C-NAR: What are Good Practices in Teaching Project Based Learning Models in Elementary Schools?

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Abstract. This study aims to describe the good practice of learning using the Project Based Learning model in elementary schools. This type of research is a continuous classroom action research using the C-NAR (Collaborative Nested Action Research) design. In practice, teachers make continuous improvements in learning and lecturers make continuous improvements in mentoring. The research procedure uses 4 steps following the DIOR pattern (Design, Implementation, Observation, & Reflection). There are 2 data collection techniques used, namely observation and 2- way conference (teachers and lecturers). The instruments used in the study were observation sheets and reflective journals. The data analysis technique uses qualitative data flow model analysis starting from data reduction, data presentation, and drawing conclusions. The results showed that the average effectiveness of using the Project Based Learning model in learning in elementary schools was 3.61 with the category of Very Effective. Based on this data, it can be concluded that the C-NAR design using the Project Based Learning model can improve learning processes and outcomes effectively in elementary schools.

Keywords: C-NAR, project based learning, elementary school

1 Introduction

The existence of teachers is an important element in the practice of education in elementary schools. This implies that the face and color of education, especially in elementary schools, in the future will be influenced by the competence and skills of qualified teachers. One of the important skills that must be possessed is the skill to develop learning, so as to be able to present the implementation of learning that is innovative, interactive, interesting, meaningful, and fun [1]. Therefore, teachers in primary schools are currently expected to be able to improve competence in developing learning.

The presentation of meaningful learning is something that every teacher must strive for. When students learn something and find meaning, then that meaning can be a reason to continue learning [2]. Thus the success of learning is caused by one of the reasons for meaningful learning which is strongly influenced by the ability of teachers to develop learning.

Skills to develop learning are the essence of competencies that must be mastered and measured through learning development practices, because they are seen as part of efforts to form professional attitudes [3]. According to these conditions, a supportive learning model is needed so that elementary school teachers can develop their learning development skills.

Therefore, to develop teacher learning development skills, a learning process is needed that integrates these aspects of development in both theoretical and practical learning. With the hope that the learning carried out can inspire teachers to innovate learning in carrying out development.

The focus of innovation in learning development is currently leading to the formation of 21st century skills of students. There are four competencies that must be possessed by students in the 21st century called 4C, namely Critical Thinking and Problem Solving (critical thinking and solving problems), Creativity (creativity), Communication Skills (communication skills), and Ability to Work Collaboratively (the ability to work collaboratively). in groups) [4]. To create the 21st century skills that are put forward, a cutting-edge learning model is needed that facilitates students to think critically and solve problems, have creativity, communication skills, and the ability to work in groups [5]. One of the learning models that can be used is the integration of Team Based Project in learning.

The team-based project learning model is one of the effective learning models used to develop students' innovative ideas, because students have confidence that they can show their best when with their groups [6]. Based on this theory, teachers are expected to be able to develop learning innovations that integrate team-based projects in learning so as to improve the 21st century skills of students that have been stated previously.

Based on the results of analysis and observations in several elementary schools in Pematang Siantar City, North Sumatra, it can be generalized that teachers are not yet skilled enough in developing learning oriented to the formation of 21st century skills for elementary school students. This is evidenced by the results of the development of learning tools that have not been effectively developed, including: (1) the formulation of learning objectives is still not detailed yet shows how to achieve competence and how to measure it; (2) learning activities are still exactly the same as those already in the teacher's book, there is no activity development for students that makes learning more meaningful (not case-based and group project-based); (3) the planned media is still very simple and tends to be less attractive; (4) the planned evaluation tool has not been targeted according to the competency indicators to be achieved.

The scale and complexity of most of the problems that occur in the learning process based on the above analysis are not only within the range of physical, cognitive, but also beyond the capacity of one person's professional expertise [7]. The impact is that the formation of 21st century skills of students is minimally carried out in learning. In this case, efforts that can be made to solve the above problems are to integrate the Team Based Project model in learning.

