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THE IMPACT OF THE INDEPENDENT LEARNING CURRICULUM'S DEVELOPMENT ON MATHEMATICS EDUCATION

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Abstrak

The curriculum is a set of educational program plans used as guidelines for implementing learning activities to achieve national education goals. The independent curriculum is newly established in Indonesia and will undoubtedly influence learning, including mathematics. This research aims to analyse the impact of changes to the independent curriculum on mathematics learning. This research uses the Systematic Literature Review (SLR) method by reviewing articles and identifying, analysing, and concluding several studies that have been conducted previously. Article searches were done using the Google Scholar search engine and the publish or perish application. The research results found that the development of the independent curriculum had a significant influence on mathematics learning. The positive impact of implementing mathematics learning is that students' abilities in mathematics increase, and teachers can increase their ability to innovate and be creative. Meanwhile, the negative impact of implementing mathematics learning is that there are still insufficient teachers and difficulty creating learning tools.

INTRODUCTION

Mathematics is one of the compulsory subjects that must be studied by all students from every level of education, from elementary to middle to high school. Mathematics subjects are given to all students as a form of effort to develop students' thinking power and students' critical thinking. It is hoped that by studying mathematics, students can master abstract mathematical concepts, which will later become a prerequisite for understanding and mastering knowledge in other fields (Rahmawati & Kusuma, 2019).

As previously explained, mathematics is a mandatory subject that must be taught at every level of an educational unit in Indonesia; this influences the curriculum changes that often occur in Indonesia. Indeed, every change in the curriculum impacts the learning process in schools, even though it remains with the same goal, namely advancing or improving the quality of Indonesian education. Besides influencing the learning process, changing the curriculum means changing everything: teachers, students, school principals, school owners, parents, the general public, and everyone involved or taking part in education (Muhammedi, 2016).

The curriculum is a set of educational program plans used as guidelines for organising learning activities to achieve an educational goal. The curriculum in the world of education will experience several changes according to developments over time. This change process occurs because of the demands of the times and is adapted to the various needs of students. Indonesia itself has experienced several curriculum changes. Curriculum changes have no purpose but to improve the quality of the learning process and learning design in schools (Masykur, 2019).

Curriculum changes in Indonesia to date have undergone several changes, reaching 12 curriculum changes. The first curriculum to be adopted in Indonesia was the Lesson Plan Curriculum (Explained in Outlined Lesson Plans), which began in 1947. There were further curriculum changes, namely 1964, 1968, 1973, 1975, 1984, 1994, 2004 (Competency-based curriculum), and 2006 (educational unit level curriculum); until 2013, Indonesia continued to experience curriculum changes (Setyorini et al., 2023). The 2013 curriculum emphasises competencies based on attitudes, skills and knowledge. The 2013 curriculum emphasises competencies based on attitudes, skills and expertise. In the independent curriculum, these three competencies are combined into cognitive competencies.

The independent curriculum is a curriculum that prioritises character education and builds an understanding of the use of technology in the era of digitalisation (Panginan & Susianti, 2022). Implementing this independent curriculum is expected to develop students' abilities, especially in the aspects of skills and character per the Pancasila student profile. This independent curriculum gives students the freedom to explore knowledge as profoundly as possible by utilising the technology available in the current era of digitalisation. One of the activities for students to explore knowledge is through literacy activities, developing personal abilities to support students' self-development (Manalu et al., 2022).

The independent curriculum, previously known as the prototype curriculum, has a flexible curriculum framework, focuses learning on essential material, prioritises character development through the Pancasila student strengthening project, and aims to improve the abilities and quality of students (Sadieda et al., 2022). In this curriculum, teachers can teach

by adjusting students' learning outcomes; teachers can use and develop teaching tools that support learning according to students' interests and learning needs so that learning can be meaningful, understandable, and of interest to students. Indonesia is experiencing a numeracy literacy crisis; many children in Indonesia cannot understand simple reading and apply mathematical concepts. This is made worse by Covid-19, where learning can only be done remotely and not intensively. Therefore, to overcome this crisis, the Ministry of Education and Culture Research has launched an independent curriculum to improve students' literacy and numeracy and catch up with the lag caused by COVID-19 (Febriani et al., 2022).

From the above explanation, this article will analyse the impact of changes to the independent curriculum on mathematics learning. Researchers will use the Literature Review Study method by summarising the results of previous research, namely through journal sources related to the independent curriculum running in Indonesia.

