Efforts to enhance self-confidence and its impact on mathematics learning: A systematic literature review

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Abstract: This study aims to examine the role and efforts that can be made to improve Self-Confidence in mathematics learning. The method used is systematic literature review. The stages in this method researchers collect various scientific publications using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines. Based on the results of the article review, it is known that students who have high Self-Confidence in mathematics tend to have better math achievement and ability. Efforts that can be made to improve Self-Confidence are with learning strategies or models. The application of the Problem Based Learning learning model is the most widely done effort to improve students' mathematical Self-Confidence. In addition to Problem Based Learning, there are several efforts that can be made to improve students' self-confidence, among others, by applying CTL, Inquiry, Problem Solving, STAD, and MEAs learning models. Each has its own advantages and characteristics so that it can increase students' self-confidence. In addition to the learning model, the selection of learning media must also be considered in order to increase students' self-confidence in learning mathematics.

Keywords: Mathematics learning; self-confidence; systematic literature review

Introduction

Education is simply a conscious effort made by humans to foster their personality in accordance with the values in society and culture. Education plays an important role in life, namely as an effort to improve and develop the quality of human resources. The purpose of education according to Law No. 20 of 2003 is to develop the potential of students to become human beings who are faithful and devoted to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. Schools as one of the formal educational institutions have the responsibility and authority to participate in educating the whole human being, namely a believer and responsible human being. The achievement of educational goals is highly dependent on how the teaching and learning process takes place at school.

The purpose of mathematics is to develop an attitude of appreciating the usefulness of mathematics in life, namely having curiosity, attention, and interest in learning mathematics, as well as creative, patient, independent, diligent, open, tough, resilient, and confident in problem solving. Self-Confidence is believing in one's own ability to mobilize the motivation and resources needed to act according to task demands (Hendriana et al., 2014). Srivastava (2013) revealed that confident people will have a positive view of themselves and the situation they are experiencing. They also believe in their own abilities with realistic reasons, and they will be able to do what they want, plan and expect.

Good student math self-confidence will make students more motivated and happy to learn mathematics, in the end it is expected that mathematics achievement or learning outcomes are also optimal. However, the fact is that many students still have a relatively low level of self-confidence. Based on the results of

the TIMSS study in 2011 regarding the level of Self-Confidence of students in Indonesia, where the percentage of students who have a high Self-Confidence category is only 3%, for the medium Self-Confidence category is 52%, while 45% are included in the category of students with low Self-Confidence (Mullis et al., 2012). These results are reinforced by the findings of Arofah & Hidayati (2021) who found that the level of self-confidence of students in learning mathematics in junior high school students was lacking, almost half of the students had not mastered the indicators of self-confidence.

Based on the results of these studies, it shows that the level of Self-Confidence of students in Indonesia is still relatively low even though Self-Confidence is very important in learning, is an important factor in achieving success (McGee, 2020, p.32), including success in learning mathematics. Various efforts can be made to increase students' self-confidence or self-confidence in learning mathematics. Based on this, a study is needed related to efforts that can be made to increase students' self-confidence. However, there is no research that reviews the literature on efforts to increase self-confidence and its effect on learning mathematics. Various efforts in this study can be used as an alternative for teachers to increase students' self-confidence and find out how Self-Confidence affects learning achievement and students' mathematical abilities at school.

Research methods

The method used in this research is Systematic Literature Review (SLR). This method is a research method that focuses on the stages, steps, or processes of identifying, assessing or analyzing, evaluating, and interpreting in making conclusions based on all relevant research results and in accordance with the selected research topic and obtained in journals in a systematic or structured manner in following the specified stages, steps, or processes (Suciati et al., 2021). As for the stages in this method, researchers collect various scientific publications using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines. The article selection process is carried out through four stages which refer to namely; identification, screening, eligibility, and included (Shamseer et al, 2015).

The literature search was conducted in May 2023 with the keyword Self-Confidence mathematic. Based on these keywords, the articles presented in the database are related to the influence of Self-Confidence in learning mathematics and efforts to improve it. The databases used in this study were google scholar and ERIC. The articles collected were only articles published in the time span of 2013 to 2023. From the various articles, the author selected articles that were closely related to the keywords used.

Articles that did not meet the criteria were excluded and not used. The articles used provided information about Self-Confidence in learning mathematics. From the number of articles obtained, then examined and selected according to the specified criteria so that the articles used were 23 articles. The article selection process was carried out as in Figure 1 below.

