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MENTOR-MENTEE PROGRAMME FOR STEM EDUCATION AT PRESCHOOL LEVEL

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ABSTRACT

The objectives of this research were to; (i) determine mentors' perspectives on their communication skills, teamwork skills, problem solving skills and social responsibility after joining the Mentor-Mentee Programme for STEM Education; (ii) identify the differences between the assessment of STEM mentors' perspective on their personal qualities before and after joining the program; and (iii) identify the problems or challenges that the mentors experienced in mentoring activities compared to classroom teaching, opinions before and after participating in the program, and the challenges faced in the program. Based on the objectives, a survey research was conducted to collect data from 53 students (mentors) in the targeted population through questionnaire. Paired sample t-test was conducted to compare various skills of mentors before and after joining the program. For Communication Skills, the mean score for pre-test is 5.50, while mean score for post-test is 5.00. There was a significant difference in the scores for communication skills in pretest (M=5.00, SD=.86) and posttest (M=5.50, SD=.68); t (58) (=-3.785, p = 0.000). Teamwork skills also show significant difference in the scores in pretest (M=5.59, SD=.89) and posttest (M=6.06, SD=.67); t (58) (=-3.325, p = 0.002). Besides, Problem Solving Skills shows significant difference in the scores in pretest (M=5.00, SD=.99) and posttest (M=5.74, SD=.68); t (58) (=-4.897, p = 0.000). However, in the social responsibility skills, there is no significant difference between pretest (M=5.48, SD=1.11) and posttest (M=5.67, SD=0.85), t (58) (=1.086, p = 0.282). These results suggest that the program increases the communication skills, teamwork skills and problem-solving skills of mentors. However, the social responsibility skills do not show a significant difference although the mean score of posttest is higher than the pretest. This can be caused by the high social responsibility skills of mentors prior to the programs they have already been dealing with small kids. The sense of responsibility is higher than handling adults or students in primary or secondary school. In addition to this, some mentors mentioned they are not confident and worried about the STEM program. Nonetheless, positive findings were elicited from the interview. Mentors felt that they gained positive improvement and the program helped them increase their creativity. The mentors also suggested that the quality of module to be improved, competency of mentors to be upgraded, and duration of the intervention be extended. Quality in service instruction over STEM pedagogy best practices is a recommendation for practice.

Keywords: preschoolers, mentor-mentee, STEM education

INTRODUCTION

In Malaysia, the STEM initiative has aggressively been implemented in order to provide a pipeline of students that will eventually serve as prospective workers for one million new STEM careers in 2020. These jobs include careers for the Industrial Revolution 4.0, such as scientists and programmers. However, the Malaysian government is facing several major challenges in achieving the goal of strengthening STEM education in the country. The first challenge is the decreasing enrolment of Science students at secondary education level (Noraini, 2018). To overcome this problem, the Ministry of Education is spearheading a STEM mentor-mentee program in which teachers and students are partnered with STEM professionals

and undergraduates to allow for a hands-on experience of STEM. Since then, many STEM mentor-mentee programs have been carried out in primary and secondary schools.

While the intellectual health of a country begins at home, prior-to-school experience plays an essential role in ensuring that all children particularly those regarded as being 'at risk' have a sound beginning. This situation calls for serious steps to be taken by early childhood practitioners to strengthen STEM education since early years of education.

Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner, to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious (Ministry of Education, 1997). Therefore, young learners need Science and Mathematics to be taught in a more interactive, fun-filled learning environment from an early age is the key foundation for success in their formal schooling years (Noraini, 2018). Children are naturally curious in their first five years, and this is the best time to introduce Science, Mathematics and reading skills. Datuk Noraini underlined the importance of nurturing greater interest in Science and Mathematics among young learners through experiments, quizzes and other innovative teaching approaches to help them develop the passion for STEM.