RESEARCH METHOD

The research method used is a Systematic Literature Review (SLR). The process carried out is 1) selecting a topic, 2) developing argumentation tools, 3) literature search, 4) literature survey, 5) criticising the literature, and 6) writing a thesis (Machi & McEvoy, 2016). The details of these steps are as follows

Step 1: Choose a topic

The independent curriculum is a new curriculum implemented in Indonesia. This change in curriculum will, of course, impact the implementation of learning. This impact will, no exception, affect mathematics learning. This topic is fascinating because this research can provide input for curriculum implementation in Indonesia, especially for mathematics learning.

Step 2: develop argumentation tools

This impact review can be carried out by direct research in the field and reviewing various existing studies. The results of this research can be found in scientific publications. Scientific work can be published as articles in journals or proceedings.

Step 3: search for literature

Research article search engines are very diverse, one of which is Scholar.google.com. The search process for this article was carried out from July 2023 to December 2023. The method of searching for publications on independent curriculum research results in Indonesia was carried out by 1) limiting the search year, namely between 2013 and 2023. 2) the first keyword used is "kurikulum Merdeka". This is because "kurikulum Merdeka" is the word for independent curriculum in Indonesian. Search results obtained 32,600 articles. 3) The next keyword is "matematika". This is because the focus of the research is focused on mathematics learning. Search results obtained 18,300 articles.

Step 4: literature survey

At this stage, the selection of the articles obtained is carried out. To sharpen the analysis, the discussion of this article is limited to Differentiated Learning, Learning Models, Numeracy Literacy, Concept Understanding and Problem Solving, and Mathematics Learning Outcomes. At this stage, use the Publish or Perish search engine tool. On the limits of differentiation learning, they were using the keyword "diferensiasi". The search results obtained 19 articles. In the learning model's limits, use the keywords "PBL" and "PjBL". The

search results obtained 24 articles. When understanding concepts and problem-solving, use the keywords "pemahaman konsep" and "pemecahan masalah". The search results obtained 5 articles. In terms of learning outcomes, use the keyword "hasil belajar". The search results obtained 13 articles.

Step 5: criticise the literature

At this stage, an analysis of the quality of the article is carried out. From the search results, 4 articles were then selected from each limitation. The selection is based on the most citations. The results of this stage obtained 16 articles. The steps for selecting articles can be explained in Figure 1 below.