Result and discussion
The effect of self-confidence in mathematics learning

Self-confidence can support one's success, including in learning mathematics. Self-confidence is one of the most influential factors in learning (Hannula et al., 2004). Based on the results of the study revealed that there is a tendency that high self-confidence corresponds to high mathematics learning outcomes (Nilasari, 2020). self-confidence can motivate students to develop their potential and maximize their abilities in learning activities. This can have a positive impact on student learning outcomes. Students who have low self-confidence tend to lack confidence when looking at their abilities and comparing their abilities with other friends. This can affect students in the learning process and have an impact on student learning outcomes later.

Self-Confidence as an affective skill can affect students' mathematical abilities in learning, one of which is problem solving ability (Hendriana et al., 2014; Ramdan et al., 2020; Ramlan, 2021) the better the student's Self-Confidence level, the student has good problem-solving skills, on the other hand the lower the student's Self-Confidence, the student will have poor problem-solving skills. In general, students with high Self-Confidence are able to solve math problems, on the other hand, students with moderate or low Self-Confidence are not able to maximally solve math problems. Students who have high Self-Confidence in mathematics, show an optimistic attitude and do not easily despair when solving difficult math problems, and are more accurate in mathematical calculations than students who have low Self-Confidence. In addition, students with high Self-Confidence in

mathematics do not feel stressed when doing math tasks (Ramdan, 2020).

Tabel 1. Inclusion and Exclusion

Inclusion	Exclusion
I1 : Focus on mathematics education	E1 : Apart from mathematics education
I1 : Focus on influence and efforts to increase student Self-Confidence	E2 : The article is about Self-Confidence, and the focus is not on influence and efforts to increase student Self-Confidence
I3 : The research subjects were elementary, middle and high school students	E3 : Students and teachers
I4 : International and national indexed articles with a minimum of SINTA 2	E4 : Articles not indexed internationally and nationally under SINTA 2

Identificatio

Identify data search results (n=10386)
- Google Scholar (n=9850)
- ERIC (n=536)

Screening

Filtering articles published before 2013
(n=6176)

Observation of title, abstract and keywords
(n=6176)

Article exclusion
E1-E3: focus and domain (n=5940)
E4: Article index (n= 201)

Eligibility

Eligible full articles (n=35)

Complete articles were excluded.
E1-E2: Research focus (9)
E3: Research subjects (n=3)

