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Creativity in Project Based Learning: A Systematic Literature Study (2015-2021)

Leony Sanga Lamsari Purba[1,*], I Wayan Dasna[2], & Habiddin[2]

[1]Department of Chemical Education, Universitas Kristen Indonesia, Indonesia

[2]Department of Chemical Education, Universitas Negeri Malang, Indonesia

Abstract: Character education has always been the focus of attention in the world of education in Indonesia. Creativity as an important form of character must really be measured with the right assessment instrument. Project Based Learning is a learning model that is able to explore the creativity of students. In this paper, a meta-review is conducted on the instruments for assessing student creativity in project-based learning on studies published in journals indexed by the Scopus database in 2011-2021. The results of this study show that the assessment of students' creativity in project-based learning by utilizing local wisdom has been widely carried out but has not found an assessment that focuses on all dimensions of creativity. In each PjBL syntax an assessment can be made, by adjusting the syntax to the creativity dimension which includes the dimensions of press, process, person, and product, but based on the results of the review there are no articles related to the implementation of PjBL based on local wisdom on the assessment of students' creativity, so the learning assessment only focuses on in the final condition does not include the learning process.

Keywords: project based learning, creativity, systematic literature study.

Abstrak: *Pendidikan karakter selalu menjadi fokus perhatian dalam dunia pendidikan di Indonesia. Kreatif sebagai salah satu bentuk karakter yang penting harus benar-benar diukur dengan instrumen penilaian yang tepat. Pembelajaran Project Based Learning merupakan salah satu model pembelajaran yang mampu mengeksploarsi kreativitas peserta didik. Pada tulisan ini, dilakukan meta-review terhadap instrumen-instrumen penilaian kreativitas peserta didik pada pembelajaran berbasis proyek terhadap kajian yang terpublikasi pada jurnal terindeks oleh database Scopus tahun 2011-2021. Hasil kajian ini diperoleh hasil yang menunjukkan bahwa penilaian terhadap kreativitas peserta didik pada pembelajaran berbasis proyek dengan memanfaatkan kearifan lokal sudah banyak dilakukan namun belum ditemukan penilaian yang berfokus pada seluruh dimensi kreativitas. Pada setiap sintaks PjBL dapat dilakukan penilaian, dengan menyesuaikan sintaks terhadap dimensi kreativitas yang meliputi dimensi press, proses, person, dan produk, namun berdasarkan hasil review belum ada artikel terkait implementasi PjBL berbasis kerarifan lokal terhadap penilaian kreativitas peserta didik, sehingga penilaian pembelajaran hanya fokus pada kondisi akhir tidak termasuk proses pembelajaran.*

Kata kunci: *pembelajaran berbasis proyek, kreativitas, studi tinjauan literatur.*

▪ INTRODUCTION

Character Character education is one thing that has been studied in a structured manner by education stakeholders in Indonesia. The creativity of students is one of the character education that affects the potential of human resources. Various studies in Indonesia related to student creativity through various applications and model development (Desnylasari et al, 2016; Balemen & Keskin, 2018; Astuti et al, 2019; Muliaman & Mellyzar, 2020; & Santyasa et al, 2021), strategies (Ricaurte & Viloria,

Leony Sanga Lamsari Purba
*Email: leony.purba@uki.ac.id

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2020), learning approaches and methods as well as media and teaching materials (Nainggolan et al, 2020). Based on search results on Google Scholar, there are 5,850,000 studies related to PjBL learning models and 3,325,500 of them focus on student creativity.

Project-based learning can be evaluated for its effectiveness in improving student achievement, which can be done by the teacher of the process and final product of the project. One of the assessments that can be done through the implementation of PjBL is to increase student creativity (Ismuwardani et al, 2019; Ummah et al, 2019). Studies related to PjBL to see the creativity of students in the field of chemistry as many as 205,500 search results on Google Scholar have been developed by several researchers involving students and stakeholders.