The hallmark of a team-based project is that the problem-solving process is carried out and completed by team members. Its characteristics necessitate the inclusion of a number of new variables, particularly the human factor. Therefore, the complexity of team based projects does not only come from the scale of the problem, but also the complex cognitive, psychological, social, and behavioral interactions between group members during the problem solving process [8]. There are four main characteristics of a team based project, namely cognitive, psychomotor, motivational, and affective (interpersonal and attitude). Team based project performance is determined by the composition of the four types of dispositions of all team members which become complex [9].

The success of team-based project-based learning in the classroom is not only determined by the ability of the practitioner in teaching practice, but also by the ability of the lecturers and tutors in providing guidance. Collaboration between practitioners, lecturers, and tutors is very important in creating good practice of team-based project-based learning in elementary

schools. This good practice can be used as a reference for continuous improvement in primary schools [10].

Based on the explanation of the problems and the solutions offered, it is necessary to conduct collaborative classroom action research. In this case, the practitioner carries out continuous classroom action research to improve the learning process. In addition, lecturers and civil servants conduct research on guidance actions on learning tools and learning practices by practitioners. Thus, the practitioner will continue to make improvements to the equipment and the continuous learning process, while the lecturers and tutors will continue to make continuous mentoring improvements in each cycle.

2 Research Methods

This research is a sustainable classroom action research with Collaborative Nested Action Research (C-NAR) approach. In this case, in addition to practitioners carrying out a continuous learning improvement process, lecturers and tutors also continue to carry out the mentoring process. With C- NAR, practitioners, lecturers, and tutors are expected to become reflective teachers and mentors by continuing to improve learning and mentoring in each cycle [11]. The research procedure follows the D-I-O- R pattern, namely: Design (D), Implementation (I), Observation (O), and Reflection (R). (1) Design phase (D), the practitioner designs team based project based learning based on student analysis, readiness of facilities and infrastructure, and current conditions of learning in schools. Then, the tutors and tutors design reflective guidance for both learning tools and learning practices. (2) Implementation (I) stage, the practitioner carries out a team-based project-based learning process in accordance with the learning design that has been prepared. Meanwhile, lecturers and tutors carry out a reflective mentoring process. (3) In the Observation (O) stage, the practitioner notes the suitability of the learning implementation with the learning design. At the same time, lecturers and civil servants observe and record the success of the mentoring. (4) In the Reflection (R) stage, practitioners, lecturers, and civil servants reflect together with the 3, 2, 1 conference pattern related to the success of the mentoring process and process. There are 2 data collection techniques used, namely observation and 2-way conference (teachers and lecturers). The instruments used in the study were observation sheets and reflective journals. The data analysis technique uses qualitative data flow model analysis starting from data reduction, data presentation, and drawing conclusions.

3 Results and Discussion
3.1 Results

The implementation of research using the C- NAR approach on good practice team-based project- based learning was carried out for 2 learning cycles. Each cycle follows the DIOR procedure previously stated, namely: Design, Implementation, Observation, and Reflection. In simple terms, the description of the D-I-O-R carried out is as follows:

a. **Design (D):** The practitioner designs team-based project-based learning tools, in the form of: learning implementation plans, teaching materials, learning media, student worksheets, and assessments. Lecturers and tutor teachers develop guidance patterns and instruments

for observing the implementation of team-based project-based learning by practitioners.

b. **Implementation (I):** Practitioners carry out the learning process in accordance with the design of learning devices that have been prepared. Lecturers and tutors direct practitioners in learning practices.

c. **Observation (O):** Lecturers and tutors observe the implementation of learning using pre-prepared instruments

d. **Reflection (R):** The practitioner reveals 3 successes and 2 failures/weaknesses obtained in the learning practice. Then, the lecturers and tutors gave 1 suggestion for an alternative solution for improving the next cycle of learning.

The series of learning processes using the team based project model are carried out through 6 stages of activities, namely: (1) problem recognition, (2) designing project plans, (3) preparing schedules, (4) project implementation and monitoring, (5) testing project results, and (6) project evaluation and reflection. Simply described as follows.

3.1.1 Cycle I

An overview of the implementation of learning using a team based project cycle I model can be seen in the following activity.

