Systematic Literature Review: Think Pair Share Learning Model on Students' Mathematical Communication Skills with Ethnomathematics Nuances in Terms of Self-Efficacy

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Abstract

The study is primarily based totally on mastering mathematics which has a tendency to be passive, and students' mathematical communication skills are low. This study used the Systematic Literature Review (SLR) approach from articles posted in 2016-2023 concerning the Think Pair Share learning model, mathematical communication skills, ethnomathematics nuances, and self-efficacy. There are 28 countrywide or global articles acquired from Google Scholar and Springer. Based at the study results, it suggests that Think Pair Share learning model can growth students' mathematical communication skills with ethnomathematics nuances in phrases of self-efficacy.

Keywords:

TPS, Mathematical Communication Skills, Ethnomathematics, Self-Efficacy

1. Introduction

Mathematics has an important role and contribution in achieving accurate and precise communication (Fahrullisa et al, 2018). Therefore, it is hoped that everyone can use the appropriate mathematical language to communicate their thoughts and information. However, many students perceive mathematics as a difficult and unpleasant subject, which has an impact on their low academic achievement.

Low student academic achievement can be caused by students' mathematical communication skills and the teacher's chosen approach. Mathematical communication skills are very important because learning mathematics requires active communication or interaction between students and teachers. In addition, mathematical communication skills enable students to organize and strengthen their mathematical ideas expressed orally or in writing in the learning process. With the help of mathematical communication, teachers can analyze the extent to which students understand the material. Seeing this explanation shows how important mathematical communication is for students to learn mathematics. However, several researchers revealed that students' mathematical communication skills were still very weak. One of the efforts that can be made to improve students' mathematical communication skills is by using a more appropriate learning model.

There are many types of learning models, one type of learning model that can overcome the problem of students' low mathematical communication skills in learning mathematics is the Think Pair Share learning model, because previous research has shown that the Think Pair Share model produces better learning outcomes compared to the traditional model. The TPS model is a strategy that gives students time to think in interactive elements of collaborative learning, which is currently one of the best ways to increase student response to teacher questions. Kurniasih & Sani (2016) state that "The Think-Pair Share (TPS) learning model or thinking in pairs is a type of cooperative learning designed to influence student interaction patterns. The TPS model is a strategy that introduces the idea of waiting time or thinking (wait or think time) in cooperative learning interaction elements which is currently a very good way of increasing student responses to questions posed by teachers (Rahmawati & Hanipah, 2018).

According to Frank Layman, TPS is an powerful manner to extrade the sophistication dialogue patterns, in which the methods utilized in TPS can provide students have greater time to assume earlier than answering instructor questions and assist every other. The advantage of this learning model is that it can optimize student participation. TPS type cooperative learning has clear procedures so that students have more time tothink, respond and help each other with their peers.

The Think Pair Share learning model also creates a fun learning atmosphere, the teacher asks questions, then students have time to think and discuss with their partners to find the answers and assistance that best suit one another. The results of this discussion were distributed in class, after which the teacher decided to hold a class discussion. The TPS learning model also requires high self-confidence or what is commonly known as self-efficacy (Hanin, 2015).

Putri *et al*. (2018) stated that Self-efficacy is the psychological aspect that gives significant influence on student success in completing tasks and problem solving questions well. Students' self-efficacy can be increased by using mathematics learning with a cultural nuanced approach, or what is commonly known as ethnomathematics nuances.

In mathematics learning, it is necessary to have a content that connects mathematics in real life based on local culture with school mathematics known as ethnomatematics (Medyasari et al, 2022). According to Barta and Brenner as cited by Farokhah (2017), ethnomathematics offers a manner to higher recognize the reciprocal nature of mathematics and way of life, of ways way of life impacts the manner cultural groups put in force mathematical applications, skills, and know-how in technique to troubles encountered daily, and the way those culturally stimulated responses reciprocally have an effect on the manner mathematics is conceived and implemented in every precise group.

Based on the description above, the researcher is interested in making the Think Pair Share learning model with a Project Based Learning approach to the mathematical communication abilities of high school students in terms of self-efficacy as research material because it is assumed that these learning models and approaches can provide positive results in terms of abilities. students' mathematical communication and self-efficacy.

The aims of this study were (1) to analyze mathematical communication skills the use Think Pair Share gaining knowledge, (2) to analyze mathematical communication skills based on self-efficacy, (3) to analyze the Think Pair Share learning model with ethnomathematics nuances in terms of self -efficacy, taking into account several things, namely the year of publication, research focus, educational level, and type of studies. Therefore the formulation of the research problem includes, (1) What is the description of the research results regarding mathematical communication skills using the Think Pair Share learning model? (2) What is the description of the research results regarding mathematical communication skills based on self-efficacy? (3) What is the description of the research results regarding the Think Pair Share learning model with ethnomathematics nuances based on self-efficacy?