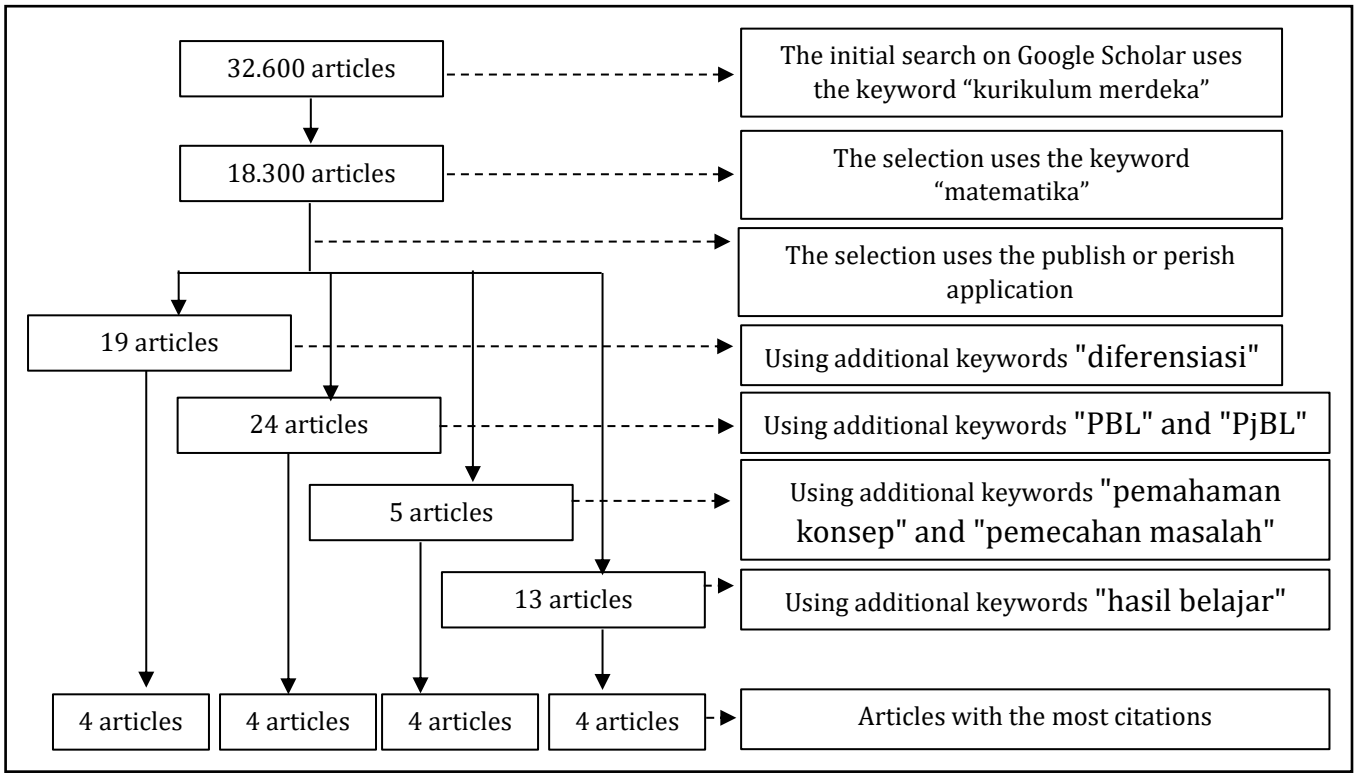

Figure 1
Article Selection Step

Step 6: write a thesis

The process in this step is to analyse in depth the 16 articles that have been selected. The results of the analysis are then described. The description focuses on the independent curriculum's influence on mathematics learning and its positive and negative impacts.

RESEARCH RESULTS AND DISCUSSION

Research Results

An independent curriculum is a curriculum that prioritises freedom for students and for teachers who teach. Teachers can be free to be creative in providing learning in class according to students' conditions, and students not only pay attention to the teacher teaching, but students can experience a more relaxed learning atmosphere, namely by discussing with the teacher and outing class (Wahdani & Burhanuddin, 2020). Apart from

prioritising freedom, the independent curriculum also focuses on the Pancasila student profile to improve students' characteristics. The independent curriculum plays a role in learning, including mathematics learning; here are 12 selected articles that discuss the influence of the independent curriculum on mathematics learning.

Table 1
Selected Articles Used in Research

No	Research focus	Selected Articles
1.	Differentiated Learning	(Aprima & Sari, 2022; Gusteti & Neviyarni, 2022; Hanif Evendi et al., 2023; M. Ningrum et al., 2023)
2.	Learning models	(Khusnun Ni'am et al., 2022; A. S. Ningrum, 2022; Sadieda et al., 2022; Septiani et al., 2022)
3.	Literacy and Numeracy	(Feriyanto, 2022; Lestari et al., 2023; Wisnu Hapsari, 2023; Yayuk et al., 2023)
4.	Understanding concepts and solving problems	(Andriani, 2023; Fianingrum et al., 2023; Jannah et al., 2023; Maghfira et al., 2023)
5.	Mathematics learning outcomes	(Fitria et al., 2023; Panginan & Susianti, 2022; Saraswati & Sulistyani, 2023; Suparjan & Heru Purnomo, 2023)

Table 1 shows several articles that discuss the independent curriculum. Because the impact of the independent curriculum is comprehensive, this research focuses on differentiated learning, the use of learning models, literacy and numeracy, understanding concepts and solving problems, and learning outcomes.

Discussion

The Influence Of The Independent Curriculum On Mathematics Learning

The independent curriculum is very synonymous with differentiated learning. Differentiated learning makes students the center of learning activities by paying attention to needs, readiness, talent profiles and interests (M. Ningrum et al., 2023). This differentiated learning is suitable for mathematics learning because it can adapt to students' needs, interests, learning styles and learning profiles (Hanif Evendi et al., 2023). Differentiated learning is considered adequate in mathematics subjects in elementary school because students' understanding of the material being tested increases, and differentiated learning is considered more interesting because it uses learning media that adapts to students' learning styles (Aprima & Sari, 2022). In implementing differentiated learning, teachers must be able to construct and manage learning using various existing media and technology. This management aims to make students more interested and interested in mathematics learning activities (Gusteti & Neviyarni, 2022).

Teachers can use several learning models integrated with differentiated learning to create exciting learning. The learning models offered in the independent curriculum are Problem-based Learning (PBL) and project-based Learning (PjBL) (Septiani et al., 2022). This learning model is suitable for use in an independent curriculum whose learning is based on constructivism theory, where students are required to build their understanding through problem-solving. Apart from using appropriate learning models, teachers can use blended learning methods. The integrated learning method is considered a learning method in accordance with the independent curriculum. This is because the integrated learning method combines direct and online teaching. Even though the pandemic has ended, teachers

can use this method because this method can attract students' attention during learning (A. S. Ningrum, 2022; Sadieda et al., 2022). Apart from the blended learning method, another method that can be used is based on computational thinking. The computational thinking-based method is a method that is suitable for use in the independent curriculum. The computational thinking method can have a positive role, namely increasing teacher creativity and making students think broadly and open to their surroundings related to mathematics learning (Khusnun Ni'am et al., 2022).