Fig. 1. Stage 1 (Problem Introduction) Cycle I

Fig. 2. Phase 2 (Project Planning) Cyc

Fig. 3. Stage 3 (Schedule) Cycle

Fig. 4. Stage 4 (Project Implementation and Monitoring) Cycle I

Fig. 5. Stage 5 (Test Project Results) Cycle I

Fig. 6. Stage 6 (Project Evaluation and Reflection) Cycle I

Based on the pictures above, the implementation of team-based project-based learning in cycle I can be described in Table 1 below.

Table 1. D-I-O-R 1 (Practice 1)

Design (D)	:	Designing a team-based project-based learning device on the material: making prisms and pyramids.
Implementation (I)		• Stage 1 (Problem Recognition): Introduce the problem using learning videos. • Phase 2 (Designing a Project Plan): Explains how to create a prism and pyramid space using a prism and pyramid model. • Phase 3 (Schedule): Not yet implemented. • Stage 4 (Project Implementation and Monitoring): Guiding project work.

	:	• Stage 5 (Examining Project Results): Students present the results of project work in their respective groups. Stage 6 (Evaluation and Reflection): Students share their learning experiences in groups.
Observation (O)	:	1) Phase 3 (Schedule Arrangement) has not been implemented. 2) There are some students who have not been actively involved 3) Practitioners have not used instruments when monitoring project work.
Reflection (R)	:	• The 3 successes obtained by the practitioner are as follows: (a) Can achieve the learning objectives, (b) The project for each group is quite varied, and (c) Students are able to present the results of project work in detail. • 2 learning failures/weaknesses: (a) The preparation of the project schedule has not been implemented and (b) Practitioners have not used instruments in monitoring student project progress. • 1 suggestion/alternative solution for improvement in the next cycle, namely: it is necessary to arrange a schedule by students so that project work can be done according to the set time.

Table 2. D-I-O-R 1 (Practice 2)

Design (D)	:	Designing project-based team-based learning on series and parallel electrical circuit materials
Implementation (I)	:	• Phase 1 (Introduction to Problems): Practicing shows a video of the application of series and parallel circuits in everyday life. • Phase 2 (Designing a Project Plan): The practitioner shows a video on how to make an electrical circuit project through a video lesson. • Stage 3 (Schedule Arrangement): The practitioner sets a project creation schedule and broadcasts it using infocus. • Stage 4 (Project Implementation and Monitoring): Students make electrical circuit projects in their daily life while the practitioner visits each group to monitor project progress. • Stage 5 (Examining Project Results): Students present the project in front of the class. • Stage 6 (Evaluation and Reflection): Students work on evaluation questions using the quizizz application and at the end of the lesson the teacher conducts learning reflection.
Observation (O)	:	Learning runs smoothly according to the lesson plan. However, there were some groups who did not finish working on the project according to the set schedule.
Reflection (R)	:	• The 3 successes obtained by the practitioner are as follows: (a) The stages of the team-based project model are fully implemented, (b) The work results of each group are quite varied, and (c) Students are actively involved in learning in each group. • 2 learning failures/weaknesses: (a) There are several groups who have not finished working on the project according to the time specified and (b) Evaluation work using the Quizizz application is only done by most students due to the limited number of devices used. 1 suggestion/alternative solution for improvement in the next cycle, namely: It is necessary to reallocate the appropriate time so that the project is completed according to the set time.

3.1.2 Cycle II

The description of the implementation of learning using the second cycle team based project model can be seen in the following activity.

Fig. 7. Stage 1 (Problem Introduction) Cycle II

Fig. 8. Phase 2 (Designing Project Planning) Cycle II

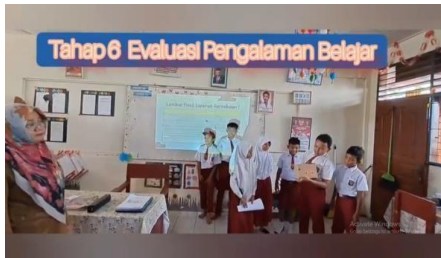**Fig. 9.** Stage 3 (Schedule) Cycle II

Fig. 10. Phase 4 (Project Implementation and Monitoring) Cycle II

Fig. 11. Stage 5 (Test Project Results) Cycle II

Fig. 12. Stage 6 (Project Evaluation and Reflection) Cycle II

Based on the pictures above, the implementation of team-based project-based learning in cycle II can be described in Table 2 below.

