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Systematic Review: Factors Affecting Academic Procrastination in Mathematics among Students

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Abstract

Academic procrastination occurs when students postpone on completion of assignments at the designated time. The main characteristic of academic procrastination can be seen when students delay working on important assignments in order to involve in various dilatory behaviors. However, research on academic procrastination in Mathematics are still limited even though procrastination can affect academic performance. Therefore, this systematic literature review was conducted to identify the causal factors that affect students' academic procrastination in Mathematics. This study also identified research trends of students' academic procrastination in Mathematics based on year and country of study. A total of 21 articles were screened from 2018 to 2022 involving databases namely SCOPUS, WoS, ERIC and Google Scholar. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was used to select articles involving four phases, which is identification, screening, eligibility and included. Accordingly, findings indicated that 26 factors had influenced academic procrastination in Mathematics which were then classified into demographic, internal and external factors. Based on the study, self-efficacy, students' motivation and interest were the two most dominant factors influencing academic procrastination in Mathematics. Most research were published in 2021 with Indonesia as the leading country in research on procrastination. This study has implications on improving students' self-development training programs to increase self-efficacy and motivation. Further studies can be conducted through the development of a psychological intervention module to explore the effectiveness of cognitive behavioral therapy on academic procrastination.

Keywords: Academic Procrastination, Mathematics, Students, Self-Efficacy, Motivations, Systematic Literature Review

Introduction

Mathematics is a compulsory subject and has been introduced since primary school. Mathematics involves lots of formulas, equations and calculations. Students need to master basic Mathematical concepts to learn new Mathematical concepts as each concept is interrelated. Academic performance in Mathematics was not satisfactory although students had learnt Mathematics since primary schools (Hasbullah, 2021). To improve understanding

on Mathematical knowledge among students, obstacles such as academic procrastination need to be solved.

Academic procrastination is one of the biggest problems that students often face. Academic procrastination occurs at all levels of education (primary, secondary and higher education institutions) and is a very controversial issue among students (Saracaloglu et al., 2018). A study conducted by Chehrzad et al (2017) showed that academic procrastination involved mostly university students in which 70% of students experience moderate level of procrastination while 14% are at a high level of procrastination. This happened as lecturers have usually set a deadline for the submission of assignments (Afzal & Jami, 2018) and a transition of life (from school to university) causes stress among students which leads to academic procrastination (Malkoc & Kesen, 2018).

Academic procrastination can be defined as the voluntary delay of beginning or not completing important and timely academic tasks (Eisenbeck et al., 2019). Nurhadi (2020) explained that tendency to perform other tasks and avoiding tasks that should be done at that time were also considered as academic procrastination. One form of procrastination that is often done by students is delaying writing reports or revising lessons for exams (Hayat et al., 2020). Students that show characteristics of academic procrastination may not see the importance of tasks, deliberately delay in submitting assignments, feel relaxed even though there are lots of task (Nurhadi, 2020), laziness in studying (Hasmayni, 2020) and not completing assignments. Findings by Setiyowati et al (2020) showed that subject with highest rate of procrastination was Mathematics (44%), followed by Physics (31%) and other subjects (28%). Thus, low academic performance in Mathematics had become a critical issue.

This implies that the more students procrastinate on their assignments, the more their achievement in Mathematics decreased. Poor academic performance in Mathematics is associated with high rate of procrastination (Setiyowati et al., 2020). Students are unable to achieve learning outcomes when they often procrastinate (Adam & Hasbullah, 2020). They may demotivate to work on particular tasks. In addition, procrastination also affects the quality of life of students such as health, mental and psychological problems (Hayat et al., 2020).

Nevertheless, there are not much discussion on previous studies on academic procrastination in Mathematics. The appeal of this approach is vital in helping students to find out their suitable learning styles so that they can complete Mathematics assignments on time and also improves students' understanding on Mathematical concepts. Determining the possible factors affecting academic procrastination may help teachers to understand students' learning styles and diversify teaching methods that suits students' learning styles to create a more effective Mathematics learning environment.

Research Objectives

This study aims to

- Identify the two most factors influencing students' academic procrastination in Mathematics
- Identify research trends in study of students' academic procrastination in Mathematics based on year and country through SLR.

Methodology

A systematic literature review (SLR) is a study to collect data related to the research topic in accordance with the criteria to answer the formulated research questions (Mengist et al., 2020). This research design is form of a systematic survey to summarize the evidence on the research question comprehensively. This systematic literature review began by developing a protocol that clarified the research questions. Next, the criteria are set to search for articles, the quality of the articles was assessed, the data was analyzed for the selected articles and finally summarization of the data (Tawfik et al., 2019). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram was used to select articles related to the research questions. There are four phases in PRISMA flow diagram. The first phase is identification, followed by screening, eligibility and inclusion (Selcuk, 2019).