Efforts to make the mathematics learning process enjoyable by implementing an independent curriculum are necessary. Numeracy literacy, mathematical understanding abilities, and mathematics learning outcomes can improve if students feel comfortable and interested in learning. This aligns with several previous studies, namely that high or low student literacy and numeracy depend on teacher innovation in making the learning process exciting and helping students think critically and creatively. If teachers can make creative innovations during the learning process, students' literacy and numeracy skills will increase and fulfil the Pancasila student profile (Wisnu Hapsari, 2023). Strategies to improve student literacy and numeracy are carried out by teachers and the government, schools, parents, and students, who must be willing to collaborate to increase literacy and numeracy. Efforts that the government can hold quality programs such as launching a numeracy literacy movement in schools, while schools can facilitate the needs of students, and parents can supervise and direct the learning media used by students (Feriyanto, 2022). The application of the independent curriculum can also improve and understand students' understanding of mathematical concepts and problem-solving in mathematics learning (Fianingrum et al., 2023); apart from that, the application of the independent curriculum can have a significant influence on mathematics learning outcomes depending on the way teachers develop themselves as efforts to create independent learning for students.

From several studies above, it can be concluded that the application of the independent curriculum significantly influences mathematics learning, where the independent curriculum uses differentiated learning, which makes students the centre and adapts to the students' conditions. The learning model that is integrated from a differentiated approach is the PBL and PjBL learning model, while the learning method can use blended learning where learning can be done face-to-face and online. Exciting and innovative learning models and methods can attract students' interest in learning so that numeracy literacy skills, understanding concepts, and solving mathematical problems improve student learning outcomes.

Positive Impact of Implementing The Independent Curriculum

Applying the independent curriculum to the mathematics learning process has positive and negative impacts. Positive and negative effects can be influenced by several elements, namely teachers, students, agencies, parents, and others. The independent curriculum allows students to express themselves according to their abilities to develop their talents (Lutfiana, 2022). Students can also improve logical and cognitive thinking, increasing literacy and numeracy skills (Zahwa et al., 2022). From the teacher's side, the independent curriculum provides opportunities for innovation and creative thinking during the learning process so that learning attracts students' attention (Zahwa et al., 2022).

Several conclusions can be drawn from the several positive impacts that have been described. The positive effect of implementing the independent curriculum on mathematics learning is that students' abilities in mathematics increase. This increase is due to freedom for students, because this freedom can improve their abilities according to their talents. This advantage is also supported by the teacher's freedom to innovate and be creative in arranging media, methods and learning models so that students can be more interested in the mathematics learning process.

Negative Impact of Implementing The Independent Curriculum

The independent curriculum is a new curriculum determined by the Indonesian minister of education in 2021, and the determination of the simultaneous use of the independent curriculum will be carried out by schools in 2024. The determination of this new curriculum has caused several negative impacts for several parties because they are not used to it and require adaptation to this independent curriculum. The adverse effect of implementing an independent curriculum on mathematics learning is that teachers have difficulty choosing a suitable learning model because the learning model must be adapted to students' characteristics and learning styles (Sadieda et al., 2022). Another weakness from the teacher's side is the difficulty in compiling teaching modules and learning assessments (Aprima & Sari, 2022). The weakness of the independent curriculum, when viewed by students, is that students are prone to missing out on material due to teachers' lack of ability to design learning and the large number of learning outcomes that must be completed (Zahwa et al., 2022).

Based on the negative impacts that have been described, the author can conclude that applying the independent curriculum to mathematics learning means that teachers have difficulty planning and assessing learning. This can result in students falling behind in the subject matter that must be mastered and not understanding the material explained by the teacher.

CONCLUSIONS

The development of the independent curriculum has influenced mathematics learning, namely, the emergence of differentiated learning, increasing students' numeracy literacy, learning models and methods used, students' understanding of concepts and problem-solving, and students' mathematics learning outcomes. Numeracy literacy skills, understanding concepts, solving mathematical problems, and student learning outcomes can improve if the independent curriculum is implemented according to its objectives. To realise the goals of a separate curriculum, teachers need to determine learning methods and models that suit students' needs and attract students' interest in learning.

The positive impact of implementing an independent curriculum on mathematics learning is that students' abilities in mathematics increase because of the freedom that allows students to improve their abilities according to their talents, and teachers can innovate and be more creative in arranging learning tools. Meanwhile, the negative impact of implementing the independent curriculum on mathematics learning is that teachers still have difficulty creating learning tools, which can result in students not understanding the material the teacher explains.

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