Table 3. D-I-O-R 2 (Practice 1)

Design (D)	:	Designing project-based team-based learning on series and parallel electrical circuit materials
Implementation (I)	:	• Stage 1 (Problem Recognition): Introduce the problem using learning videos. • Phase 2 (Designing a Project Plan): Explains how to create a series and parallel series project using student worksheets. • Phase 3 (Schedule): The practitioner determines the time allocation for the project. • Stage 4 (Project Implementation and Monitoring): The practitioner visits each group and uses observation instruments during monitoring. • Stage 5 (Testing Project Results): Students present demonstrating series and parallel electrical circuits in their respective groups. • Stage 6 (Evaluation and Reflection): Students tell their learning experiences while continuing demonstrations in front of the class.
Observation (O)	:	The lesson went smoothly according to the previous lesson plan. All stages of the team-based project model have been implemented and maximized based on the shortcomings in the previous 1st cycle.
Reflection (R)	:	Learning is successful according to plan and there is an increase in the process and learning outcomes of students

Table 4. D-I-O-R 2 (Practice 2)

Design (D)	:	Designing a team-based project-based learning about the application of series and parallel circuits in daily life in the form of traffic lights.

Implementation (I)	:	• Stage 1 (Problem Recognition): Introduce the problem using learning videos. • Phase 2 (Designing Project Plans): Describes how to create a traffic light orally and on video. • Stage 3 (Schedule): The practitioner determines the time allocation for the project and displays it through infocus. • Stage 4 (Project Implementation and Monitoring): The practitioner visits each group and uses observation instruments during monitoring. • Stage 5 (Examining Project Results): Students present the results of project work in front of the class in turn. • Stage 6 (Evaluation and Reflection): Students work on evaluation questions using the quizizz application in pairs. At the end of the lesson, the practitioner does a learning reflection.
Observation (O)	:	Learning using the team-based project model went according to plan and all stages were carried out well. The use of quizizz at the time of evaluation in pairs was effectively implemented to overcome the problems in the previous first cycle.
Reflection (R)	:	There were no significant problems during the learning process. The success rate of students in learning also increased significantly from the previous cycle 1.

3.1.3 Learning Effectiveness

The effectiveness of learning using a team based project model with the C-NAR approach is described as follows.

Table 5. Learning Effectiveness Using Team Based Project Model

No	Effectiveness of Team Based Project Model	Score	Category
1	Effectiveness of Phase 1. Problem Recognition	3.67	Very effective
2	Phase 2 Effectiveness. Designing Project Plans	3.67	Very effective
3	Phase 3 Effectiveness of Scheduling	3.67	Very effective
4	Phase 4 Effectiveness of Project Implementation and Monitoring	3.67	Very effective
5	Phase 5 Effectiveness Testing Project Results	3.33	Effective
6	The Effectiveness of Stage 6 Evaluation and Reflection	3.67	Very effective
	Average	3.61	Very effective

3.2 Discussion

The implementation of team-based project- based learning using the C-NAR approach has been carried out in 2 learning cycles by 2 practitioners. C- NAR is able to produce reflective teachers by continuously implementing improvements in each lesson [12]. The good practices implemented are described as follows.

3.2.1 *Learning Effectiveness*

The effectiveness of learning using a team based project model with the C-NAR approach is described as follows.

