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Collaboration of Implementation of PBL and PjBL in Increasing Students' Critical Awareness of the Social Impact of ICT at SMP Negeri 2 Jereweh

Erna Milosopa
Magister Pendidikan Dasar, Universitas Terbuka

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Abstract
Although today's students are proficient in the use of information and communication technology (ICT), their critical awareness of the negative social impact of ICT is still low. This study aims to apply the Problem Based Learning (PBL) and Project Based Learning (PjBL) learning model in increasing students' critical awareness of digital social issues such as the spread of hoaxes, cyberbullying, access inequality, and digital ethics. Using a descriptive qualitative approach, data was collected through observation, interviews, and documentation of seventh grade students at SMP Negeri 2 Jereweh, with a total of 24 people. The learning implementation was conducted in three stages with a project approach and real problem solving related to social issues in technology. The implementation results showed an increase in concept understanding, active involvement of students in discussions, and the ability to convey creative solutions to the problems raised. The results showed that the application of PjBL was able to encourage students to think critically, conduct social analysis, and produce reflective products related to ICT issues such as personal data security, digital dependence, and social media ethics. In conclusion, the PjBL model is effective in shaping students' critical understanding of social reality influenced by ICT development.

Corresponding Author:
Erna Milosopa
Magister Pendidikan Dasar, Universitas Terbuka
Email: milosopae@gmail.com

1. INTRODUCTION

Background of the Problem

The development of Information and Communication Technology (ICT) in the digital era has fundamentally changed the way humans interact, access information, and live their daily lives. For the younger generation, especially high school students, ICT has become an inseparable part of learning, playing, and socializing. However, this progress also brings complex social impacts, such as the rise of cyberbullying, the spread of hoaxes, privacy violations, and digital addiction. This phenomenon requires critical awareness from students to be able to respond to technological developments wisely and responsibly.

Unfortunately, learning in schools still tends to focus solely on the technical aspects of ICT, such as the use of software or basic computer skills, without providing enough space for the development of critical and reflective thinking on its social impacts. In fact, one of the important competencies of the 21st century that students must have is digital literacy and the ability to think critically about the content they consume or produce in cyberspace.

In this context, a learning approach is needed that is able to link technical knowledge with social issues contextually. One potential approach is Project Based Learning (PjBL), which emphasizes the learning process through real projects that are relevant to students'

lives. This model is believed to be able to encourage students to be more active, collaborative, and reflective in understanding the problems faced in the digital era.

2. RELATED THEORY OR LITERATURE REVIEW

The Project Based Learning model is a student-centered pedagogical approach, where students are involved in the problem-solving process through the design and implementation of complex and meaningful projects (Thomas, 2000). PjBL has been shown to increase learning motivation, critical thinking skills, and teamwork skills (Bell, 2010). In its implementation, PjBL requires active student involvement starting from problem identification, project planning, implementation, to reflection and presentation of results.

Meanwhile, critical awareness in education refers to students' ability to recognize, question, and evaluate social reality, including the impact of technological developments (Freire, 1993). In the context of ICT, critical awareness means that students are able to understand not only the benefits, but also the social risks that accompany the use of technology.

Previous literature has widely discussed the effectiveness of PjBL in improving students' cognitive and affective learning outcomes (Markham et al., 2003), but there is still little that specifically links PjBL with increasing critical awareness of social issues in the ICT domain.

Research Gap

Most research on ICT learning at the secondary school level still focuses on mastery of technology and increasing digital literacy technically. There are not many studies that explicitly examine how learning strategies, especially Project Based Learning, can be used to foster students' critical awareness of the social impacts of ICT use. In fact, this gap is very important to fill considering the increasingly complex digital social challenges faced by the younger generation. Therefore, a study is needed that explores how the integration of PjBL in ICT subjects can shape students' understanding of issues such as digital ethics, cybersecurity, and social dynamics in cyberspace.

Objectives and Problem Formulation

This study aims to describe and analyze the application of Project Based Learning in increasing students' critical awareness of the social impact of ICT in the digital era.