Student creativity is one of the demands of 21st century educational competencies, namely the ability to think critically, communicate, think creatively, and collaborate (Suyitno, 2020; Wrahatnolo, 2018). The assessment of students' creativity skills which consists of four dimensions, namely the Person, Process, Press, Product dimensions, known as the Four P's Creativity, has never been carried out thoroughly, especially in chemistry. However, in particular, assessment of learning outcomes of chemistry projects to determine skills has been studied by several researchers (Tuan et al, 2020; Intarapong et al, 2019; Fourniyati et al, 2020). This research related to increasing the dimensions of student creativity was conducted to see that the measurement of the increase in student creativity was not based on the dimensions of creativity as a whole and comprehensively by using a validated assessment rubric.

Research related to creativity through the application of project based learning in chemistry learning using electronic or web-based devices (Schneider et al, 2022) or conventional or involving the surrounding environment (Umar, 2016; Ainun & Rasmawan, 2021). Product development through student projects based on guidelines or innovative teaching materials generally applies a learning model (Winarti, Indriyanti, & Rahayu., 2015) in its development, regardless of the availability of learning resources closest to students. Science learning resources, especially chemistry, are closest to students and the surrounding environment (Yunanto, 2004). In various lessons, educators, both teachers and lecturers, conduct research and development of teaching materials based on appropriate learning models. Indonesia is a country that has natural wealth (Samekto & Winata, 2010) and culture (Kamardi, 2007) which has the power of educators in designing and developing teaching materials according to the needs of students.

Indonesia, with its 33 provinces, each has local wisdom. Indonesian local wisdom is the same but generally different in each province (Brata, 2016). Local wisdom is a source of learning that can be presented in learning materials that can be arranged innovatively as an effort to improve student character (Fajarini, 2014). The improvement of student character is easily observed through the application of a project-based learning model, namely Project Based Learning (PjBL) in chemistry learning by utilizing students' local wisdom (Pratiwi, Ardianti, & Kanzunnudin, 2018). Various studies have implemented PjBL into chemistry learning to increase creativity. Creativity analyzed as a result of PjBL implementation provides a lot of input for educators, students, and educational decision makers. Several researchers have implemented PjBL based on local wisdom to increase students' creativity.

Because the study of local wisdom in chemistry subjects is very minimal, the authors consider local wisdom in all science learning to be the study material in this paper. Overall, in this paper the authors review articles to determine the effect of developing project-based innovative teaching materials with various chemistry topics using local wisdom on students' creativity. More specifically, the authors conducted a study of local wisdom in chemistry subjects by applying PjBL to observe the increase in the dimensions of students' creativity.

The natural wealth and demands for 21st century skills as well as the pedagogical competence of educators through the implementation of project-based learning models are opportunities for stakeholders in the world of education in Indonesia to improve the quality of graduates or human resources in our country. Given the importance of increasing creativity through PjBL learning based on local wisdom, the author reviews various articles that have been published in various media such as unaccredited national journals, sinta 1 to 6 accredited national journals, international journals, reputable international journals such as Scopus and Thomson Reuters.

▪ METHOD

Participants

The population in this research is the best articles on student creativity in project learning integrated with local wisdom, from the digital library ScienceDirect (1,914 articles), JSTOR (2,674 articles), Sage Pub (652 articles), DOAJ (18,500 articles) and Springer (2,297 articles). The determination of the research sample was carried out using a purposive sampling technique, so the sample in this study were articles from 2011-2015 with a total of 15,600 articles.

Research Design and Procedures

Systematic review includes both quantitative techniques (meta-analysis) and qualitative techniques (meta-synthesis). In this research, a systematic review method with a qualitative approach is used, which is used to synthesize (summarize) the results of research that are descriptive qualitative in nature. The research process refers to the Systematic Review by Perry & Hammond, (2002) in the order presented in table 1 below:

Table 1. Systematic review procedure

No	Procedure Stage	Purpose
1.	Identification of research questions.	Transforming project-based learning problems into research questions.
2.	Develop a systematic review research protocol.	Provide guidance in conducting a systematic review.
3.	Determine the location of the research results database as the search area.	Provides search area boundaries for relevant research results.
4.	Selection of results relevant research.	Collect research results that are relevant to the research question.

