

DEVELOPMENT OF A PJBL-BASED MODULE TO IMPROVE CREATIVE THINKING IN JUNIOR HIGH SCHOOL LEVEL STUDENTS: SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

This research was conducted to analyze literature related to the development of PJBL-based modules to improve creative thinking in junior high school students. The aim of this research is to select articles that are suitable for analysis related to the Development of Pjbl-Based Modules to Improve Creative Thinking in Middle School Students. The benefit of this research is to make it easier for researchers to obtain literature that is suitable for analysis related to the title of the research that will be carried out by the researcher. The method of this research is to use the PRISMA method, which is a method that has steps, namely identification, screening, eligibility, and inclusion. The conclusion of this research is that the PRISMA method is a systematic literature review type research method which aims to make it easier for researchers to carry out research whose research results are based on the results of literature analysis that has been selected in stages through several systematic procedures. Based on the results of the PRISMA method carried out by researchers, 7 pieces of literature were obtained that were suitable for analysis. As a result of the PRISMA method, which was carried out to select several literatures, the total number of literatures that were excluded or not suitable for analysis was 1,989 literatures.

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1. INTRODUCTION

The 21st century is marked by the rapid development of science and technology in various areas of social life, especially ICT. Therefore, learning is needed that can prepare students to be literate in science and technology, able to think logically, critically, creatively, and be able to argue correctly (Trianto, 2012: 154). One of the government's efforts is curriculum renewal. Apart from that, skills are also needed in Learning and Innovation Skills-4Cs, there are 4 most important aspects that students must master at primary to secondary education levels, namely critical thinking, communication, collaboration, and creativity). These 4Cs Skills can be developed through science learning.

The science learning that has been implemented has not developed students' creativity much. Pradita (2015: 90) High creativity will make it easier for students to understand the material being studied, so their knowledge or cognitive level will also be high. Subur (2013: 50) creativity is the ability to see possibilities that can be used to solve problems or discover new concepts. Guilford (Supriyadi, 1994: 7) states that there are four characteristics of creative thinking abilities, namely fluency, flexibility, originality, and elaboration.

The step to realize science learning that fosters creativity is the use of the Project Based Learning (PjBL) model. Clegg (Wena, 2013: 144) through learning project work, students' creativity and motivation will increase. Harris (2014: 28) skills in Project Based Learning such as critical thinking, flexibility, ability to work in groups, think creatively, etc. Insyasiska (2015: 16) project-based learning can increase creativity in students. Roessingh (2011: 63) Project-based instructional design is commonly organized around a central or essential question, a set of questions, or a problem. Ardianti (2017: 149) The application of the project based learning (PjBL) model invites students to produce products so that they can increase students' creativity. Kizkapan (2017: 48) The implementation of PjBL has a crucial role in science education and promotes meaningful learning in students. Pradita (2015: 95) in Project Based Learning, students are not only required to be able to express their ideas, but students are also required to be able to solve problems through giving projects so that students' creativity in thinking increases.

The benefit of this research is that it helps teachers add variety of questions in learning assessments and also helps students to develop creative thinking skills (Marudut et al., 2020; Yulistiana & Setyawan, 2020) . It is hoped that with the development of critical thinking test instruments created by researchers, teachers will be able to evaluate students' 21st century skills and can develop learning evaluations and add variety to the evaluation of student learning.

This research uses the prism method with the aim of making it easier for researchers to analyze articles related to the titles created. The prism method consists of several steps, namely *identification*, *screening*, *eligibility and inclusion* (Abelha et al., 2020) . The advantage of using the prism method is that it is easier for researchers to carry out research based on analysis of journal articles. Based on this background explanation, researchers are interested in conducting research on "Development of PJBL-Based Modules to Improve the Creative Thinking of Middle School Students: Systematic Literature Review".