The specific objectives are to:

- ☑ Identifying the steps for implementing PjBL in ICT learning.
- ☑ To examine changes in students' attitudes and understanding of ICT social issues after participating in PjBL.
- ☑ Develop recommendations for contextual and reflective learning practices on digital social issues.

The problem formulation in this research is:

- ☑ How is Project Based Learning implemented in ICT learning at the junior high school level?
- ☑ How does the implementation of PjBL affect students' critical awareness of the social impact of ICT?

What are the challenges and solutions in implementing PjBL for these purposes?

3. RESEARCH METHOD

1. Types and Approaches of Research

This study uses a qualitative research type with a descriptive approach. This approach was chosen to gain an in-depth understanding of the process and impact of implementing Problem Based Learning (PBL) and Project Based Learning (PjBL) in increasing students' critical awareness of social issues caused by the development of Information and Communication Technology (ICT). Qualitative descriptive research allows researchers to explore phenomena contextually through the direct experience of research subjects, without variable manipulation.

2. Population and Sample

The population in this study were all seventh grade students at SMP Negeri 2 Jereweh who had participated in Informatics learning based on PBL and PjBL. The research sample was taken by purposive sampling, namely by selecting subjects who were considered relevant and able to provide in-depth information related to the phenomenon being studied.

The research sample consists of:

☑ 24 grade VII students actively involved in the ICT learning project.

☑ 1 Informatics subject teacher who applies the PBL and PjBL models in his learning.

3. Data Collection Techniques

Data collection is done using three main techniques:

- ☑ Participatory observation, researchers observe student activities and are directly involved during the learning process, including group interactions, discussions, and the project creation process.
- ☑ In-depth interviews, conducted by observers of selected students to explore their views on the social impact of ICT and how the projects they undertook helped shape critical consciousness.
- ☑ Documentation, in the form of notes on the learning process, results of student project products (such as campaign videos, infographics, or digital posters), and written student reflections.

4. Research Instruments

The instruments used in this study are:

- ☑ Observation guide, to record student activities, responses, and engagement in the project.
- ☑ A semi-structured interview guide, designed to explore students' and teachers' perceptions of the use of PBL and PjBL and their understanding of the social impacts of ICT.
- ☑ Document analysis sheet, to assess the content and social message of student project results.

The instrument was developed by researchers based on indicators of critical thinking skills and digital social awareness, and validated by school assistants as experts in ICT education and also problem-based and project-based learning.

5. Data Analysis Techniques

Data was analyzed using thematic analysis, with the following stages:

- ☑ Data reduction, namely sorting and simplifying raw data obtained from observations, interviews and documentation.
- ☑ Data presentation, by organizing information into a matrix or descriptive narrative that makes it easier to identify patterns and relationships between data.
- ☑ Drawing conclusions, based on the emerging theme patterns related to increasing students' critical awareness and the PjBL implementation process.

To maintain the validity of the data, researchers also conducted technical triangulation, namely comparing the results of observations, interviews, and documentation to obtain a comprehensive and consistent understanding.

6. Validity and Reliability

In the context of qualitative research, validity and reliability are achieved through:

- ☑ Triangulation of data and sources, namely comparing information from various sources (students and teachers) and through various data collection methods.
- ☑ Member check is done by asking respondents to verify the accuracy of quotes and interpretations of interview results.
- ☑ Audit trail, namely recording the entire research process systematically so that it can be replicated or re-checked by other parties.
- ☑ Peer debriefing, which is a discussion with colleagues to assess the logic of analysis and data interpretation.

4. RESEARCH RESULTS AND DISCUSSION

4.1.Research Results (displays research results data)

This study produced three main themes that represent the process and impact of the implementation of Problem Based Learning (PBL) and Project Based Learning (PjBL) on students' critical awareness of the social impact of ICT. The three themes are: (1) students' active involvement in digital social projects, (2) the development of critical awareness of ICT social issues, and (3) challenges and solutions in the implementation of PjBL.