Article Searching Strategy

The main databases used to find articles were SCOPUS and Web of Science (WoS). SCOPUS and WoS databases were used because these two databases are influential and impact databases (Yaman et al., 2019). Besides, these databases were widely used as references by past researchers. Education Resources Information Center (ERIC) and Google Scholar were used as support databases to search for additional articles as studies related to academic procrastination in Mathematics were very limited in SCOPUS and WoS databases. Keywords such as "factors", "mathematics", "academic procrastination" and "students" were used to search for articles in English and Malay. These keywords were used to identify the factors that affect academic procrastination among students in Mathematics.

Article Selection Criteria

Selection of articles are based on several criteria. Articles that are selected are up-to-date within five years of publication, which is from 2018 to 2022. The selection of recent articles is important to obtain a comprehensive overview of current research findings as well as to obtain the most relevant and up-to-date research data (Arsyad et al., 2018). Articles published were in English, Malay and Indonesian. The main reason these three languages were chosen because the study on the academic procrastination among students in Mathematics was mostly conducted in these three languages.

Journal articles were selected by excluding proceedings, conferences, article reviews, dissertations or theses, manuscripts and books. Journal articles were used primarily because the details in journal articles is more recent. Any changes or research gaps can be described clearly through journal articles (Jokic et al., 2019). Journal articles provide more information and describe previous research or discussion clearly that has been published on any topic. Selected articles must also relate with the education field of Mathematics for primary, secondary and tertiary levels as main focus of this SLR was on academic procrastination among students in Mathematics. The selection criteria for this article were shown in Table 1.

Table 1
Article Selection Criteria

Criteria	Acceptance	Rejection
Year of publication	Articles published from 2018 to 2022	Articles published before 2018
Language	English, Malay and Indonesian	Languages except English, Malay and Indonesian
Reference materials	Journal articles	Proceedings, conferences, article reviews, dissertations or theses, manuscripts and books
Field of study	Mathematics	Other than Mathematics
Education level of study	All levels of education (primary, secondary and tertiary)	-

Article Selection Process

Article selection process were shown in Figure 1. PRISMA flow diagram (Tawfik et al., 2019) were adapted, showing different phases of a systematic review. The first stage is identification to identify articles related to the study. Based on four main databases, 1092 articles were identified. Second, these articles were screened based on acceptance and rejection criteria. A total of 40 articles were accepted after screening to acquire a more transparent, detail and accurate research.

Additional criteria were also included in PRISMA flow diagram in which, articles that did not have full text were excluded. Besides, articles must fit the context of studies and duplicated articles were excluded. Therefore, after relevance screening, a total of 21 articles were included in this SLR.