2. Method

The approach used on this studies is Systematic Literature Review (SLR). Systematic Literature Review is a studies approach for identifying, evaluating and interpreting all applicable studies effects associated with sure studies questions, sure topics, or phenomena of concern. The function of the Systematic Literature Review data analysis technique is to synthesize as well as deepen the various relevant research results.

a. Inclusion Criteria

The inclusion criteria used include: (1) Articles related to the Think Pair Share learning model with ethnomathematics nuances in terms of self-efficacy, (2) Articles that investigates students' mathematical communication skills in terms of self-efficacy, (3) Articles that use Indonesian or English, (4) Articles published between 2016 – 2023.

b. Research Instrument

The research instrument used a protocol related to inclusion criteria based on the years of publication, research focus, educational level, and type of research used. The protocol that use in this SLR is data collection, data analysis, and drawing conclusions (Juandi & Tamur, 2020).

3. Discussion

The outcomes in this studies are withinside the shape of an evaluation and precis of formerly posted articles related to mathematical communication skills, ethnomathematics, Think Pair Share learning models, and self-efficacy. After inclusion was applied and 28 relevant articles were obtained, the articles were further categorized based on study characteristics or required variables. Variables in this study include the year of publication, research focus, education level, and type of research. The diversity of research on mathematical proving ability based on study characteristics is presented in **Table 3. 1.**

Table 3. 1 Number of Studies Based on Criteria

Characteristics Study	Criteria	Frequency
Year of Publication	2016	1
	2017	2
	2018	5
	2019	8
	2020	2
	2021	8
	2022	2
	2023	0
Focus Research	TPS & Self-efficacy	7
	TPS & Mathematical Communication Skills	10
	Self-Efficacy & Mathematical Communication Skills	4
	Ethnomathematics & self-efficacy	2
	Ethnomathematics & Mathematical Communication Skills	2
	Ethnomathematics, Self-efficacy, and Mathematics Communication Skills	1
	TPS, Ethnomathematics, and Self-efficacy	2
Education Level	Elementary School	1
	JHS	17
	SHS/VS	8
	College	2
Types of Research	Qualitative	7
	Quantitative	12
	Mixed Method	8
	SLR	1

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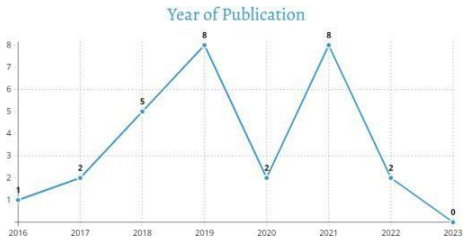

b

Figure 3. 1 (a) Year of Publication; (b) Focus Research.

Figure 3. 1(a) shows the number of articles reviewed in this study. Based on the figure and tables it is known that the number of articles that are relevant to Think Pair Share mastering model on students' mathematical communication skills with ethnomathematics nuances in term of self-efficacy, author can find one article from 2016, 2 articles from 2017, 2 articles from 2018, 8 articles from 2019, 2 articles from 2020, 8 articles from 2021, and 2 articles from 2022.

From **Figure 3. 1(b)** author can conclude that the most frequently discussed in the previous articles namely TPS and mathematical communication skills; then TPS and self-efficacy; then self-efficacy and mathematical communication skills. For ethnomathematics and self-efficacy; ethnomathematics and mathematical communication skills; TPS, ethnomathematics, and self-efficacy. The least discussed in the previous articles namely relationship between ethnomathematics, self-efficacy, and mathematical communication skills.

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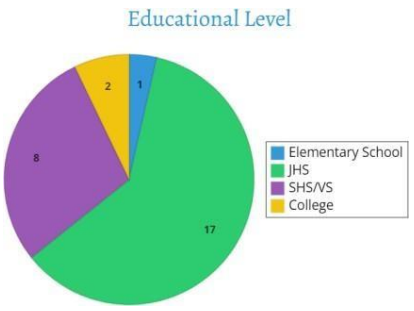

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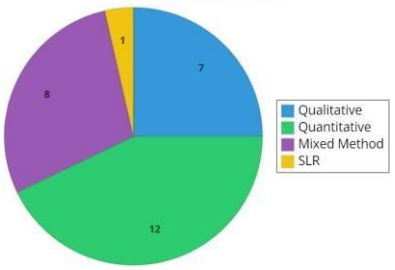

Figure 3. 2 (a) Educational Level; (b) Types of Research

According to **Figure 3. 2(a)** the education level that most frequently discussed in the previous articles namely for Junior High School, then Senior High School or Vocational School, then College. The least discussed educational level in the previous articles is Elementary School.

From **Figure 3. 1(b)** author can conclude that quantitative method is the most frequently use method for the previous article. Usage qualitative and mixed method do not differ much in frequency for the previous article. SLR is the least used method do for the previous article.

In this research, a linkage pattern between the keywords studied is needed. These keywords include Think Pair Share learning models, mathematical communication skills, ethnomathematics, and self-efficacy. To make it easier to find patterns of

interrelationships, the article analysis results that the author has carried out will be presented in **Table 3. 2**.

