiday Allowance) and 50% for health funds. In waste management, the hamlet level involved 7 personnel (2 personnel at the hamlet level and 5 personnel at the neighborhood level (assuming the number of neighborhood were 5 each neighborhood was 1 personnel). In addition to this procedure, each household is charged with waste money of IDR. 30,000 to transport waste from the neighborhood to the landfill. This money was combined with the sale of salable inorganic waste at the hamlet level and used for operational costs such as honorarium, food and drink.(31)

The design of the model can be illustrated as follows:



2. Infrastructure
   a. Garbage cart
   b. Scales
   c. Stationary
3. Design testing phase in the field (limited trial)
   a. At the neighborhood level there was 1 officer, his job was to sort organic and inorganic waste, sort out inorganic waste that was fit for sale and not fit for sale, and brought organic waste and inorganic waste that was not fit for sale to the landfill
   b. Residents bring inorganic waste worth selling to the hamlet and weigh it to determine the selling price.
   c. One hamlet personnel weighed inorganic waste and stored it in a landfill, another officer in the finance department made payments and bookkeeping, 50% was paid in cash and 50% was paid for holiday allowance (50%) and health funds (50%). The financial officer was also tasked with selling inorganic waste that was fit for sale and also noting the residents' fees for waste management, which was IDR. 30,000 per month. The financial officer also kept financial records for honorarium, meals and drinks for all personnel, both daily and monthly financial reports.
   d. Collecting information about the feasibility of the model through interviews:
      1. What do you think about the waste bank procedure?
      2. What do you think about the waste bank's financial mechanism?
      3. What do you think about the waste bank personnel?
4. Revise the waste management model of the Waste Bank
   a. All proceeds from the sale of inorganic waste at the hamlet level were saved, so that it could increase the holiday allowance and health funds
   b. There will be an annual waste bank financial audit conducted by the head of the hamlet
   c. Waste Bank Model after limited trial



d. There will be the financial audit of the Waste Bank at the end of each year carried out by the Head of hamlet

5. Feasibility test
   a. Testing the effectiveness and adaptability of the model in the community
   b. The collection of information on the feasibility of the model was conducted by interviewing:
      1. What do you think about the feasibility of the waste bank model?
      2. Do people feel comfortable with this waste bank model?
6. Implementation of the waste management model of the Waste Bank

Correlation between Project Based Learning and 21st century skills 4C

SYNTAX of PjBL	INDICATOR	LEARNING EXPERIENCE	21st CENTURY SKILLS 4C
The big question	Find problems or questions which are challenging, meaningful, real and relevant	Analyze needs Study of literature small scale research	Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration
Design a plan for project	Designing projects, Limited trial, Product revision, Extensive trial, Product revision, Product eligibility, Final product revision Product, implementation	Designing projects, Limited trial, Product revision, Extensive trial, Product revision, Product eligibility, Final product revision, Product, implementation	Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration
Create a schedule	Project activity schedule	Create a project activity schedule	Communication, Collaboration
Monitor the students and the progress of the project	Product design report, Limited trial report, Product revision report, Extensive trial report, Product revision report, Product feasibility report, Final product revision report, Product implementation report	design presentation, Limited trial, presentation, Product revision presentation, Extensive trial presentation, Product revision presentation, Product feasibility presentation, Final product revision presentation, Product implementation presentation,	Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration
Assess the outcome	Group assessment (project), Individual assessment (21st century skills 4C)	Group performance Individual performance	Communication, Collaboration
Evaluate the experience	PjBL Expression of feelings and experiences during PjBL	Presentation of feelings and experiences during PjBL	Communication

From the table above, it can be explained that each stage or syntax of project based learning students is able to build or improve 21st century 4C skills as followings:

1. The big question: Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration
2. Design a plan for project: Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration
3. Create a schedule: Communication, Collaboration
4. Monitor the students and the progress of the project: Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration
5. Assess the outcome: Communication, Collaboration
6. Evaluate the experience: Communication