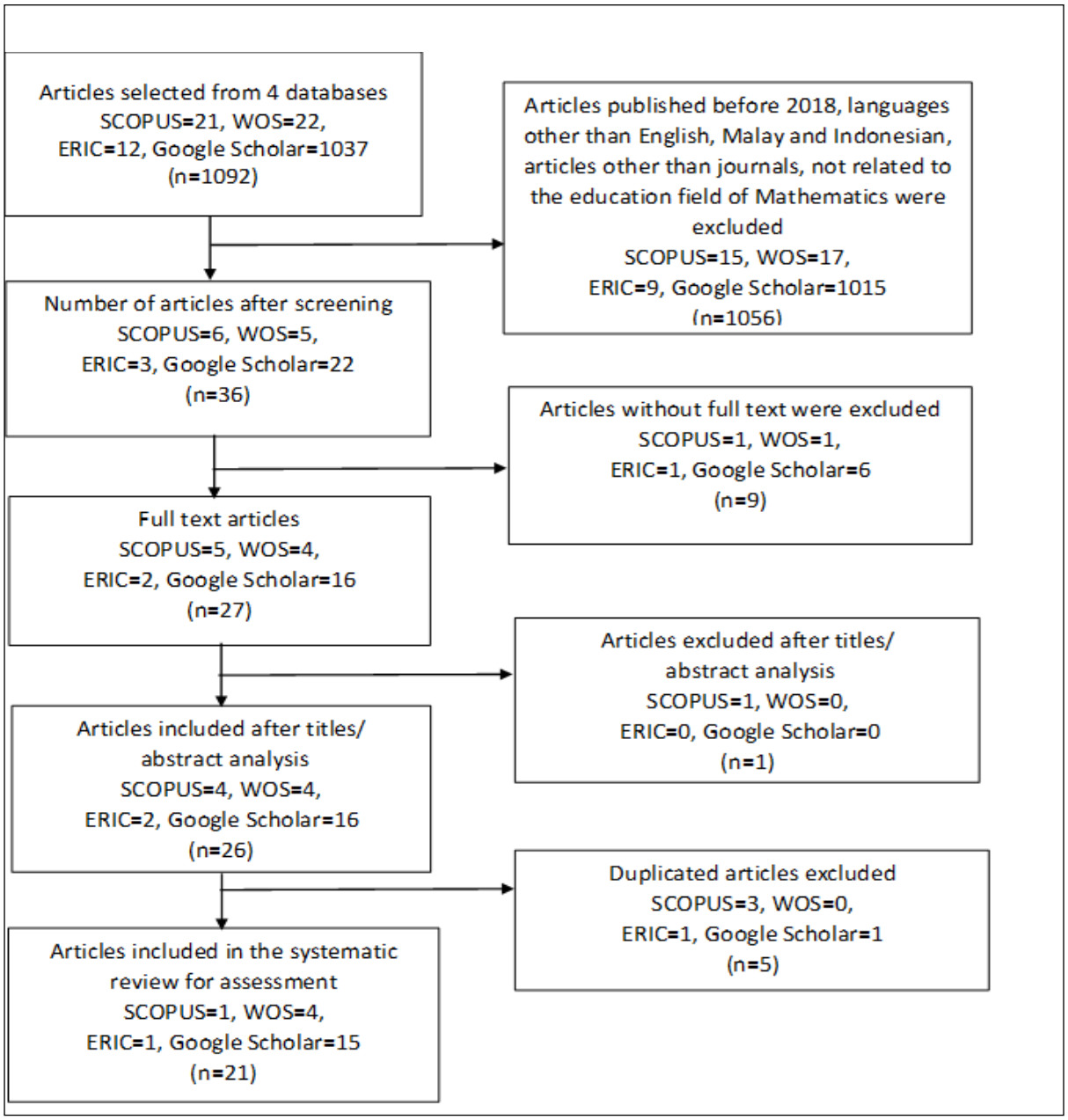

Figure 1: PRISMA Flow Diagram in the Article Selection Process (Source adapted from PRISMA flow chart (Tawfik et al., 2019))

Data Collection and Analysis

Data collection were based on 21 articles that have been screened based on the PRISMA flow diagram. Four main databases were used to collect the data. Most articles were obtained by Google Scholar database, followed by WoS, SCOPUS and ERIC. These data were collected by extracting the title of the article, year of publication, author's name and country into a table using Microsoft Excel 2019 software. Analyzed data were shown in the form of tables and diagrams. Based on Table 2, the factors that influence academic procrastination among students in Mathematics were categorized. The list of previous research article titles along with the author's name, country and year of publication was shown in Table 2.

Table 2
List of Previous Research Articles

Author's name	**Year of Publication**	**Country**	**Title**
Gonda, Pavlovicova, Tirpakova & Duris	2021	Rusia	Setting Up a Flipped Classroom Design to Reduce Student Academic Procrastination
Scheunemann, Schnettler, Bobe, Fries & Grunschel	2021	Jerman	A Longitudinal Analysis of the Reciprocal Relationship Between Academic Procrastination, Study Satisfaction, and Dropout Intentions in Higher Education
Fulano, Magalhaes, Nunez, Marcuzzo & Rosario	2021	Portugal	As the Twig is Bent, so is the Tree Inclined: Lack of Prior Knowledge as a Driver of Academic Procrastination
Selçuk, Kocak, Mouratidis, Michou & Sayil	2021	Turki	Procrastination, Perceived Maternal Psychological Control, and Structure in Math Class: The Intervening Role of Academic Self-Concept
Xue, Wang, Li, Gao & Si	2021	China	The Association Between Mathematical Attitudes, Academic Procrastination and Mathematical Achievement Among Primary School Students: The Moderating Effect of Mathematical Metacognition
Agustin & Winarso	2021	Indonesia	Profile of Student Academic Procrastination Behavior in Problem Solving and Mathematical Digital Literacy
Rahayu & Hidayati	2021	Indonesia	Analisis Penyebab Prokrastinasi Akademik Matematika Siswa Sma Sederajat Saat Pembelajaran Daring
Jeremy, Natalia & Lumbantoruan	2021	Indonesia	Faktor Procrastination Penyebab Mahasiswa Terlambat Menyelesaikan Tugas Akhir di Program Studi Pendidikan Matematika
Ikhsan	2021	Indonesia	Hasil Belajar Matematika Siswa Ditinjau dari Kemampuan Metakognisi dan Prokrastinasi Akademik
Hasbullah	2021	Indonesia	Pengaruh Prokrastinasi Akademik dan Motivasi Belajar Terhadap Penguasaan Konsep Matematika (Survei Pada Siswa SMP Negeri di Kota Tangerang)