Problem Statement

There is a considerable national interest in STEM education in Malaysia. The Ministry of Education has even set up its own national committee to spearhead STEM initiatives especially in education of all levels. Roles and responsibilities to ensure the successful implementation of STEM education have also been delegated to all parties involved. There is a strong support for STEM education especially for Asian countries. Findings from Trends in International Mathematics and Science Study (TIMMS) and Programme for International Student Assessment (PISA) revealed that students who originate from East Asia countries outperformed students from other countries consistently (Chong, 2019). STEM is indeed at the heart of a new wave which is transforming live and the way we work. One common way to view this challenge, particularly through an economic lens, is the STEM pipeline (Tytler et al., 2008). In Malaysia, the STEM pipeline begins with cradle to tertiary education. Also, teacher quality is one point in the pipeline that has received significant attention (Ingvarson et al., 2014).

Recent studies on STEM education highlight issues that contribute to its success. Ejiwale (2013) examined the barriers to successful implementation of STEM education. It was concluded that the barriers include poor preparation, shortage of qualified STEM teachers, lack of investment in teacher's professional development and lack of research collaboration across STEM fields.

Early childhood STEM education also is a part of appropriate practice which can be regarded as a foundation of quality preschool experiences for all young children (Ritter, 2015). However, many preschoolers lacked the interest and engagement to learn STEM Education due to limited availability of interactive teaching method and tools. Hassan et al. (2018) succesfully integrated STEM in mathematics curriculum framework through the systematic model of ADDIE and involving experts and teachers. They proved that STEM can be implemented successfully by having a well-planned curriculum design.

These reviewed articles can be utilized as a direction or reference by different researchers in conducting the comparable studies especially for those in developing appropriate practices for the preschoolers.

Research Objectives

The objectives of the research:

i. To identify the perspective of STEM mentors on their:
   a. Communication skills after joining the program.
   b. Teamwork skills after joining the program.
   c. Problem solving skills after joining the program.
   d. Social responsibility after joining the program.
ii. To identify the differences between the assessment of STEM mentors perspectives on their personal qualities before and after joining the program.
iii. To identify the problems or challenge that they experienced in mentoring activities compared to classroom teaching.
   a. Opinion before participating in the program.
   b. Opinion after participating in the program.
   c. The challenges faced in the program.

Comparative Study

STEM has been applauded as the current trend as many countries have adopted it to prepare the workforce for the Industrial Revoultion 4.0 that is taking place now. Norway is one of the countries that the researchers have been following closely. In 'Norwegian STEM Strategy' by Oftedal (2017), comprehensive information on STEM education in Norway is presented. Like Malaysia, Norway also has put lots of efforts in enrolling more STEM students at all levels in a holistic approach since 2002 Norway government took the initiatives to mobilize all the stakeholders such as education councils, councils of higher education, the research councils and social partners. In addtion, theirMinistry of Education and Research chaired many national forums for STEM and proposed National policies and program such as Science for the Future - Strategy for Strengthening Mathematics, Science and Technology (MST) 2010-2014 and Gender equality action plan 2014 (Including access to STEM) and STEM strategy for 2015 to 2019: kindergarten and school education (4^{th} strategy in a row). Apart from that, Norway government also encourages initiatives, projects, good practices of national relevance, involving companies, for example, Lektor2 Scheme - Cooperation with social partners on the teaching of Science and School of the Future Ullern High school (UHS) and Oslo Cancer Trust (OCT). Norwegian STEM strategy aims to increase 15% of the number of candidates in STEM and Norwegian students should be at the international average level in PISA and TIMSS (Oftedal, 2017).

In Norway, a peer mentor mentee program is usually designed to help university students to work along two primary dimensions; 1) functional and professional support (i.e consulting, feedback), and 2) psychosocial and emotional support (i.e friendship, acceptance, confirmation and role modeling) (Terrion and Leonard, 2007; Haggard *et al.*, 2011). In this peer mentoring model, more experienced students provide assistance and support to less experienced students. Peer mentors and mentees are closer in age and have the same position in the educational