DISCUSSION

Moursund in Priatna (2018) explains the weaknesses of the project based learning model:

1. Increased motivation, the methods makes students become very diligent, very passionate in learning, and delays in attendance are greatly reduced
2. Increased problem solving ability or increasing problem-solving skills, making students more active and successful in solving complex problems
3. Improved library research skills, since project-based learning requires students to be able to quickly obtain information through information sources, students' skills to seek and obtain information will increase
4. Increased collaboration, it is the importance of group work in projects that allow students to develop and practice communication skills. Cooperative working groups, student evaluations, online exchange of information are collaborative aspects of a project
5. Increased resource management skills, when the project-based learning is implemented properly provides students with learning and practice in organizing projects and making allocations of time and other resources such as equipment to complete assignments.

Surya, Andita Putri., Relmasira, Stefanus C., Hardini, Agustina Tyas Asri. (2018) stated that project based learning was able to: 1) develop creativity, b) improve cooperation skills, c) improve communication skills, d) students gained experience from project completion and product manufacture.

Setiasih, Lusiyana, Sumliyah (2019), the results of the study show that: 1) High Order Thinking Skills of students whose learnt used the Project Based Learning (PjBL) model were higher than students who learnt conventionally, 2) increased thinking skills high level (High Order Thinking Skill) of students who learnt used the Project Based Learning (PjBL) model were higher than students who learnt conventionally, 3) the response of students whose learnt used the Project Based Leaning (PjBL) model was higher than students who learnt conventionally.

CONCLUSION

The project score was 95 and the average 21st century skill value was 95. The syntax or stages of Project Based Learning students were able to build or improve the skills or competencies of the 21st century 4C as follows:

1. The big question: Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration
2. Design a plan for project: Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration
3. Create a schedule: Communication, Collaboration
4. Monitor the students and the progress of the project: Critical thinking and problem solving, Creativity thinking and innovation, Communication, Collaboration
5. Assess the outcome: Communication, Collaboration
6. Evaluate the experience: Communication