Sesilia & Sutirna	2021	Indonesia	Prokrastinasi Akademik Pembelajaran Matematika Siswa Smp Kelas Viii
Ramadhan, Alipatan & Khotimah	2021	Indonesia	Penyebab Prokrastinasi Siswa pada Pembelajaran Matematika
Setiyowati, Triyono & Rachmawati	2020	Indonesia	Academic Procrastination of High School Students in East Java
Zuraidah, Sari & Yuniarti	2020	Indonesia	Pengaruh Kecemasan Matematika dan Prokrastinasi Akademik Siswa Terhadap Hasil Belajar Matematika Siswa Kelas VIII SMP Negeri 7 Balikpapan
Adam & Hasbullah	2020	Indonesia	Pengaruh Motivasi Berprestasi dan Prokrastinasi Akademik terhadap Pemahaman Konsep Matematika.
Ami & Yuniantaq	2020	Indonesia	Profil Karakter Prokrastinasi Akademik pada Siswa SMP dalam Pembelajaran Matematika
Nurhadi	2020	Indonesia	Studi Deskriptif Prokrastinasi Akademik pada Siswa Kelas Xi Ips 4 Sma Negeri 11 Banjarmasin.
Resya	2019	Indonesia	Pengaruh Efikasi Diri dan Prokrastinasi Akademik Siswa Terhadap Pemahaman Konsep Matematika (Survey di Smp Se Kecamatan di Kabupaten Tegal)
Ningsih & Nirwana	2019	Indonesia	Hubungan Konsep Diri Matematika Dengan Prokrastinasi Akademik pada Siswa
Ziegler & Opdenakker	2018	Netherlands	The Development of Academic Procrastination in First-Year Secondary Education Students: The Link with Metacognitive Self-Regulation, Self-Efficacy, And Effort Regulation
Cahyadi	2018	Indonesia	Prokrastinasi Akademik Mahasiswa pada Mata Kuliah Aljabar Linear

Research Findings

Findings for first objective: To identify the factors that affect academic procrastination among students in Mathematics

The purpose of this systematic literature review was to identify the factors that influence academic procrastination among students in Mathematics. Analysis and synthesis were carried out on 21 articles based on the main objective of the study. There were 26 factors that had been identified as factors affecting students' academic procrastination in Mathematics. These factors were further divided into three main factors as shown in Table 3.

Table 3
Factors Affecting Students' Academic Procrastination in Mathematics

Category	Factors Affecting Students' Academic Procrastination in Mathematics
Demography	Age
	Gender
	Years of study
	Socio-economic status
Internal	Students' academic achievement
	Students' basic understanding on Mathematical concept
	Self-efficacy
	Self-regulation
	Students' satisfaction in learning Mathematics
	Students' self-concept
	Students' attitude and perception towards Mathematics
	Students' emotion
	Students' Mathematical skills
	Time management
	Low concentration
	Health problems
	Motivation and interest
	Students' metacognition
	Other workloads
External	Teaching methods
	Learning environment
	Teachers' attitude
	Excessive use of social media
	Parents' attitude
	Peer influence
	Inappropriate learning time

Table 3 showed factors that affecting academic procrastination among the students in Mathematics. There were divided into three main groups: demographic groups, internal groups and external groups. 4 factors were included in the demographic group, 15 factors in internal group, whereas 7 factors in external group.

Demographic groups included factors such as age, gender, years of education, socioeconomic status. Internal factors are factors that are directly associated with students themselves. Internal factors were students' academic achievement, students' basic understanding on Mathematical concepts, self-efficacy, self-regulation, students' satisfaction in learning Mathematics, students' self-concept, students' attitude and perception towards Mathematics, students' emotions while studying Mathematics, students' Mathematical skills, time management, low concentration in studying Mathematics, health problems, motivation and interest, students' metacognition and other workloads. The external group refers to the factors that are not influenced by the students themselves, namely the teaching method, learning environment, teacher's attitude, excessive use of social media, parents' attitude, peer influence and inappropriate learning time. Analysis findings from 21 articles were summarized in Table 4, Table 5 and Table 6.

Table 4
Findings Based on Demographic Factors

No.	Author's name	Demographic Factors			
		Age	Gender	Years of education	Socioeconomic status
1.	Gonda et al (2021)				
2.	Scheunemann et al (2021)	*	*	*	
3.	Fulano et al (2021)				
4.	Selçuk et al (2021)				
5.	Xue et al (2021)		*		*
6.	Agustin & Winarso (2021)				
7.	Rahayu & Hidayati (2021)				
8.	Jeremy et al (2021)				
9.	Ikhsan (2021)				
10.	Hasbullah (2021)				
11.	Sesilia & Sutirna (2021)				
12.	Ramadhan et al (2021				
13.	Setiyowati et al (2020)				
14.	Zuraidah et al (2020)				
15.	Adam & Hasbullah (2020)				
16.	Ami & Yuniantaq (2020)	*	*		
17.	Nurhadi (2020)				
18.	Resya (2019)				
19.	Ningsih & Nirwana (2019)				
20.	Ziegler & Opdenakker (2018)		*		
21.	Cahyadi (2018)				