system, which provide learning opportunities beyond just pure academic skills (Terrion and Leonard, 2007), such as moral and social support. The mentees and peer mentors are encouraged to stay in regular contact outside the formal part of the course through social media. For the mentoring program to realize the full potential of a mentoring relationship, the mentors should not have too much contact with, nor influence from teachers during the process. Instead, the course teachers arrange two 'reflection upon-practice' sessions to allow the mentors, mentees and the faculty to meet and reflect upon practice. Prior to the course, the faculty recruits peer mentors among the second-year students in the Masters Programme, each of whom signs up voluntarily in exchange for experience and competence. As second year students, peer mentors have attended a 3-days training course in peer mentoring arranged by the faculty. After completion of their mentor role, peer mentors are awarded a Certificate of Contribution by the faculty dean. To summarize, the peer mentoring model implemented in Norway is a tool for facilitating development of important generic competencies in action based learning processes. Peer mentoring enhances abilities like reflection and social learning in teams, provides feedback, confirmation and emotional support during action and opportunity taking, and functions as a more familiar role model for similar experience, which contributes to learning from experience and developing enhanced self-efficacy.

Based on the findings from studies related to STEM in Norway and Malaysia. There are several recommendations that can be taken into account in order to enhance the interest in younger generation to choose STEM as their career. The first is to ensure teachers' and parents' support in choosing STEM program in the university. The second is to initiate concerted action of all involved parties instead of small, independent measures to ensure sustainable outcomes.

In addition, increasing contact frequency, setting concrete mentoring goals (in particular in the area of STEM activities), and planning and monitoring the entire mentoring year is vital to ensure younger generations keep their interest in STEM and choose STEM jobs as their future career.

Literature Review

A mentor-mentee program in this study was designed to improve the reach of STEM education at the level of early childhood education through mentor-mentee relationships in building strong learning experiences among the preschoolers. The Faculty of Psychology and Education, University Malaysia Sabah recruited mentors among the first and second-year students in the Early Child Education Program, each of whom signs up voluntarily to provide assistance and support the preschoolers in STEM learning. The mentors have attended a one-day training course in peer mentoring on STEM activities arranged by the program coordinator. After completion of their mentor role in the preschool, mentors are awarded a Certificate of Contribution by the faculty.

Teachers serve as important mentors within a student's talent development program. Teachers hold prior views and experiences that will affect their STEM instruction (Counsell *et al.,* 2016). Similarto Morgot and Kettler (2019), it is important to understand teachers' beliefs and perceptions related to STEM talent development for schools to include quality STEM education. This is because teachers make a difference. The success of any plan for improving educational outcomes depends on teachers who carry it out and thus on the abilities of those attracted to the field and their preparation" (National Research Council, 2010, p.1).

Teachers who feet motivated would enhance their effort to carry out STEM education by including collaboration with peers, quality curriculum, district support, prior experiences, and effective professional development (Morgot and Kettler, 2019). To be effective, Mathematics teachers require a strong foundation in Mathematics content as part of their teacher preparation programs since Mathematics is the core subject to bind the STEM learning together (Uttendorfer, 2014). Unfortunately, there are some researches that indicate that most teachers are not well prepared in their subject matter to be highly effective teachers of Mathematics (Uttendorfer, 2014). Hence, teachers play an important role in motivating and implementing STEM learning to the young children.

METHODOLOGY

Research Design and Sample

For Mentors, a survey research was employed as the research design of this study. This research design involves collecting data from selected individuals at a single point in time through questionnaire or interviews or to answer questions about their opinions on some topic or issue. It is effective for providing a snapshot of the current opinions in a population relatively quickly as compared to a longitudinal survey research (Gay et al., 2011). Based on the research objectives of this study, a survey research omwas conducted on 53 students (mentors) at UMS in the targeted population through questionnaire to appropriately answer the research questions about their current opinions on their communication skills, teamwork skills, problem solving skills and social responsibility skills. Mentors were selected to give responses towards three questions. These include their opinion before and after they participated in the program and what were the challenges they faced in the program. All pre-schoolers in Sk. Rampayan Mengatal (100 preschoolers) and Preschool teacher- trainees are respondents of this study.

Instrument

The instrument was developed by team of researchers of National STEM Movement consisting items on communication skills, teamwork skills, problem solving and social responsibility. This instrument also looks into problems/challenge that they experienced in mentoring activities in as compared to classroom teaching.