Table 5. Learning Effectiveness Using Team Based Project Model

No	Effectiveness of Team Based Project Model	Score	Category
1	Effectiveness of Phase 1. Problem Recognition	3.67	Very Effective
2	Phase 2 Effectiveness. Designing Project Plans	3.67	Very Effective
3	Phase 3 Effectiveness of Scheduling	3.67	Very Effective
4	Phase 4 Effectiveness of Project Implementation and Monitoring	3.67	Very Effective
5	Phase 5 Effectiveness Testing Project Results	3.33	Effective
6	The Effectiveness of Stage 6 Evaluation and Reflection	3.67	Very Effective
	Average	3.61	Very Effective

3.3 Discussion

The implementation of team-based project- based learning using the C-NAR approach has been carried out in 2 learning cycles by 2 practitioners. C- NAR is able to produce reflective teachers by continuously implementing improvements in each lesson [12]. The good practices implemented are described as follows.

3.3.1 *D-I-O-R 1*

Learning in the first cycle was carried out following the D-I-O-R stages with the following general description: (1) Design (D): designing team- based project-based learning in the form of lesson plans, teaching materials, learning media, student worksheets, and assessments. (2) Implementation (I): carry out 6 stages of the team based project model. (3) Observation (O): observe the suitability of the learning design with the implementation of learning. (4) Reflection (R): practitioners, lecturers, and tutors hold conferences 3, 2, 1 at the end of the lesson.

Based on the findings of the implementation of the learning cycle I found the following things: (1) There were 3 successes by practitioner 1, including: being able to achieve the learning objectives, (b) the project for each group was quite varied, and (c) the students were able to present the project work in detail. In addition, there are 2 learning failures/weaknesses by practitioner 1, namely the preparation of the project schedule has not been implemented and the practitioner has not used instruments in monitoring student project progress. Then, continuous improvement is needed by practitioner 1, namely the need for scheduling by students so that project work can be carried out according to the set time.

Furthermore, 3 learning successes by 2 practitioners include: (a) the stages of the team-based project model are carried out in full, (b) the work results of each group are quite varied, and (c) students are actively involved in learning in each group. There are 2

learning failures/weaknesses by practitioner 2, namely there are several groups who have not finished working on the project according to the set time and evaluation work using the Quizizz application is only done by most of the students due to the limited number of devices used. Then, 1 suggestion/alternative solution for improvement in the next cycle is that it is necessary to reallocate the appropriate time so that the project being carried out is completed according to the set time.

Based on the implementation of learning in cycle I, it is necessary to carry out continuous improvement in the next cycle II that focuses on the weaknesses and shortcomings of learning in cycle I.

3.3.2 D-I-O-R 2

Referring to the lack of team-based project- based learning in cycle I, improvements were made to learning in cycle II while still following the D-I-O- R stages: Design, Implementation, Observation, and Reflection. Practitioner 1 made improvements to learning by focusing on deficiencies in cycle 1, including: not implementing the stage of preparing a learning schedule and practicing not using instruments when monitoring project work. In cycle II, practitioner 1 has prepared a project work schedule and used instruments when monitoring project work. Practitioner 2 focuses on improving learning in accordance with the weaknesses in cycle I, namely: there are several groups that have not finished working on the project according to the time set and evaluation work using the Quizizz application is only done by most students because of the limited number of devices used. In cycle II, practitioner 1 has conditioned the project work in accordance with the set time and conditioned the learning evaluation activities in pairs in doing quiz.

Based on the improvements carried out in cycle II, improvements were obtained with various indicators as follows: (1) Learning went smoothly according to the previous lesson plan. All stages of the team-based project model have been implemented and maximized based on the shortcomings in the previous 1st cycle. (2) The success rate of students in learning increased significantly from the previous first cycle.

The results of the analysis of the effectiveness of the application of the team based project model with the C-NAR approach obtained an average value of 3.61 in the Very Effective category. The characteristics of successful learning are as follows: (a) successfully guiding participants to achieve learning objectives, (b) providing a meaningful learning experience and involving participants actively, and (c) conditioning facilities that support the learning process [13]. Furthermore, the success of the mentoring program is indicated by the minimum percentage of success being in the effective or good category. Based on this data, it can be concluded that the C-NAR design using the Project Based Learning model can improve learning processes and outcomes effectively in elementary schools.