Table 1. Students' Active Involvement in Digital Social Projects

Observation Aspects	Before Implementing PBL and PjBL	After Implementation of PBL and PjBL
Student involvement in discussions	Low, only some students are active (30%)	High, most students actively discuss (80)
Initiative in conveying ideas	Rarely express an opinion (20%)	Often convey creative ideas (76%)
Cooperation in groups	Less structured (40%)	Collaborative, sharing tasks equally (83%)
Enthusiasm in completing tasks	Get bored quickly, tend to be passive (28%)	High enthusiasm, fully engaged (87%)
Average percentage	30%	82%

Table 2. Development of Critical Awareness of ICT Social Issues

Critical Awareness Indicators	Before Implementation (Pre-Project)	After Implementation (Post-Project)
Understanding of ICT social issues	Limited to general negative impacts (50%)	More in-depth, linking to local realities (82%)
Ability to analyze information	Just receiving information (35%)	Able to criticize and compare information (81%)
Concern for social solutions	Passive towards digital social issues (40%)	Actively offering solutions through digital projects (75%)
Reflection on the use of ICT	Not yet critical of the impact of use (40%)	Starting to consider digital ethics (82%)
Average percentage	41%	80%

Table 3. Challenges and Solutions for Implementing PBL and PjBL

Challenges Faced	Implemented Solutions	Solution Results
Limited learning time	Rescheduling and integration between subjects	The project remains fully implemented
Low initial digital literacy of students	Providing basic ICT training before the project starts	Students are more confident and independent
Students' difficulties in determining issues	Intensive guidance in the project planning stage	The issues raised are more relevant and contextual
Lack of teacher experience	Collaboration with other teachers and PjBL training	Teachers are more prepared and open in the learning process

Research result

1. **Active Student Engagement in Digital Social Projects**
   Before the implementation of PBL and PjBL methods, student engagement was relatively low. Class discussions were dominated by several students, while others were passive. Initiatives to convey ideas and opinions were still rarely seen, and group work often ran without direction and unclear division of tasks. After the implementation, significant changes occurred. Students became more active in discussions, shared ideas with each other, and showed high enthusiasm in working on projects. This increase in engagement shows that PBL and PjBL are able to create a collaborative and participatory learning environment.

   Based on observations and documentation of learning, students showed high involvement in the process of designing and implementing projects. From 30%, a significant increase of 82% occurred in student group activities designing projects based on digital social issues of their choice, such as cyberbullying, personal data security, hoaxes on social media, and the impact of gadget addiction.

   One example of a project that stands out is a digital campaign video titled "**Save Your Data!**" which discusses the importance of maintaining privacy and social media ethics. This project was created by a group of students who were previously not very active in class, but after participating in the PjBL process, they appeared more confident and critical in conveying social messages through digital media. This active involvement shows that PjBL has succeeded in building students' sense of responsibility for the issues they raise and increasing their collaboration and creativity in conveying messages to the public.

2. **The Development of Critical Awareness of ICT Social Issues**
   Students' critical awareness of ICT social issues has clearly developed. Previously, students only knew the general impacts of ICT, such as game addiction or social media abuse. After participating in problem-based projects and real projects, they began to understand issues such as disinformation, digital privacy, and the gap in access to technology. They were able to critically analyze information and provide solutions in the form of digital works such as posters and campaign videos. This awareness grew through the process of investigation and reflection facilitated during the project.

In the results of interviews and student reflections, it was found that most students experienced an increase in their critical thinking skills on social issues of ICT. Before the project, only about 41% of students were able to identify social risks from ICT use independently.

After the project was completed, 81% of students were able to mention more than two negative social impacts of ICT and provide concrete solutions to deal with them. One student stated: "I just realized that the personal information I upload on social media can be detrimental to myself if misused. After making this project, I became more careful and also want to educate my friends."

These results reinforce Freire's (1993) theory of critical consciousness as a result of reflective experience of social reality. Through the contextual PjBL process, students not only know a problem, but are also able to analyze, assess, and convey this understanding in the form of real work.