RESULTS

This chapter presents the findings of the mentor mentee program, which were obtained from various analyses (i.e. post-tests, surveys, interviews and etc.). The chapter starts with a brief discussion on the general analysis of the mentors' opinion on STEM upon joining the program. The demographic data (mentors) for the program participants is also presented in this chapter. Furthermore, the respondent's data which was recorded based on Likert-type scale data (7-point) were analyzed accordingly to answer the research questions.

Mentors and Mentee Demographic Data

The demographic data of the participants in the mentor mentee program is illustrated in Figure 1. All mentors are full-time students of Early Childhood Education Program at Universiti Malaysia Sabah.

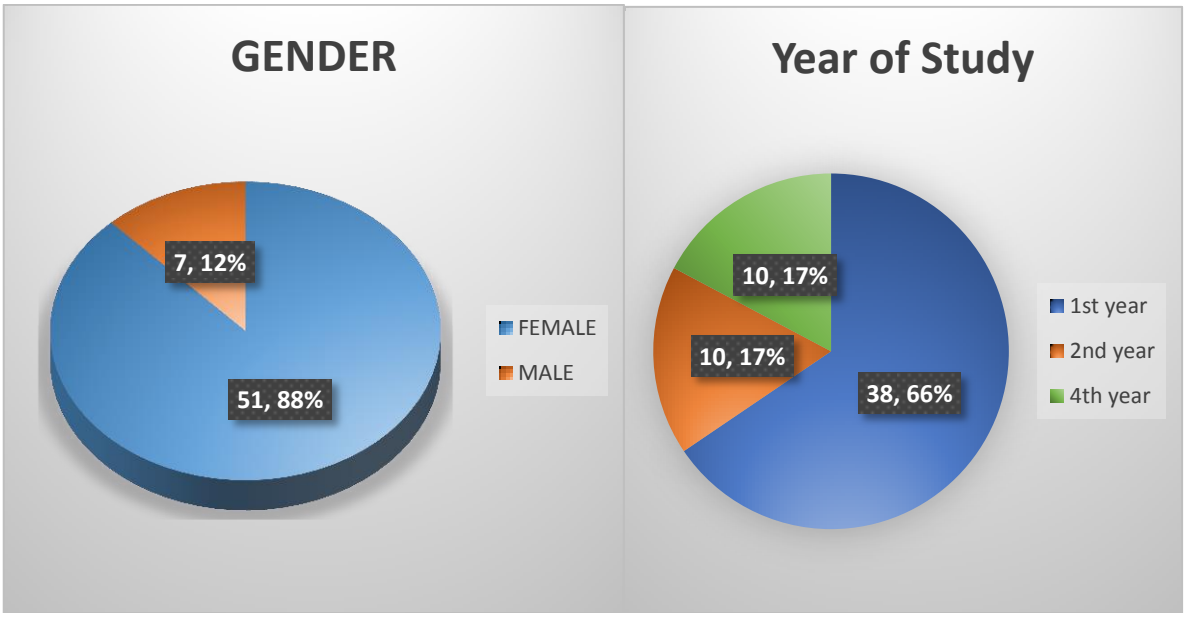

Figure 1. Demographic Data for Mentors

STEM Mentor's Perspective on Their Personal Qualities after Joining the Program

The assessment of STEM mentor's perspective on their personal qualities after joining the program is presented in this section.

i) Communication Skills

From the analysis (Table 1), 89.6% of the mentors agreed that they are able to convey a new idea (mean=5.60, standard deviation = 0.793) and able to explain an idea or problem (mean=5.57, standard deviation = 0.797). 86.3% of the mentors agree that they were able to convince the listeners about their new ideas (mean=5.38, standard deviation = 0.855). 84.5% of the mentors were able to describe the idea or concerns to listeners (mean=5.43, standard deviation = 0.957). Overall, in communication skills construct, most of the mentors agreed that they have good communication skills (mean=5.50, standard deviation = 0.68).