5.	Select results research that quality.	Exclusion and inclusion of research that will be included in a systematic review based on quality.
6.	Data extraction from individual study.	Extracting data from individual studies to get important findings
7.	Synthesize results with narrative method (if not possible)	Synthesize results with techniques narrative technique (metasynthesis)
8.	Results Presentation	Write down the research results in a systematic review report document

This research method refers to the Systematic Review. Systematic review is a very rigorous procedure in identifying, assessing, and synthesizing all relevant research results related to research questions, specific topics, or phenomena of concern using strategies to limit bias (Briner & Denyer, 2012; Garg et al, 2008; Kitchenham, 2004),

Instruments

To obtain articles to be reviewed, the determination of Inclusion and Exclusion Criteria uses the PICOS approach (Budgen and Brereton, 2006). (Population, Intervention, Comparison, Outcomes, Study) used as presented in table 2 below:

Table 2. Inclusion and exclusion with the pico approach

Criteria	Inclusion	Exclusion
Populasi	Creativity in project-based learning integrated with local wisdom	Creativity, local wisdom project-based learning which is carried out separately
Intervension	No action	No action
Comparison	No comparison	No comparison
Outcome	Student Creativity in project-based learning integrated with local wisdom and supervisors.	Nothing
Study	Sejumlah 15,600 articles mulai tahun 2011 himga 2015 with a total of .	Article Before 2015 and after 2021
Publication Year	2015-2021	Before 2015 and after 2021
Language	Indonesian, English	Besides Indonesian, English

Data Analysis

Sources of journals in this study were using the google schoolar database, Directory of Open Access Journal (DOAJ), digital library ScienceDirect, JSTOR, Sage Pub and Springer. The determination of the research sample was carried out using a purposive sampling technique, so the sample in this study were articles from 2011-2015 with a total of 15,600 articles.with articles for 2015-2021, Fulltext Articles that matched the topic, namely articles that discussed the implementation of PjBL based on local wisdom to increase the creativity of participants. students are reviewed in this article.

Studies on local wisdom in increasing the dimensions of students' creativity through project learning, specifically in chemistry learning are still in the small category when compared to the many researchers in the field of chemistry education spread across 111 chemical education study programs in Indonesia (Kemdikbud, 2021).

The stages after collecting data and information are selection of all appropriate data, selection of relevance using Duffy's Research Appraisal Checklist Approach, followed by comparative analysis to see a comparison between the main ideas of this paper and several relevant theories, and to further provide recommendations for increasing student creativity. viewed from its dimensions through project-based learning by utilizing local wisdom. The articles to be reviewed are obtained using the keywords project-based learning, student creativity and local wisdom in chemistry learning, dengan total artikel.The next step is to analyze some of the literature from the results of articles that have passed QA.

▪ RESULT AND DISSCUSSION

The article on Collaboration learning: project-based learning and local wisdom, illustrates that project-based learning in elementary schools in collaboration with the local community of Kampung Naga wisdom makes learning more active, enthusiastic, and happy (Nurdiansah et al, 2021). Similar research was conducted by Retnowati et al (2020), the results showed that the development of the PjBL model based on local wisdom increased their ability to solve environmental problems, the average value of the experimental class was 0.69 and the control class was 0.055 (scale 0-1.0). Research on local wisdom was also conducted by Setiawan (2019); Imansari et al (2018); Minarni et al (2017); Shidiq (2016); Wiratma (2015). Based on the results of the study, the study focused on the implementation of the PjBL model based on local wisdom, not focusing on the creativity of students.

The creativity of students studied through the implementation of the PjBL learning model by Astuti (2015); Kusumaningrum & Djukri (2016); Insyasiska et al (2017); Lutfi et al (2018); Sukmajaya et al (2019); Hidayati & Siswanto (2020); Fatma (2021) in the subject of Biology. In the Physics subject, the study of the implementation of the PjBL learning model on increasing student creativity was carried out by Fadilah (2015); Khoiri at al (2016); Suranti et al (2017); Sari et al (2018); Umamah & Andi (2019); Cahyani et al (2020); Rana et al (2021). In the subject of Chemistry, as a part of science, researchers also conducted the same study from 2015 to 2020. Several study results were presented in Scopus indexed and nationally accredited International Journals. The results of the study are presented by Paradita et al (2015); Widyasari et al (2016); Widyasari (2017); Surya et al (2018); Rosid (2019); Khotimah & Suhirman (2020); Fatima (2021).