2. RESEARCH METHODS

This research uses the SLR (Systematic Literature Review) method with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta Analysis) model. The steps in the prism method are formulating a formulation (*identification*), systematic literature search (*screening*), filtering or selecting articles that are deemed suitable to the researcher's title (*eligibility*) and analyzing articles that have been selected (*included*) (Savec & Mlinarec, 2021; Zarate et al., 2022) . The formulation in this research is as follows.

Table 1 literature search formula

Databases	Search String
Google Scholar	Keyword (“Module” OR “Science Module” OR “Module Development” OR “Learning Media”) AND (“PJBL” OR “Project Base Learning”)
Crossref	Keyword (“Module” OR “Science Module” OR “Module Development” OR “Learning Media”) AND (“PJBL” OR “Project Base Learning” OR “Learning”)

In this method there are criteria for selecting articles that have been searched, namely inclusion criteria and exclusion criteria. Inclusion criteria are literature criteria that match the title or aim of the research being conducted, for example year of publication of the article (ex: 2019-2023), language of the article (ex: Indonesian), school (ex: SMP), etc. Exclusion criteria are criteria that do not match the inclusion criteria set by researchers (Ahmad & Junaini, 2020; Rahman et al., 2021) . The following are the inclusion and exclusion criteria for this study.

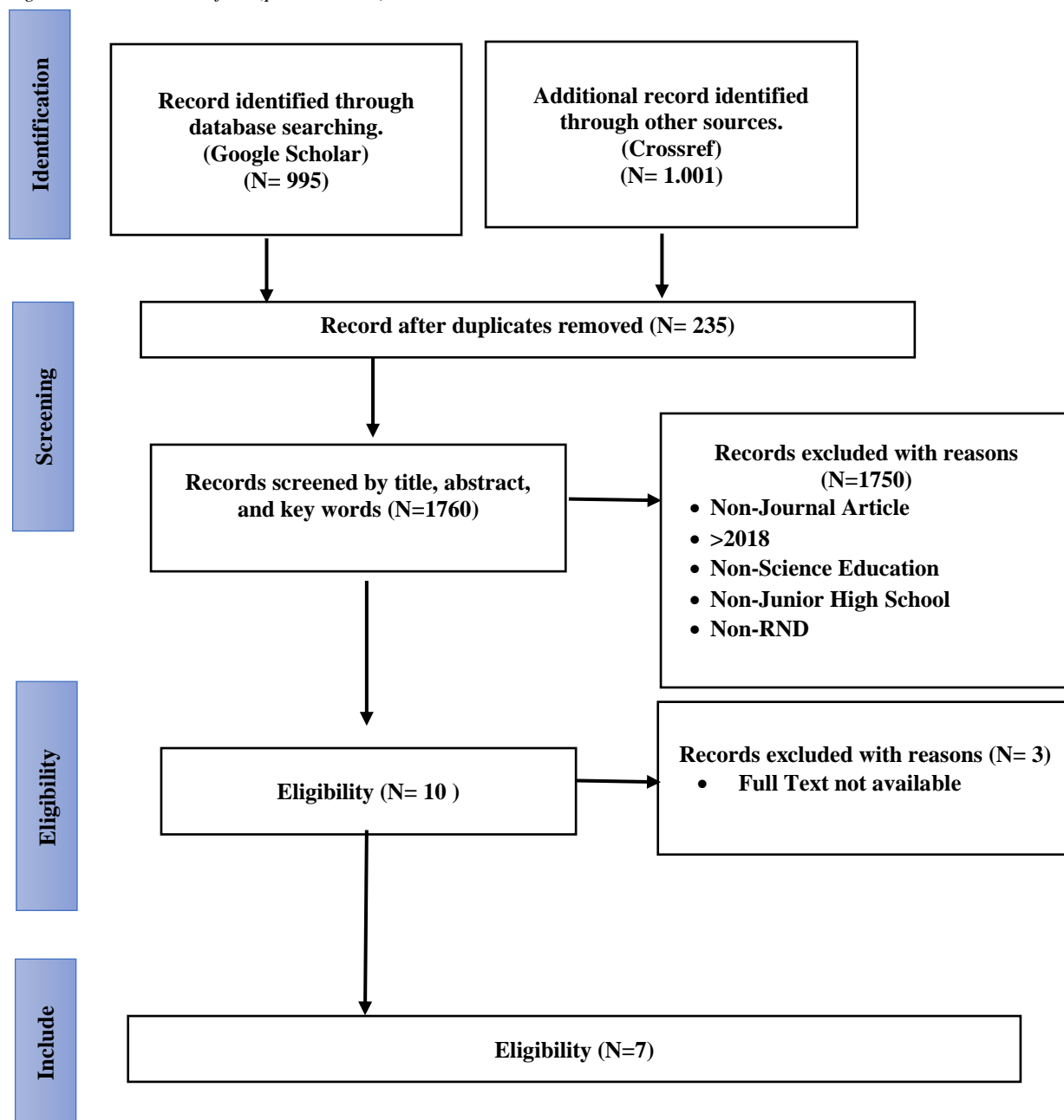
Table 2 inclusion and exclusion criteria