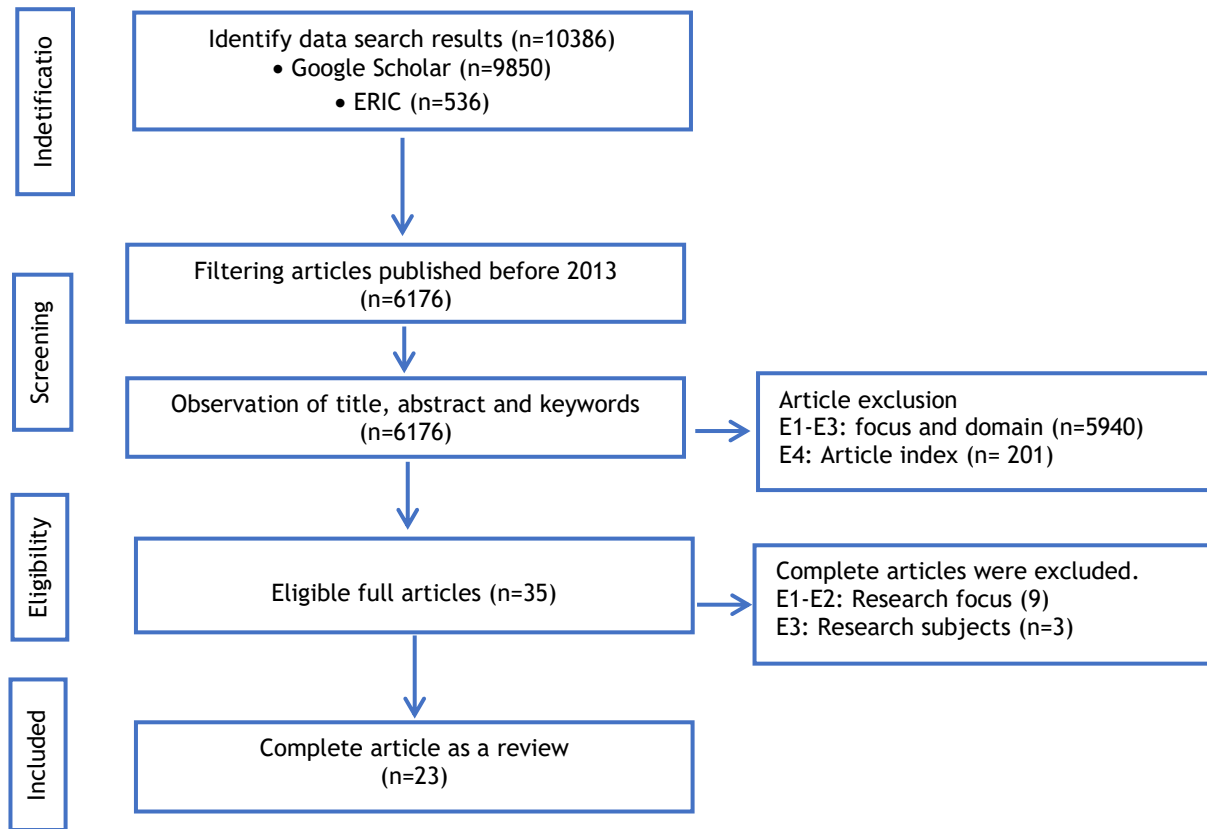**Included**

Complete article as a review
(n=23)

Figure 1. Diagram of the article selection process

Self-confidence also has a positive relationship with students' creative thinking skills (Nufus et al, 2018). Students are very confident in answering questions and are able to explain their solutions clearly and easily understood. They did not experience difficulties in answering questions. They also showed courage in expressing their opinions about the details of the solution although they needed support for medium-level students. In contrast, low-level students did not fulfill the indicators of creative thinking ability. Students did not understand the information contained in the problem. So, students could not find the right method to solve the problem.

Efforts to increase student self-confidence

Based on the results of the article review, efforts to improve Self-Confidence can be done by applying models, approaches, methods, or learning strategies and also using learning media. Reviewing the importance of Self-Confidence that every student must have, teachers need to choose learning strategies in

order to increase students' Self-Confidence. Based on previous research, various learning models and strategies that are reported to be able to increase students' self-confidence include Problem-based learning, CTL, Problem solving, Inquiri Learning , STAD, MEAs, and Project-based learning.
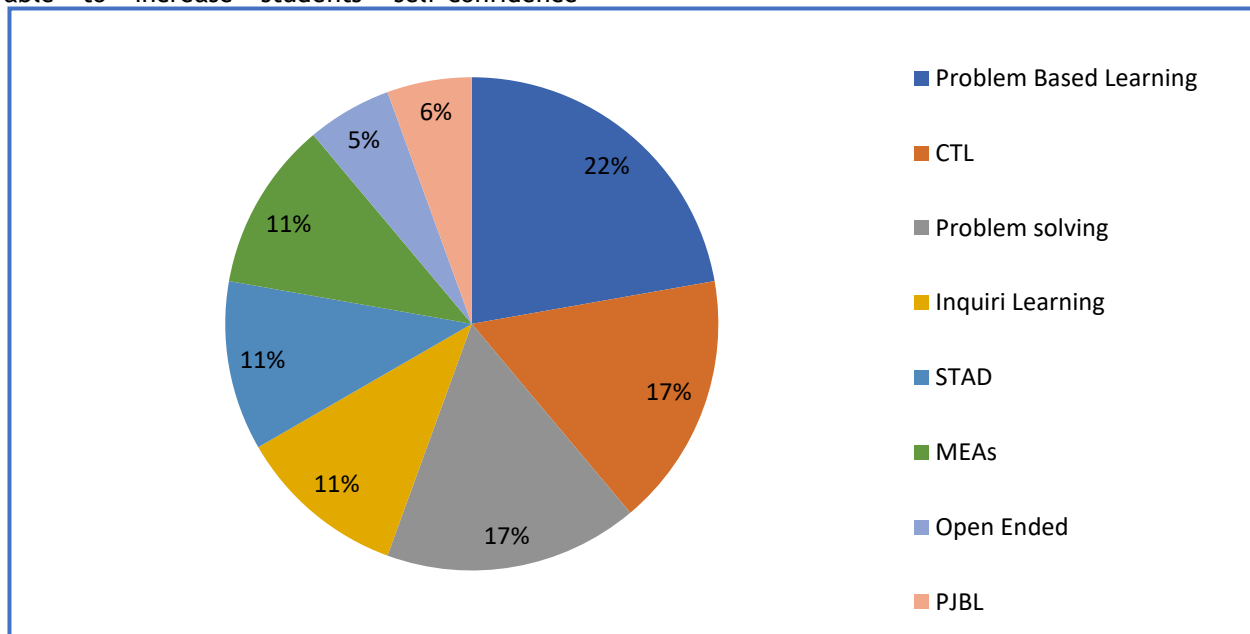

Figure 2. Learning strategy

Table 2. Research Results

Author	Research result
Nilasari, 2020	There is a tendency that high Self-Confidence corresponds to high mathematics learning outcomes.
Hendriana et al., 2014; Ramlan, 2021; Ramdan et al., 2020;	The better the student's Self-Confidence level, the student will have good problem-solving abilities, conversely the lower the student's Self-Confidence, the student will have poor problem-solving abilities.
Nufus et al, 2018	Self-Confidence also has a positive relationship with students' creative thinking abilities.