Table 1
STEM Mentors Perspective on Their Communication Skills

	I am able to convey a new idea. (Eg: intonation, conviction, fluency)	I am able to explain an idea or problem. (Example: presentation arrangement, delivery structure)	I am able to convince the listeners about my new idea. (For example: sincerity, deep knowledge)	I am able to describe the idea or concerns to listeners. (Examples: using sketches, diagrams, flow charts)
Mean	5.60	5.57	5.38	5.43
Std. Deviation	0.793	0.797	0.855	0.957

ii) Teamwork Skills

Besides (Table 2), 98.2% of the mentors agreed that they are able to work in group (mean=6.29, standard deviation = 0.726) and 94.9% of them were able to address the new ideas in the group work (mean=5.83, standard deviation = 0.798). Overall, in teamwork skills construct, most of the mentors agreed that they have good teamwork skills (mean=6.06, standard deviation = 0.669).

Table 2
STEM Mentors Perspective on Their Teamwork Skills

	I am able to work in groups.	I am able to address the new ideas in the group work.
Mean	6.29	5.83
Std. Deviation	0.726	0.798

iii) Problem Solving Skills

For problem solving skills (Table 3), 91.4% of the mentors agreed that they were able to relate to the knowledge that they learned in solving a problem, and 88% of them were able to able to find information to solve a problem (mean=5.57, standard deviation = 0.901). 89.6% of the mentors also agreed that they were able to consider factors related to existing resources in solving a problem (mean=5.57, standard deviation = 0.840). Overall, in problem solving skills construct, most of the mentors agreed that they have good problem-solving skills (mean=5.74, standard deviation = 0.68).

Table 3
STEM Mentors Perspective on Their Problem-Solving Skills

	I am able to relate the knowledge that has been learned in solving a problem.	I am able to find information to solve a problem.	I am able to consider factors related to existing resources in solving a problem.
Mean	5.67	5.57	5.57
Std. Deviation	0.846	0.901	0.840

iv) Social Responsibility Skills

From the analysis (Table 4), 96.5% of the mentors agreed that they understand their responsibility to the community (mean=6.07, standard deviation = 0.856), showing that they have good social responsibility skills (mean=5.67, standard deviation = 0.846).

Table 4
STEM Mentors Perspective on Their Social Responsibility Skills

	I understand my responsibility to the community
Mean	6.07
Std. Deviation	0.856

The Difference of STEM Mentors' Perspectives on Their Personal Qualities before and after Joining the Program

The difference between the assessment of STEM mentor's perspectives on their personal qualities before and after joining the program is demonstrated in this section (Table 5 and Table 6).

Table 5
Mean Score of STEM Mentor's Perspectives on Their Personal Qualities before and after joining the Program

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	POScommunication_skill	5.50	58	0.68	0.09
	PREcommunication_skill	5.00	58	0.86	0.11
Pair 2	POSTeamwork_skills	6.06	58	0.67	0.09
	PRETeamwork_skills	5.59	58	0.89	0.12
Pair 3	POSsocial_responsibility_skills	5.67	58	0.85	0.11
	PREsocial_responsibility_skills	5.48	58	1.11	0.15
Pair 4	POSProblem_solving_skills	5.74	58	0.68	0.09
	PREProblem_solving_skills	5.00	58	0.99	0.13

Paired sample t-test was conducted to compare various skills of mentors before and after joining the program. For Communication Skills, the mean score for pre-test is 5.50, while mean score for post-test is 5.00. There was a significant difference in the scores for

communication skills in pretest (M=5.00, SD=.86) and posttest (M=5.50, SD=.68); t (58) (=-3.785, p = 0.000). Teamwork skills also show significant difference in the scores in pretest (M=5.59, SD=.89) and posttest (M=6.06, SD=.67); t (58) (=-3.325, p = 0.002). Besides, Problem Solving Skills shows significant difference in the scores in pretest (M=5.00, SD=.99) and posttest (M=5.74, SD=.68); t (58) (=-4.897, p = 0.000). However, in the social responsibility skills, there is no significant different between pretest (M=5.48, SD=1.11) and posttest (M=5.67, SD=0.85), t(58) (=1.086, p = 0.282).