Criterion	Eligibility	Exclusion
Literature Type	Journal (Research Article)	Journal (Systematic Review), Book Series, Book, Chapter in Book
Language	Indonesian, English	Non Indonesian, Non English
Timeline	2018-2023	< 2018
Subjects	Science	Mathematics, PAI, History, Arabic, Indonesian, Criminal Law, Accounting, Management, Geography, Entrepreneurship
Research Respondents	School Students (Middle)	Teacher, University Student, School Student (Elementary and High School)

Research Design	Rnd	Non Rnd
Open Access	Full Text	Abstract only

After determining the inclusion and exclusion criteria for the research to be conducted, the next step is to create an article selection flow (PRISMA method).

Figure 1 article selection flow (prism method)



Based on the literature selection process (prism method) that has been carried out, it is known that the total literature search (identification) results amount to 1995 pieces of literature, 995 pieces of literature sourced from Google Scholar and 1,001 pieces of literature sourced from Crossruff.

After carrying out the identification stage, a screening stage was carried out to select the literature that had been obtained. There were 235 duplicate literatures found so that the remaining literature was 1760 pieces of literature. Then, after further selection, 1750 articles were found that met the exclusion criteria, leaving 10 pieces of literature remaining. After the screening stage is carried out, the eligibility stage is carried out, namely the literature selection stage again so that literature is found that meets the inclusion criteria. From the eligibility stage, 3 pieces of literature were excluded because the literature was not full text, not for junior high school

level and did not have science, biology, physics, and chemistry subjects. Next, the final stage, namely the included stage, aims to obtain articles that are suitable for analysis. At this stage, 7 pieces of literature were found.

3. RESULTS AND DISCUSSION

Based on the systematic literature review that was carried out, articles were found that were worthy of analysis. The articles taken are articles that contain the development of PJBL-based modules. The following table 3 presents an analysis of the article.

No	Name	Title	Year	Journal name	Link
1.	PP Rahayu	Development of a Physics Module Based on Project Based Learning (Pjbl) Using Analogies to Improve Scientific Literacy Skills on Temperature.	2020	digilib.uns.ac.id	https://digilib.uns.ac.id/document/detail/84865/Pemembangan-Modul-Physics-Berbasis-Project-Based-Learning-Pjbl-Mengusing-Analogi-untuk-Improving-Sains-Literacy-Kemampuan-pada-Material-Temperature-and-Heat-Class-X-SMK
2.	IW Ardithayasa	Development of Project Based Learning Modules to Improve Scientific Literacy and Problem Solving in Plant Breeding Material	2022	repo.undiksha.ac.id	https://repo.undiksha.ac.id/id/eprint/12924
3.	Y Yuliana, ZK Prasetyo, PW Hastuti	Development of a Science Module Based on Project Based Learning to Develop the Creativity of Class VIII Middle School Students	2018	journal.student.uny.ac.id	https://journal.student.uny.ac.id/index.php/ipa/article/view/11826
4.	S Febryani	Development of an Integrated Science Module Based on Project Based Learning (Pjbl) Integrated Science, Technology, Engineering, Arts.	2022	e-repository.perpus.iainsalatiga.ac ...	http://e-repository.perpus.iainsalatiga.ac.id/14077/
5.	IW Soleh	Development of an Integrated Science Module Based on Project Based Learning for Class Vii Smp/Mts Students.	2021	repo.undiksha.ac.id	https://repo.undiksha.ac.id/8566/
6.	Ice Taurina	Development Of Project Based Learning Modules on Environmental Change Materials to Grow.	2019	repository.radenintan.ac.id	http://repository.radenintan.ac.id/7889/1/SKRIPSI%20ENDANG.pdf
7.	Agus Junaidi, Rufi'i Rufi'i, Yoso Wiyarno	Development Of a Biology Module on Environmental Pollution Materials To Improve Science Process Skills And Critical Thinking Ability	2021	FKIP Sultan Ageng Tirtayasa University	http://dx.doi.org/10.30870/biodidaktika.v16i2.12867