One way to increase the level of students' self-confidence is the selection of learning models used in the classroom. From the results of the article search, several learning models were obtained that could increase students' self-confidence.

Contextual teaching and learning
CTL learning can increase students' mathematical self-confidence level (Susanti & Wutsqa, 2020; Agustyaningrum & Widjajanti, 2013; Surya et al., 2017). This is because in CTL learning students are given wider opportunities to play a more active role. Students are no longer just recipients of knowledge, but in CTL learning students are expected to be able to find learning concepts by experiencing and constructing knowledge. CTL learning emphasizes the process of full student

involvement to be able to find the material learned and connect it to real life situations. Discussion in CTL learning also makes students more responsible in their groups because each group member is required to have the same capacity to participate in discussions, dare to ask questions or express their opinions without feeling shy or inferior. Someone needs other people to be a place to practice for them, so that they are more confident and skilled. When in a group, students will automatically practice socializing with their friends, so that their self-confidence will be well nurtured (Agustyaningrum & Widjajanti, 2013).

Problem based learning
The application of problem-based learning is able to actively involve students in the learning process. Student contribution occurs

through group investigation and discussion activities. Investigation groups aim to create a meaningful learning atmosphere and increase students' confidence, especially in the process of solving mathematical problems. Problem-based learning often involves positive feedback from peers and teachers, which can help students feel more confident in their work and progress. Problem-based learning requires students to solve real-world problems, which can help them develop problem-solving skills and feel more confident in their ability to overcome challenges.

Project-based learning has also proven to be effective for students' self-confidence (Azizah & Widjajanti, 2019). This is because in project-based learning there are discussion activities and activities to present project/product results. This activity can train students in increasing their Self-Confidence, because students practice to look calm and not have fear when dealing with people and train students to be responsible for the projects that have been done. Students are trained to be confident in their ability to convey their ideas during discussions and develop them into a product so that students can be optimistic about the products they display. A person who believes that he can produce results, achieve goals, or perform tasks competently shows that he has Self-Confidence (Schunk, 2012).

Problem solving

Problem solving learning can provide a space for students to build their own ideas about math and take responsibility for their own learning. The positive thing that can be taken from students' experience in problem solving learning is the sense of pleasure that arises when the problem is finally solved, this will increase students' Self-Confidence and contribute to students' positive attitude towards mathematics (Susanti & Wutsqa, 2020). Several studies have shown that problem-solving activities can increase students' self-confidence and help them overcome their fear of failure. Problem solving activities can also help individuals develop a growth mindset, which is the belief that their abilities can be developed through hard work and dedication. This mindset can increase confidence and motivation to tackle new challenges.

Inquiri learning

Another learning model that can be used to improve self-confidence is inquiry-based learning. Inquiry makes students actively participate in learning, increasing interaction between students and interaction between teachers and students. Through inquiry-based learning, students are facilitated to find and formulate their own concepts systematically, logically, and analytically and provide more opportunities for students to explore their abilities. When students are able to discover the concepts they learn systematically, logically, and analytically, they will be more confident in formulating their findings (Nurlaela & Ismayati, 2015).

Learning media

In addition to the learning model used in the classroom, learning media can also be used as a tool to be able to increase students' Self-Confidence as in Susanti's research (2020) media utilization makes learning more interesting so that it can increase students' Self-Confidence. This is because during the learning process, students who are taught with interactive learning media will be more enthusiastic and very interested in participating in learning. Learning media can increase students' self-confidence because it can help students understand learning materials better, so that students feel more confident in facing exams or assignments. In addition, learning media can also help students to develop new skills, such as presentation skills or skills in the use of technology, which can increase students' confidence.

Conclusion

Based on the results of the article review, it is known that students who have high self-confidence in mathematics tend to have better math achievement and ability. Efforts that can be made to improve Self-Confidence are with learning strategies or models. The application of the Problem Based Learning learning model is the most widely done effort to improve students' mathematical Self-Confidence. In addition to Problem Based Learning, there are several efforts that can be made to improve students' self-confidence, among others, by applying CTL, Inquiry, Problem Solving, STAD, and MEAs learning models. Each has its own advantages and characteristics so that it can increase students' self-confidence. In addition to the learning model, the selection of learning media must also be considered in order to increase students' self-confidence in learning mathematics.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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