Table 5
Findings Based on Internal Factors

No.	Internal Factors	Author's Name
1	Students' academic achievement	• Scheunemann et al (2021)
2	Students' understanding on Mathematical concept	• Scheunemann et al (2021) • Hasbullah (2021) • Setiyowati et al (2020) • Adam & Hasbullah (2020) • Ami & Yuniantaq (2020) • Nurhadi (2020) • Resya (2019)
3	Students' self-efficacy	• Scheunemann et al (2021) • Xue et al (2021) • Agustin & Winarso (2021) • Jeremy et al (2021) • Sesilia & Sutirna (2021) • Ramadhan et al (2021) • Nurhadi (2020) • Resya (2019) • Ziegler & Opdenakker (2018)
4	Students' self-regulation	• Scheunemann et al (2021) • Ziegler & Opdenakker (2018)
5	Students' satisfaction	• Scheunemann et al (2021)
6	Students' self-concepts	• Selçuk et al (2021) • Ningsih & Nirwana (2019)
7	Attitude and perception	• Xue et al. (2021) • Agustin & Winarso (2021) • Sesilia & Sutirna (2021) • Ramadhan et al (2021) • Setiyowati et al (2020) • Ami & Yuniantaq (2020) • Cahyadi (2018)
8	Students' emotion	• Agustin & Winarso (2021) • Jeremy et al (2021) • Ramadhan et al (2021) • Zuraidah et al (2020) • Ami & Yuniantaq (2020)
9	Students' Mathematical skills	• Agustin & Winarso (2021)
10	Time management	• Agustin & Winarso (2021) • Rahayu & Hidayati (2021) • Jeremy et al. (2021) • Sesilia & Sutirna (2021) • Ramadhan et al (2021) • Setiyowati et al (2020) • Ami & Yuniantaq (2020)

11	Students' concentration	• Agustin & Winarso (2021) • Cahyadi (2018)
12	Health problems	• Jeremy et al (2021)
13	Motivation and interest	• Jeremy et al (2021) • Hasbullah (2021) • Sesilia & Sutirna (2021) • Ramadhan et al (2021) • Setiyowati et al (2020) • Adam & Hasbullah (2020) • Ami & Yuniantaq (2020) • Nurhadi (2020)
14	Students' metacognition	• Ikhsan (2021) • Ziegler & Opdenakker (2018)
15	Other workloads	• (Sesilia & Sutirna, 2021) • Ami & Yuniantaq (2020)

Table 6
Findings Based on External Factors

No.	External Factors	Author's Name
1	Teaching methods	• Gonda et al (2021) • Rahayu & Hidayati (2021)
2	Learning environment	• Selçuk et al (2021) • Rahayu & Hidayati (2021) • Nurhadi (2020) • Cahyadi (2018)
3	Teachers' attitude	• Selçuk et al. (2021) • Cahyadi (2018)
4	Excessive use of social media	• Rahayu & Hidayati (2021) • Ramadhan et al (2021) • Setiyowati et al (2020) • Ami & Yuniantaq (2020) • Cahyadi (2018)(Ziegler & Opdenakker, 2018)
5	Parents' attitude	• Rahayu & Hidayati (2021) • Nurhadi (2020)
6	Peer influence	• Jeremy et al (2021) • Setiyowati et al (2020) • Nurhadi (2020)
7	Inappropriate learning time	• Ramadhan et al (2021)

Demographic Factors

There were four demographic factors that affecting academic procrastination among students in Mathematics. A total of 4 studies on academic procrastination based on demographic factors such as age (2 studies), gender (4 studies), years of education (1 study) and

socioeconomic status (1 study). The findings support the view on academic procrastination in Mathematics related with age and gender were carried out in Germany (Scheunemann et al., 2021) and Indonesia (Ami & Yuniantaq, 2020). Xue et al (2021) conducted a study related to age and socioeconomic status in China. However, Ziegler and Opdenakker (2018) mainly focused on the study from the aspect of gender in Netherland whereas study on academic procrastination in Mathematics related to years of study were conducted only in Germany (Scheunemann et al., 2021).

Internal Factors

There were 15 factors within internal groups which were identified through 19 studies including students' academic achievement (1 study), basic understanding on Mathematical concept (7 studies), students' self-efficacy (9 studies), students' self-regulation (2 studies), students' satisfaction in learning Mathematics (1 study), students' self-concept (2 studies), students' attitudes and perceptions in Mathematics (7 studies), students' emotions (4 studies), students' Mathematical skills (1 study), time management (7 studies), students' concentration in studying Mathematics (2 studies), health problems (1 study), motivation and interest in Mathematics (7 studies), students' metacognition (2 studies), other task load (2 studies). Self-efficacy factor was recorded as the highest number of studies (9 studies).
6 out of these 9 studies were conducted in Indonesia (Agustin & Winarso, 2021; Jeremy et al., 2021; Nurhadi, 2020; Ramadhan et al., 2021; Resya, 2019; Sesilia & Sutirna, 2021) while one studies in Germany (Scheunemann et al., 2021), one study in China (Xue et al., 2021) and one study in Netherlands (Ziegler & Opdenakker, 2018). Self-efficacy factor can also be defined as confidence level of students in Mathematics (Agustin & Winarso, 2021; Ramadhan et al., 2021; Xue et al., 2021).