3. **Challenges and Solutions in Implementing PBL and PjBL**
Some of the challenges found in the implementation of PBL and PjBL include:
   - ☑ Differences in abilities between students in understanding social issues, especially students who are less accustomed to critical thinking.
   - ☑ Time constraints and low initial digital literacy of students because problem and project analysis require a fairly long process from planning to presentation.
   - ☑ Limited access to technology for some students in editing videos or creating digital designs.

   The solutions taken included rescheduling, basic ICT training, and intensive mentoring in designing projects. Teachers also received support in the form of training and collaboration between colleagues. As a result, these challenges were effectively addressed, and the implementation of project-based learning went smoothly and had a positive impact.

Discussion

Collaboration between approaches*Problem Based Learning*(PBL) then*Project Based Learning*(PjBL) in Informatics learning at SMP Negeri 2 Jereweh has proven effective in increasing students' critical awareness of the social impact of Information and Communication Technology (ICT). The implementation of this strategy provides space for students to not only learn theory, but also actively engage in identifying problems, finding solutions, and producing works based on real issues that they face in their daily digital lives.

Through the PBL approach, students are invited to analyze digital social issues such as the spread of hoaxes, data privacy, and inequality of access to technology. Their critical thinking skills are honed through group discussions and real case analysis. PjBL then completes this process by directing students to compile projects as a form of active response to the problem. Projects such as digital campaigns, educational videos, and interactive posters provide direct experience in applying the knowledge that has been acquired in a meaningful and contextual way.

The research conducted shows that collaboration between PBL and PjBL can improve students' critical thinking skills, collaboration skills, and social awareness. This is in line with Bell's (2010) findings which state that project-based learning develops 21st century skills, including critical and collaborative thinking. Thomas (2000) also emphasized that PjBL allows students to construct knowledge through active involvement in meaningful projects.

Furthermore, Krajcik and Blumenfeld (2006) stated that involvement in authentic projects can increase students' intrinsic motivation because they feel that learning has direct

relevance to their lives. In the context of SMP Negeri 2 Jereweh, students became more aware of their social responsibilities in using ICT, and were able to design creative solutions that reflected an understanding of digital ethics and concern for society.

Thus, the collaboration of PBL and PjBL not only improves academic competence, but also forms students' character and digital social awareness holistically.

5. CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that the collaborative implementation of Problem Based Learning (PBL) and Project Based Learning (PjBL) in Informatics learning is able to increase students' critical awareness of the social impact of Information and Communication Technology (ICT) at SMP Negeri 2 Jereweh. This is reflected in the increase in students' active involvement in the learning process, their ability to understand and analyze digital social issues, and their initiative in designing solutions through real projects.

Students not only showed an increased understanding of the issues, but were also able to convey solutions through creative works such as campaign videos and digital posters. In addition, the implementation of PBL and PjBL also encouraged student collaboration, communication, and creativity, which are part of the important competencies of the 21st century.

Although there are challenges in its implementation, such as differences in student abilities, time constraints, and access to technology, these obstacles can be overcome with adaptive guidance strategies, flexible time management, and technical support from teachers.

This learning model not only strengthens students' cognitive aspects, but also forms character and values of social concern and digital responsibility. By providing space for students to think critically and work independently and collaboratively, PBL and PjBL have proven to be relevant approaches in developing digital social awareness in the increasingly complex era of information technology.

6. SUGGESTION

1. For Teachers
   Teachers are advised to integrate the Project Based Learning model in ICT learning and other relevant subjects. PjBL not only improves cognitive competence, but also forms students' deeper social awareness. It is also important to conduct intensive guidance and provide learning resources that support critical reflection.
2. For Schools
   Schools are expected to facilitate a learning environment that supports the implementation of PjBL, including the provision of ICT facilities, collaborative spaces, and teacher training. Schools can also encourage student involvement in digital social projects that are connected to real life and the surrounding community.
3. For Further Researchers
   Further research is recommended to examine the effectiveness of PjBL in a broader context, for example at different levels of education or other social issues. The use of quantitative or mixed approaches can also complement the results of this study with stronger statistical data.

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Hopefully the results of this research can provide real benefits for the world of education, especially in the development of learning models that encourage students' critical awareness of social issues in the digital era.

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