Table 6
Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	POScommunication_skill - PREcommunication_skill	.49569	.99725	.13094	.23348	.75790	3.785	57	.000
Pair 2	POSTeamwork_skills - PRETeamwork_skills	.47414	1.08588	.14258	.18862	.75966	3.325	57	.002
Pair 3	POSsocial_responsibility_skills - REsocial_responsibility_skills	.18966	1.33057	.17471	-.16020	.53951	1.086	57	.282
Pair 4	POSProblem_solving_skills - PREProblem_solving_skills	.73563	1.14412	.15023	.43480	1.03646	4.897	57	.000

These results suggest that the program helps increase the communication skills, teamwork skills and problem-solving skills in mentors. However, the social responsibility skills do not show significant different although there is an increase in the mean score of posttest. This can be caused by the high value of social responsibility skills of mentors prior to the program as they have already been dealing with small kids. Their sense of responsibility is considered higher than handling adults or students in primary or secondary schools.

Reflection of Mentors towards the Program

12 mentors were selected randomly to give responses towards three questions. Since all respondents underwent the same program together and have similar background and knowledge, it was deemed sufficient by the researchers to only select some for the interview. In addition, the interview questions aimed to get general perceptions regarding how they felt before and after they participated in the program and what were the challenges they faced in the program.

i) Opinions before Participating in the Program

Five mentors responded that they were less confident and nervous before they enrolled in this program. However, the uncomfortable feeling was not caused by the program itself, but due to the lacking of communication skills of the mentors. Mentors had to interact, communicate and speak in front of the crowd. This make them felt nervous and less confident, especially for those who were the first time interact with children.

> *"…I see STEM as a less stimulating program for children and I am less confident about doing this program because this program requires me to interact with children and should have the appropriate strategy to attract the children interest." (S***a)*

> *"I was a little nervous because this was my first time communicating something to a child.*" (N****t)

> "*I am looking for a way to attract basic communication skills so mentee will not get bored during the intervention. Less confidence to speak in front of the crowd also caused me a little nervous before starting activities…*" (Sh****h)

> *"…I feel that it is difficult for children to understand this subject…it is my first time in teaching children with a module.*" (E***s)

> *"…I was very worried. This is because I'm less confident that the child can understand what I'm going to say in this STEM program - the early math and Science of children…*" (C***g)

Besides, mentors also worried about the lesson preparation. Although the materials were given to the mentors in the program, mentors still need to try out all the kit and materials.

> "*I found that self-preparation in the program was quite unsatisfactory because exposure in practical form was less focused.*" (Wa*****n)

> "*…I need to understand and master every step that needs to be taken when performing activities. In addition, I also need to provide the materials needed for the activity to run smoothly without any disruption in terms of material deficiencies. Materials used are provided prior to intervention by each group. Such activities also require the cooperation of each mentor group in order for the children to have effective knowledge…*" (A***e)

ii) Opinion after Participating in the Program

After the program, mentors stated that the program was able to emphasize 21st century skills, such as collaborative, communication, critical thinking, creativity and values (4C1V) to the mentors and mentees.

> "*I found some changes in the form of positive improvements in group collaboration, creative thinking and critical thinking skills and some methods of applying learning in the form of games to children.*" (W***din)

> "*I can see the difference in every child where some children have the confidence to express their creativity partially through their observations. Although my mentee rarely presents myself, the mentee has a good cognitive ability…*" (S***fah)

> *"…creativity of students to be developed…*" (M***ita)

"*…for example, in Science subjects, children are able to build a solid building by stabilizing and multiplying plastic cups at the site of their building to reinforce their building…*" (A**e)

"*…my creativity is also increasing…*" (E***s)

From the observation of the mentors, mentees also gain knowledge easily in this program.

"*For example, interventions in recognizing numbers use the form commonly seen by children, namely the shape of a star or beetle in calculating the number either ascending or descending. This is because, children are quick to understand what is commonly seen around them.*" (Wah****in)

"...After I gave a guide on the activities of the pupils and I will start asking questions to my students. Most of the questions, they can be answered correctly and accurately..." (Ch***g)

The mentors also realized that the program able to give motivation to the preschool teachers and train the mentors in terms of communication skills and teaching strategies. Mentors are more confident to interact and communicate with children after the program.