External Factors

External factors consisted of 7 factors that contributed towards academic procrastination in Mathematics. These 7 factors included teaching method (2 studies), learning environment (4 studies), teachers' attitudes (2 studies), excessive use of social media (5 studies), parents' attitudes (2 studies), peer influence (3 studies) and inappropriate learning time (1 study). Factor of excessive use of social media were the most identified in research studies (5 studies) in which all the studies were conducted in Indonesia (Ami & Yuniantaq, 2020; Cahyadi, 2018; Rahayu & Hidayati, 2021; Ramadhan et al., 2021; Setiyowati et al., 2020).

Findings for second objective: To identify the research trends of academic procrastination in Mathematics based on year and country of study

Years of Study Trend

Figure 2 showed the frequency of number of articles on academic procrastination among students in Mathematics from 2018 to 2022 based on four primary databases: SCOPUS, WoS, ERIC and Google Scholar. Year 2021 recorded most research articles (12 studies) on academic procrastination, while 5 studies in 2020. Year 2018 and 2019 had 2 studies respectively. There were no data studies in 2022.

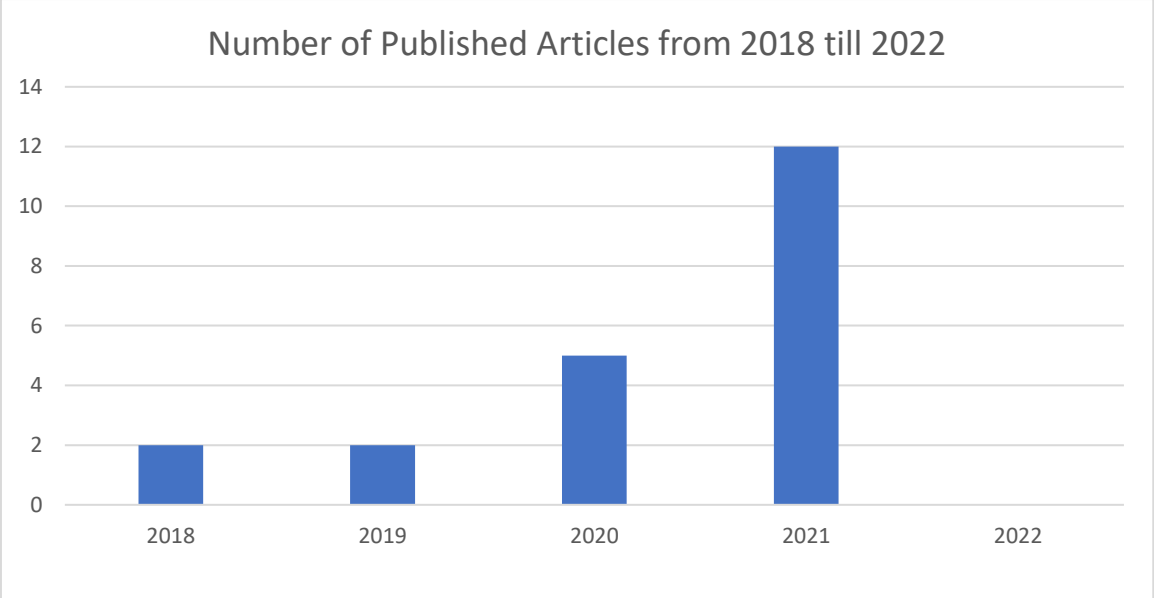

Figure 2: Frequency of Number of Articles from 2018 till 2022

The trend of studies on academic procrastination among students in Mathematics increased. This indicates that researchers begin to gain interest in exploring more widely on students' academic procrastination in Mathematics.

Country Trends Study

Figure 3 showed that 7 countries had conducted studies on academic procrastination among students from year 2018 till 2022 in Mathematics. Indonesia with 15 studies was the most dominant country in conducting academic procrastination study. Russia, Germany, Portugal, Netherlands, Turkey and China had conducted one study respectively. Indonesia had published 7 articles in 2021, 5 articles in 2020, 2 articles in 2019 and 1 article in 2018. Hence, Indonesia is conducting research on academic procrastination in Mathematics every year. Whereas Russia, Germany, Portugal, Turkey and China began conducting studies on academic procrastination in 2021 with one study respectively while Netherlands published related articles in year 2018 with one study. In conclusion, there was increase in amount of research on academic procrastination among students in Mathematics to overcome the research gaps.