Table 3. 2. Article Analysis Results

No.	Journal	Author (Year)	Result
1.	Jurnal Matematika dan Pendidikan Matematika	Rifa Fahrullisa,et al. (2018)	TPS learning model can increase the mathematical communication skills.
2.	Journal of Mathematics Education and Applied	Andi Nurul Fitriani, et al. (2021)	There is an affects of self-efficacy on the learning process with the TPS learning model.
3.	Journal of Physics	Dwi Yan Nugraha, et al. (2018)	The TPS learning model influences student self-efficacy.
4.	Creative Education	Ahmed Amin Awad Raba (2017)	The TPS learning model can increase the mathematical communication skills.
5.	Jurnal Pendidikan Matematika	Dikri Maulana Rapsanjani and Teni Sritresna (2021)	Self-efficacy affects the mathematical communication skills.
6.	Susunan Artikel Pendidikan	Nuning Melianingsih and Desi Tri Utami (2019)	Self-efficacy affects the learning process with the TPS learning model.
7.	Journal of Mathematics Education and Applied	Mulia Suryani and Welly Apria (2021)	There is an affects of self-efficacy on the learning process with the TPS learning model.
8.	Paradikma Jurnal Pendidikan Matematika	Zulfantry, et al. (2021)	There is an affects of self-efficacy on the learning process with the TPS learning model.
9.	Jurnal Pendidikan Matematika	Destiniar, et al. (2019)	Self-efficacy affects the learning process with the TPS learning model.
10.	Jurnal Serunai Matematika	Riska Febriani br. Sembiring, et al. (2020)	TPS learning model can increase the mathematical communication skills.
11.	Journal for Research in Mathematics Learning	Muhammad Abdi and Hasanuddin (2018)	TPS learning model can increase the mathematical communication skills.
12.	Jurnal Matematika Kreatif-Inovatif	Hartini, et al. (2016)	TPS learning model can increase the mathematical communication skills.
13.	Jurnal Inovasi Pendidikan Matematika	Andi Mulawakkan Firdaus, et al. (2019)	TPS learning model can increase the mathematical communication skills.
14.	Journal of Education, Teaching, and Learning	Syaiful Rohim and Khoerul Umam (2019)	TPS learning model can increase the mathematical communication skills.
15.	International Journal of Innovation, Creativity and Change	Baiduri, et al. (2020)	TPS learning model can increase the mathematical communication skills.
16.	Jurnal Ilmiah Pendidikan MIPA	M. Taufik Qurohman, et al. (2021)	TPS learning model can increase the mathematical communication skills.
17.	Journal of Physics	A. Irma, et al. (2019)	Think Pair Share learning model influences students' mathematical communication skills.
18.	Journal of Primary Education	Resty Ayu Herdini, et al. (2019)	Self-efficacy can increase the mathematical communication skills.

19.	Unnes Journal of Mathematics Education Research	Uswatun Hasanah, et al. (2021)	There is an influence of the ethnomathematics, self-efficacy, and mathematics communication skills.
20.	Unnes Journal of Mathematics Education Research	Aulia Zulfa, et al. (2021)	Self-efficacy can increase the mathematical communication skills.
21.	Unnes Journal of Mathematics Education Research	Teguh Ananta, et al. (2022)	There is a relationship between ethnomathematics nuances and self-efficacy.
22.	Unnes Journal of Mathematics Education Research	Larasati Tiara Medyasari, et al. (2022)	There is a relationship between ethnomathematics nuances and self-efficacy.
23.	Journal of Mathematics Education IKIP Veteran Semarang	Novia Eka Putri, et al. (2018)	There is an influence of the Think Pair Share with ethnomathematics nuances on students' self-efficacy.
24.	Journal of Physics	D. Herawaty, et al. (2019)	There is an influence of the Think Pair Share learning model with ethnomathematics nuances on students' self-efficacy.
25.	International E-Journal of Advances in Education	Laely Farokhah, et al. (2017)	Ethnomathematics can influence the mathematical communication skills.
26.	Journal for the Education of Gifted Young Scientists	Sitti Hartinah, et al. (2019)	Ethnomathematics can influence the mathematical communication skills.
27.	American Journal of Educational Research	Yuli Ragelia Sinaga, et al. (2018)	Self-efficacy affects the learning process with the TPS learning model.
28.	Unnes Journal of Mathematics Education Research	Kristina Handayani, et al. (2021)	Self-efficacy affects the mathematical communication skills.

4. Conclusion

From all the series of research that the authors have carried out, starting from the data collection and data analysis, the authors can conclude that: (1) mathematical communication skills can be improved by the use of Think Pair Share learning model, (2) self-efficacy is able to influence mathematical communication skills, (3) Think Pair Share learning models with ethnomathematics nuances based on self-efficacy is more effective than conventional learning.

Based on the results of research that has been carried out by the authors, it is suggested to mathematics teachers to be able to apply the TPS learning model with ethnomathematics nuances in order to improve students' mathematical communication skills. This research is still limited to students' mathematical communication skills, it is hoped that co-authors will be able to carry out further research in a wider scope.

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