"*...I see that the STEM program is able to motivate and train the teacher...*" (S***n)

"*…I have gained a lot of knowledge and experience. I can understand a little and how to communicate with them*." (N***it)

"*…the mentor program of this stem mentee enhances my communication skills as well as enhances the new experience…*" (S***h)

"*…my enthusiasm for teaching children is also growing…*" (J***ih)

"*… The mentors also get the appropriate teaching strategies to attract students…*" (Su***r)

iii) The Challenges Faced in the Program

The main challenge faced by most of the mentors is the effort to maintain the mentees' focus in the class. All the mentees in this program are children in kindergarten. Unclear instructions, long waiting time, and boring activities caused the mentees to lose concentration. Therefore, the activities needed to be further enhanced with more creativity in order to attract the attention of children. As what N***it said, she tried hard to maintain the mentees' focus in the classroom because they can easily become less responsive. Besides, she also wondered whether the mentees understood what she was talking about.

Another challenge discovered was the quality of module which needs to be increased. For example, the games need to be various and interesting.

"…*children are less concerned and easily bored*…" (Je***n)

"…*some of the students do not pay attention and are easily bored*." (Ch***g)

Besides, mentor like Sh***h face difficulty in accessing the mentee because the mentees does not attend certain activities of the program. Same with Jeisih, she found that the transportation to go to the school is also one of the problems. Hence many of the university's activities are in conflict with the day set for the stem program.

"…*I have difficulty assessing the mentee because my mentee often does not attend. This has made it difficult for me to evaluate the performance of the mentee*" (Sh***h)

The competency of the mentors also one of the challenge. Due to this, the time to carry out the activities become longer.

"… *Here I need the help of other partners to explain how the activities are doing well and effectively. It takes a lot of time to carry out activities*…" (A**e)

"…*the program has to be extended because they do not follow the program schedule*…" (Su***ir"

The other challenge that mentors face were different cognitive level of children. Some children are very weak and some are brilliant.

"…*children are less likely to identify the numbers given and are still weak in calculations*…" (S****a).

DISCUSSION AND IMPLICATIONS

Teachers are important persons within a student's talent development as they hold prior views and experiences that will influence their STEM instruction. It is important to understand teachers' beliefs and perceptions related to STEM talent development for schools to include quality STEM education (Morgot and Kettler, 2019). In previous chapters, the problem stated that teachers were not exposed to STEM lessons as there are no teaching and learning modules or guidelines. In addition, the preschool teachers had little knowledge about doing assessments on STEM activities as there is no instrument or guideline provided by the Ministry of Education at the preschool level and more fun learning module should be developed as mentors got easily bored using the instruments in this study.

In this study, the level of mentors' communication skill is satisfactory with the mean score of 5.60, teamwork skill 6.29, problem solving skills 5.57 dan social responsibility 6.07. In addition to this, some mentors mentioned they were not confident and worried of the STEM program. However, from the analyses from the interview after the intervention it was found that the mentors gained positive improvement and the program helped them increase their creativity. They suggested that the quality of module to be improved, competency of mentors improved and and duration of the intervention extended.

Paired sample t-test was conducted to compare various skills of mentors before and after they joined the program. The results suggested that the program increases the communication skills, teamwork skills and problem-solving skills in mentors. However, the social responsibility skills do not show significant difference although there is a slight increase in the mean score of posttests. This can be caused by the already high social responsibility skills of mentors at the beginning as they have dealt with small kids.

CONCLUSION

Quality in service instruction over STEM pedagogy best practices is a recommendation for practice. It is believed that STEM mentor-mentee program has important implications for early Mathematics and Science education and creativity researchers. This study opens an endless source for researchers to explore more STEM activities in the early years. It would also be interesting to produce module which can beneficial to all educators. Although this was the first success of STEM education story for preschoolers in Sabah, further research is essential to improve the nation STEM performance.

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