Based on the table above, there are 7 articles eligible for analysis, the selected articles have met the inclusion and exclusion criteria. The selected articles have gone through 4 stages, the first stage is identification, namely the initial database/or combined database totaling 1996, then the second stage is screening where we carry out filtering and duplication. At this stage all the remaining databases are 10, the third stage namely the stage of selecting which articles are full text or not and 3 articles are found that are not full text, the fourth stage or final article produces 7 articles in the table.

From the table presented, there are 7 articles that have been selected for analysis. The initial identification stage was carried out by searching for related articles in relevant databases, which in this case included the 1996 database. A screening process was then carried out to filter out relevant articles and remove duplicates, resulting in 10 remaining articles. The next stage was to evaluate whether the articles were available in full text form or not, and it was found that 3 articles were not available in full text form. Finally, the final article selection process was carried out, resulting in 7 articles that would be analyzed further.

The theory that supports this research highlights the importance of STEM project-based learning in improving students' creative thinking abilities. This approach gives students the opportunity to actively engage in the learning process, explore concepts in real contexts, and apply their knowledge to solve complex problems. Through relevant and meaningful projects, students are also invited to collaborate, communicate, and think critically. The research results presented in the table show that the application of STEM project-based learning has a significant effect on students' creative thinking abilities. In most articles, there is a significant increase in students' N-gain after participating in STEM project-based learning. The high average N-gain value indicates that this learning is effective in improving students' creative thinking abilities.

In addition, the selected articles also highlight certain aspects of STEM project-based learning that contribute to improving students' creative thinking abilities. Some articles may emphasize the importance of integration between different disciplines in STEM learning, while others may highlight the role of technology in supporting student exploration and innovation. Thus, the results of this research provide richer insight into the various strategies and approaches that can be used in implementing STEM project-based learning. In the context of relevant theories, the findings of this research are consistent with the literature which shows that project-based learning has a positive impact on the development of students' creative thinking skills. This approach allows students to be actively involved in the learning process, fosters their interest and motivation, and prepares them to face real-world challenges.

However, it is important to remember that although research results show the positive impact of STEM project-based learning, there are still several considerations that need to be considered. For example, factors such as the quality of learning implementation, student characteristics, and school context may also influence the effectiveness of STEM project-based learning. Therefore, further research is needed to better understand how these factors can influence learning outcomes. In conclusion, the research results obtained from the PRISMA method show that STEM project-based learning has the potential to improve students' creative thinking abilities. These findings provide a strong foundation for continuing to develop and implement innovative and relevant learning strategies in STEM education contexts.

4. CONCLUSION

The PRISMA method is a systematic literature review type research method which aims to make it easier for researchers to carry out research whose research results are based on the results of literature analysis that has been selected in stages through several systematic procedures. Based on the results of the PRISMA method carried out by researchers, 7 pieces of literature were obtained that were suitable for analysis. As a result of the PRISMA method, which was carried out to select several literatures, the total number of literatures that were excluded or not suitable for analysis was 1,989 literatures.

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