Suggestion

1. Referring to the results of this study that the learning model based learning model was able to improve the abilities or competencies of the 21st century 4C, it should be applied to all courses and even all study programs
2. It is necessary to build a team of lecturers and student teams across study programs so that the problem/topic will be broader, problem solving will be more comprehensive and covering many disciplines.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Afriana, Jaka. 2015. Project Based Learning (PjBL). Makalah untuk Tugas Mata Kuliah Pembelajaran IPA Terpadu. Program Studi Pendidikan IPA Sekolah Pascasarjana. [Papers for Integrated Science Learning Course Assignments. Graduate School Science Education Study Program]. Universitas Pendidikan Indonesia. Bandung.
2. Akademi. 2020. Pembelajaran Berbasis Proyek. Project Based Learning (PBL). Dinas Pendidikan dan Kebudayaan Kabupaten Kolaka Utara. [Project Based Learning. Project Based Leaning (PBL). North Kolaka Regency Education and Culture Office].http://dikbud.kolutkab.go.id/blog/pembelajaran-berbasis-proyek-project-based-learningpbl/
3. Anis, Herman.2021. 4C. Keterampilan Abad 21 yang harus Dikuasai Peserta Didik. [21st Century Skills that Student Must Master]. https://hermananis.com/4c-keterampilan-abad-21-yang-harus-dimiliki-peserta-didik
4. Daryanto dan Rahardjo, M. 2012. Model Pembelajaran Inovatif. [Innovative Learning Model]. Yogyakarta: Gaya Media.
5. Fathurrohman, M. 2016. Model Pembelajaran inovattif: Alternatif Desain Pembelajaran yang Menyenangkan. [Innovative Learning Models: Fun Learning Design Alternative]. Yogyakarta: Ar-Ruzz Media Group
6. Goodman, Brandon and Stivers, J. 2010. Project Based Learning. Educational Psychology. ESPY 505.
7. Isriani & Puspitasari, D. (2015). Strategi Pembelajaran Terpadu: Teori, Konsep & Implementasi. [Integrated Learning Strategy: Theory, Concept & Implementation]. Yogyakarta: Relasi Ini Media Group.
8. Lestari, Tutik. 2015. Peningkatan Hasil Belajar dengan Model Pembelajaran Project Based Leaning dan Metode Pembelajaran Demonstrasi SMK Muhammadiyah Wonosari. [Improving Learning Outcomes with Project Based Learning. Learning Models and Demontration Learning Methods at SMK Muhammadiyah Wonosari]. Skripsi. Program Studi Pendidikan Teknik Informatika Fakultas Teknik Universitas Negeri Yogyakarta. Yogyakarta.
9. Muchson, Mochamad. 2020. Statistik Deskriptif. [Descriptif Statistic]. Bogor. Guepedia
10. Nurfitriyanti, Maya. 2016. Model Pembelajaran Project Based Learning terhadap Kemampuan Pemecahan Masalah Matematika. [Project Based Learning. Learning Model on Mathematical Problem Solving Ability]. Jurnal Formatif 6 (2): 149-160
11. Priatna, Komang. 2017. Pengembangan E-Modul Berbasis Model Pembelajaran Project Based Learning pada Mata Pelajaran Videografi untuk Siswa kelas X Desain Komunikasi Visual di SMA Negeri 1 Sukasada. [Development of Project Based Learning Model-Based E-Module in Videography Subject for Class X Visual Communication Design Students SMA Negeri 1 Sukasada]. Jurnal Nasional teknik Informatika (JANAPATI) Volume 6 Nomor 1, p-ISSN: 2089-8673 e-ISSN: 2548-4265, h.72https://www.google.com/search?q=Komang+priatna+
12. Rianse, Usman, Abdi. 2008. *Metodologi Penelitian Sosial dan Ekonomi, Teori dan Aplikasi*. [Social and Economic Research Methodology, Theory and Application]. Bandung: Alfabeta.
13. Sari, Rona Taula., Angreni, Siska. 2018. Penerapan Model Pembelajaran Project Based Learning (PjBL) Upaya Peningkatan Kreativitas Mahasiswa. [Implementation of Project Based Learning (PjBL) Learning Model efforts to Increase Student Creativity]. Varia Pendidikan: Vol. 30, No. 1, Juli 2018: 79-83 ISSN: 0852-0976. https://www.google.com/search?q=Varia+Pendidikan
14. Saefudin, A & Berdiati, I. (2014). Pembelajaran Efektif. Bandung: PT Remaja Rosdakarya.
15. Setiasih, Ajeng., Lusiyana, Desy., & Sumliyah, Sumliyah. 2019. Penerapan Model Pembelajaran Project Based Learning dalam Pembelajaran Matematika untuk Meningkatkan Kemampuan High Order Thinking Skill Pada Siswa SMP. [Application of Project Based Learning Model in Mathematics Leaning to Improve High Order Thinking Skill in Junior High School Students] Integral: Vol. 10 No. 02

(2019). https://e-journal.umc.ac.id/index.php/JNR/article/view/1130

16. Surya, Andita Putri., Relmasira, Stefanus C., Hardini, Agustina Tyas Asri. 2018. Penerapan Model Pembelajaran Project Based Learning (PjBL) untuk Meningkatkan Hasil Belajar dan Kreativitas Siswa Kelas III SD Negeri Sidorejo Lor 01 Salatiga. Pesona Dasar. Jurnal Pendidikan Dasar dan Humaniora. Jurusan Pendidikan Guru Sekolah Dasar (PGSD) FKIP Universitas Syah Kuala.http://jurnal.unsyiah.ac.id/PEAR/article/view/10703.DOI: https://doi.org/10.24815/pear.v6i1.10703

How to cite this article: Mochamad Muchson. Application of the project based learning model to improve 21st century competence 4C. *International Journal of Research and Review*. 2023; 10(1): 654-665.
DOI: *https://doi.org/10.52403/ijrr.20230173*

******