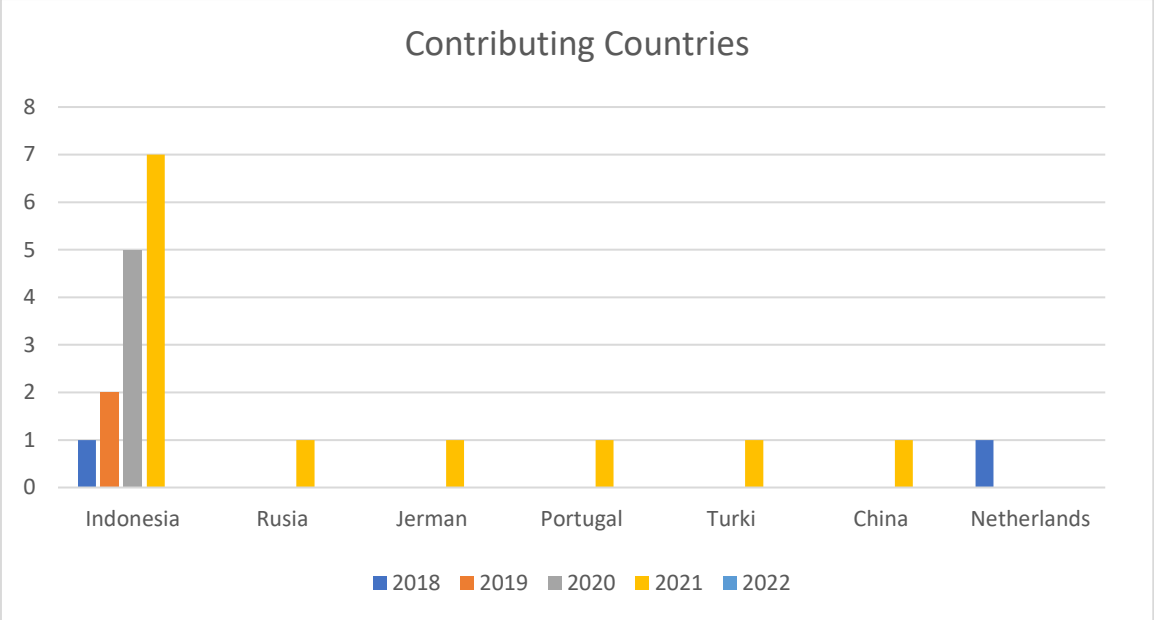

Figure 3: Country Trends Study on Students' Academic Procrastination in Mathematics from 2018 till 2022

Discussion

Discussion for First Objective

The study found that there are various factors that influence academic procrastination among students in Mathematics based on a systematic literature review. These factors were divided into three groups namely demographic group, internal group and external group. The findings of the study showed that internal factors play an important role in influencing students' academic procrastination in Mathematics. These internal factors included self-efficacy (9 studies) and motivation and interest (8 studies) which were the two dominant factors in influencing academic procrastination among students in Mathematics.

There were differences in the study of Xue et al. (2021) compared to previous studies that focused on students' Mathematical metacognition as a mediator in association between self-efficacy on academic procrastination among students in Mathematics. High Mathematical metacognition increased students' self-efficacy and helped in reducing academic procrastination among students in Mathematics. The findings of this study can help in determining the difference in students' abilities in various metacognitive levels of Mathematics to overcome academic procrastination.

In addition, the results of the study also found that there were similarities in the previous studies on self-efficacy and academic procrastination among students in Mathematics. Studies on the relationship between self-efficacy and academic procrastination among students in Mathematics were consistent that self-efficacy was significantly negatively correlated with academic procrastination (Jeremy et al., 2021; Resya, 2019; Ziegler & Opdenakker, 2018). Low self-efficacy also predicts high rate of academic procrastination (Sesilia & Sutirna, 2021).

Based on research findings by Agustin and Winarso (2021), they proved that low self-efficacy in students caused academic procrastination in Mathematics. Qualitative case study was conducted to explore more on academic procrastination. They found that students had difficulty to solve Mathematical problems and being passive in their own learning as they had low self-confidence. This caused many students to seek help from their teachers and friends to solve Mathematical problems. Some students doubt their own abilities in completing

assignments or tasks in Mathematics, causing them to feel that the assignments or tasks given by the teacher were difficult to complete (Jeremy et al., 2021; Nurhadi, 2020; Sesilia & Sutirna, 2021).