4 Conclusion

Learning using the team-based project model has proven to be effective in improving the process and learning outcomes in elementary schools. Strengthening the implementation of each stage in a team based project is the most decisive aspect in the

success of learning. Efforts to produce an effective learning process with a team based project model need to be carried out through continuous learning improvements using the C-NAR approach. In this case, improvements are not only made by the practitioner in the learning cycle, but improvement in mentoring is also important in continuous classroom action research. The results of the analysis of the effectiveness of the application of the team based project model with the C-NAR approach obtained an average value of 3.61 in the Very Effective category. Thus, team-based project-based learning with the C- NAR approach deserves consideration in improving the learning process and outcomes in elementary schools in the future.

References

[1] Parlindungan, D. P., Mahardika, G. P., & Yulinar, D. (2020). Efektivitas Media Pembelajaran Berbasis Video Pembelajaran dalam Pembelajaran Jarak Jauh (PJJ) di SD Islam An-Nuriyah. In *Prosiding Seminar Nasional Penelitian LPPM UMJ* (Vol. 1, No. 1).

[2] Nazgul, K., Anar, B., Baglan, Z., Moldir, S., Nishanbayeva, S., & Sadvakasova, G. (2020). Preservice Teachers' Opinions on the Use of Technology in Education. *International Journal of Emerging Technologies in Learning,* 15(23), 182– 192.

[3] Sunardi, & Hasanuddin. (2019). *Pengembangan Employability Skill Mahasiswa Vokasi Melalui Pembelajaran Stem-Project Based Learning.* SemanTECH, 3(4), 210–217.

[4] Harlianti, S. (2021). *Pengembangan pembelajaran matematika model project based learning (PjBL) untuk melatih keterampilan abad 21 berkarakter entrepreneurship* (Doctoral dissertation, UIN Sunan Ampel Surabaya).

[5] Meilia, M., & Murdiana, M. (2019). Pendidik Harus Melek Kompetensi Dalam Menghadapi Pendidikan Abad Ke-21. *Al Amin: Jurnal Kajian Ilmu Dan Budaya Islam*, 2(1), 88-104.

[6] Franco-santos, M., & Gomez-mejia, L. R. (2015). *Team-based incentives: Creating a Culture of Collaboration, Innovation, and Performance.* The Compensation Handbook, 6, 199–209.

[7] Rosidah, C. T., & Pramulia, P. (2021). Team Based Project dan Case Method Sebagai Strategi Pengembangan Keterampilan Mengembangkan Pembelajaran Mahasiswa. *MENDIDIK: Jurnal Kajian Pendidikan Dan Pengajaran*, 7(2), 245- 251.

[8] Andayani, E. (2022). Case Method: Mengoptimalkan Critical Thinking, Creativity Communication Skills dan Collaboratively Mahasiswa Sesuai MBKM di Era Abad 21. *Jurnal Penelitian dan Pendidikan IPS*, 16(1), 52-60.

[9] Al-Tabany, T. I. B. (2017). *Mendesain Model Pembelajaran Inovatif, Progresif, dan Konteksual.* Jakarta: Prenada Media.

[10] Faisal, F. (2021). C-NAR: Best Practice Tindakan Pembimbingan Berkelanjutan PPL PPG Prajabatan Universitas Negeri Medan. *Jurnal Inovasi Pendidikan dan Pembelajaran Sekolah Dasar*, 5(1), 1-11.

[11] Faisal, F., Ananda, L., Lova, S., & Purnomo, T. (2022, May). Collaborative Nested Action Research (C-NAR): Effective Approach Produces Reflective Teachers in Elementary School. In *Proceedings of the 3rd International Conference of Science Education in Industrial Revolution 4.0, ICONSEIR 2021, December 21st, 2021, Medan, North Sumatra, Indonesia*.

[12] Faisal, F., Ananda, L. J., Mansyur, A., Lova, S. M. (2022). *IMPRECI: Model Pembimbingan Reflektif di Sekolah Dasar.* Purwokerto: Pena Persada Kerta Utama.

[13] Firman, Harry. (2010). *Penilaian Hasil Belajar dalam Pengajaran.* Bandung: FMIPA UPI.