The Urgency of Implementing PjBL Learning Models based on local wisdom

Learning with PjBL is learner-centered learning (Suryaningsi & Nurlita., 2021) so as to improve student learning outcomes (Minanlarat et al, 2021; Harefa et al, 2019). PjBL can be implemented with various approaches, one of which is a scientific approach (Umar, 2016) based on local wisdom. The use of local wisdom in learning can be used as a strategic step in developing a more characteristic learning (Nadlir, 2016) in various subjects and more specifically on various learning topics. Currently, the

government strongly encourages learning that is able to improve scientific literacy because the PISA results from 2000-2015 show that the ability of students in Indonesia to understand reading, count, or think scientifically has not changed much, in 2015 PISA Indonesia's literacy ability is in the order of 66. In an article published by Khery et al (2020), local wisdom-based chemistry learning can improve students' scientific literacy. The ability to share knowledge is one of the impacts of students' scientific literacy skills, which must receive attention in the implementation of learning. The ability to share knowledge of students can also be improved through learning chemistry by using books developed based on local wisdom (Agustina, 2021). Based on the description above, the urgency of implementing the PjB learning model based on local wisdom is to create a student-centered learning atmosphere and instill character education by utilizing the local wisdom of students so that it is not eroded by modernization.

The results of the review obtained in the Urgency of Implementing Local Wisdom-Based PjBL Learning Models are (1). not all chemistry topics have been taught by teachers through the application of the PjBL Learning Model with integrated local wisdom; (2). Learning in the 3T areas has not comprehensively and consistently implemented PjBL learning integrated with local wisdom; and (3). Local wisdom-based learning through the PjBL model improves student achievement.

Contribution of the Focus of the Creativity Dimension in Optimizing the Implementation of the PjBL Learning Model based on Local Wisdom

The dimensions of creativity are divided into four parts, namely personal (person), pusher (press), process (process), product (product). Each student has different abilities in terms of cognitive, psychomotor and affective. El Shinta et al, (2015), conducted a study on "The influence of the application of the PBL model on creativity and written communication skills students" it was found that the creativity of students on the Process dimension had good criteria, on the Person and Press dimensions and the Product dimension had sufficient criteria while the personal dimension not examined in this study.

The search results for studies that discuss the dimensions of creativity have not been many. In the implementation of the PjBL learning model based on local wisdom, to improve the ability and strengthen the character of students, it is necessary to conduct a detailed learning evaluation to find space to solve learning problems. In this case, to increase the creativity of students through the implementation of the PjBL learning model based on local wisdom, it must be evaluated from all dimensions of the creativity of each student. Based on the study of the implementation of the PjBL learning model in increasing the creativity of students in science subjects, both biology, physics and chemistry, it does not specifically discuss creativity based on its dimensions. Overall, the publication of the articles reviewed measured the increase in students' creativity by using a questionnaire without distinguishing the dimensions of creativity. To obtain more specific data related to increasing creativity, students must pay attention to four dimensions of creativity (Boden, 1996), which consist of personal, pusher, process , product (product).

The results of the article review on the Contribution of the Focus Dimensions of Creativity in Optimizing the Implementation of Local Wisdom-Based PjBL Learning

Models are (1). There is no complete assessment of student creativity on 4 dimensions (product, press, person and process) and (2). There is no complete creativity assessment rubric in its 4 dimensions in learning that implements local wisdom-integrated PjBL.

▪ CONCLUSION

The results of this study indicate that not all chemicals have ever been studied through the implementation of PjBL integrated with local wisdom. Moreover, many assessments of creativity in project-based learning by utilizing students' local wisdom have been carried out but assessments that focus on the dimensions of creativity have not been found.

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