Difference in students' self-confidence level will affect the learning outcomes in Mathematics. Low self-confidence affects learning performance due to negative perceptions (Ramadhan et al., 2021). Poor learning performance will increase chance for students to procrastinate on assignments given by their teachers. Resya (2019) noted the self-efficacy of students in understanding the basic concepts of Mathematics. High self-efficacy will encourage students to try to understand the topics taught by their teachers and not try to avoid when given assignments because they understand and have good Mathematical skills in problem solving. When students master the basic skills in Mathematics, it is easy for them to complete the exercises and assignments given by the teacher. Students will perceive difficult assignments as a motivation for them to revise their lessons better, work harder and avoid procrastinating assignments. Moreover, low self-efficacy causes students to set goals that are easy for them to achieve and avoid achieving higher goals (Ziegler & Opdenakker, 2018).

In addition, high self-efficacy increases the level of students' satisfaction in learning Mathematics (Scheunemann et al., 2021). High self-efficacy is also vital in improving the students' attitude towards Mathematics. Students who have good attitude or behavior in learning Mathematics will strive to achieve excellent academic performance in Mathematics. As a result, they will keep improving themselves by completing assignments on time and not delaying assignments as instructed.

Motivation and interest are the two biggest factors in influencing students' academic procrastination in Mathematics. Overall, all the findings of previous studies discussed the relationship between students' motivation and interest in academic procrastination in Mathematics. Students who have high motivation and interest in learning Mathematics show low academic procrastination. Ami and Yuniantaq (2020) found the same relationship between motivation and interest and academic procrastination in Mathematics.

Jeremy et al. (2021) stated that when students lack of self-motivation, students are more likely to do other tasks to avoid themselves from doing things they dislike (Setiyowati et al., 2020). Hasbullah (2021) proved that motivation is one of the key factors that affect students' success and performance in Mathematics. High motivation can increase students' determination to keep trying when facing with difficulty in understanding Mathematical concepts. High motivation in learning can also prevent students from feeling burdened while solving Mathematics problems that may lead to academic procrastination.

Motivation is said to have impact on academic procrastination in Mathematics by promoting enthusiasm in learning (Adam & Hasbullah, 2020). When students have high enthusiasm, Students will spend their time more in studying and completing assignments on time. Lack of motivation is also one of the causes of students being lazy (Ami & Yuniantaq, 2020), thus causing them to find it difficult to start doing assignments. This causes students' demotivation which will lead them to finish their tasks in last minute (Nurhadi, 2020).

Two main factors which are self-efficacy as well as motivation and interest have given a new dimension in the discussion of academic procrastination among students in Mathematics. This systematic literature has clearly found some new ideas such as the need to develop cognitive behavioral therapy intervention modules in the context of school education to help students in managing their emotions and behavior to increase self-efficacy and students' motivation and interest in Mathematics, thereby avoiding academic procrastination in Mathematics.

Discussion for Second Objective

The research trend of academic procrastination in Mathematics based on the year showed an increase in the amount of publication from 2018 to 2021 with the highest number of articles published in 2021 which was 12 articles. Increased in the articles published on academic procrastination among students in Mathematics help to cover the lack of research in previous years. Besides, study on academic procrastination also has high potential in promoting the effectiveness in learning Mathematics.

Research trends in academic procrastination were also examined from the aspect of the country of study. A total of seven countries had conducted studies on academic procrastination among students in Mathematics from 2018 till 2022. Indonesia had dominated the study of academic procrastination by publishing 15 articles that focused in Mathematics. Indonesia was also consistent in publishing article related to academic procrastination. This can be seen in Figure 3 where Indonesia had always shown an increase in publication of articles over the last five years.

Therefore, the study on academic procrastination among students in Mathematics over the last five years is considered a new study especially in Malaysia as research on academic procrastination is still limited. Research needs to be conducted to overcome the research gap and examine other factors that affect academic procrastination among students in Mathematics to help students and teachers preventing academic procrastination to increase the effectiveness learning in Mathematics.

Conclusion

In conclusion, study found that self-efficacy as well as motivation and interest were the two biggest factors that influence academic procrastination among students in Mathematics. Year 2021 recorded the highest number of research publications on academic procrastination among students in Mathematics. Indonesia had published the most articles on academic procrastination among students in Mathematics in the last 5 years. This study has several limitations such as the limitation on selection of articles that do not have complete texts and limitations from the aspect of high-impact reference articles related to the topic due to the lack of articles. Most previous studies focused on academic procrastination as in general and not in Mathematics. Thus, most articles were obtained through Google Scholar database.

This study has implications to improve student self-development training programs to promote self-efficacy and motivation. For future research, it is suggested that the study be conducted by examining more detailed on other factors that can influence academic procrastination among students in Mathematics. This research will guide teachers and parents in taking initiatives to reduce the tendency of students to postpone Mathematics academic tasks to create more effective Mathematics learning. Further studies can be conducted through the development of psychological intervention modules in education to explore effectiveness of cognitive behavioral therapy on academic procrastination.

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