

## A Study of STEM Program among Rural Students

Siti Nurul 'Ain Hj Zaiton<sup>1,2,a</sup>, Haryana Mohd Hairi<sup>1,2,b</sup>, Nurhuda Ismail<sup>3,c</sup>, Mohammad Bin Abdullah<sup>4</sup>, Nurin Amilin Othman<sup>2</sup>, Nursyazni Syahirah Kamal Baharin<sup>2</sup>, Nor syahirah Irwan<sup>2</sup>, Nuraina Badrulhisam<sup>2</sup>, Noor Irdina Mohamad Sopian<sup>2</sup>

\*Corresponding author:  
siti6687@johor.uitm.edu.my

<sup>1</sup>Faculty of Applied Science, Universiti Teknologi MARA (UiTM),  
<sup>2</sup>Science and Technology Club, Universiti Teknologi MARA (UiTM),  
<sup>3</sup>Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA (UiTM),  
<sup>4</sup>Faculty of Chemical Engineering, Universiti Teknologi MARA (UiTM), Cawangan Johor, Kampus Pasir Gudang, Johor, Malaysia.

<sup>a</sup>siti6687@johor.uitm.edu.my, <sup>b</sup>haryana.hairi@johor.uitm.edu.my,  
<sup>c</sup>nurhudaismail@johor.uitm.edu.my

### Abstract

This study shows the implementation one of the STEM activity namely 'Science to Action' amongst rural students. It was implemented at one of the primary school in Pontian, Sekolah Andek Mori Mukim Serkat on 12<sup>th</sup> May 2018. This school was chosen by Science and Technology Club, UiTM Cawangan Johor, Pasir Gudang Campus in order to promote STEM amongst rural students in Malaysia. A total number of 50 school students including Standard 3, 4, and 5 was chosen to take part in this programme. 30 facilitators from Science and Technology Club actively involved in this programme to facilitate all the modules in this programme. STEM programme used nine modules which is specially designed based on school syllabus. The main objective of this programme is to infuse interest among youth in the field of Science and Technology. From the study, we strongly conclude that implementation of STEM programme give a high positive impact towards STEM education.

Keywords: STEM; STEM Activity; Primary School; Children; Rural Students.

### 1.0 INTRODUCTION

STEM term began in the early 90s in the United State in the policies of US government to make sure every citizen of the United State is willing to pursue Science, Technology, Mathematics and Engineering [1][2].

In Malaysia, STEM's skilled students greatly needed by the state for remain competitive in global level [3][4].

This provable with STEM education become an important agenda tabled in Pendidikan Pembangunan Malaysia (PPP) 2013-2025 [5][6]. Various activities have been implemented to attract student's interest to venture field in STEM [4] [7] [8] [9]. Student who actively participate in STEM activities will produce students who are self-learning oriented. They manage to reflect what

they have learn in their classes and tends to have better understanding in their studies [10]. The objectives of this study are to study the effectiveness of the activities in relation with STEM field and to study the effect of STEM activities towards enhancement of soft and hard skills amongst rural students. 50 students from Sek.

Andek Mori is involved in this survey via questionnaire. The effectiveness of the program is assessed using one of the instrument study called questionnaire as the data sources.

## 2.0 Methodology

Science to Action programme handled by Science and Technology Club, UiTM Caw Johor, Pasir Gudang branch is one of the efforts to extend STEM knowledge among rural students. This programme involves nine modules based on STEM practice. The modules are built based on syllabus of primary school level for Science and Mathematics subjects specifically for Standard 3, 4 and 5. It were composed following the STEM practices suggested in PPPM 2013-2025. STEM practices encompass defining problems, developing models, plan and conduct investigations, analyze, build explanation and they form of solution and get engaged in debate and discussion based on evidents [1]. Apart from that, this programme activities also practise communication element, cooperation, creative and critical thinking amongst the student. This study is done on assess module effectiveness and the result of STEM activities amongst the participants.

Table 1 shows nine 'Science to Action' programme activity module.

Table 1. Program Science to Action module list.

Activity	Overview
Can You Do It?	This activity requires high creativity since students need to balance water in a can by 45 degrees using the principle of gravitation.
Dimensioning	This activity requires students to use their creativity and critical thinking skills. They are given 2 minutes to form 3D objects based on given question by the facilitators.
Mystery Box	This activity scrutiny the focus level, sense and students' capabilities in identifying objects inside the black box.
Puzzle	Students were given several questions in order to solve the puzzles. They have to use their critical thinking skills

	since they have to solve the puzzles in 2 minutes.
Density	This activity executed by facilitator by showing "density" application. Student tested with couple of questions about density. Student should guessing the answer.
Volcano	Facilitator will performs a volcano demonstration. The lava will come out from the tip of the volcano due to acid-base reaction Student will disclose the concepts and facts of volcano and geology.
TV Rosak	Each students in each group will be asked to queue in a line. Then the facilitator will question the first person and they have to convey the answer from one to another till the last person in the line. However they must not convey it through speech, they need to use their creativity as long as the messages is delivered to the other person. They are succeeded if the last person manages to give the correct answer to the facilitator.
Draw Me	Facilitators will question some of the scientific term to the students and they are required to guess and draw the answers on a piece of paper.
KLCC	Every group will be given time to build highest tower by merely using straw, glue and scissors. After final period, every group asked to explain their tower creation.

Questionnaire is divided into two parts; 'Science to Action' module assessment in accordance with STEM practices and 'Science to Action' module effectiveness evaluation to the student.

Table 2 shows the scale used in questionnaires forms to respondent (students).

Table 2. Questionnaire form scale.

Scale	Information
1	Strongly disagree
2	Do not agree
3	Agree
4	Really agree

### 3.0 RESULTS AND DISCUSSION

The analysis presented in mean distribution form and mean score information is according to the mean score [11].

Table 3 shows mean score value according to the given information.

Table 3. Mean score value.

Mean score value	Information
1.00 – 1.40	Very low
1.50 – 2.40	low
2.50 – 3.40	Medium
3.50 – 4.40	High
4.50 – 5.00	Very high

Table 4 shows the mean score to 'Science to Action' module assessment in accordance with STEM practice.

Table 4. Mean score to 'Science to Action' module assessment in accordance with STEM practice.

Bil.	Item	Mean Score Item
1	I understand every activity procedure	3.54
2	I know ways to resolve every activity	3.32
3	I can solve every activity successfully	3.41
4	I can explain this activity clearly	3.41
Overall Mean Score		3.42

Meanwhile Table 5 show mean score to Science to Action module effectiveness evaluation to student involved.

Table 5. Mean score to Science to Action module effectiveness evaluation to students.

Bil.	Item	Mean Score Item
1	I am fun to perform every activity given.	3.88
2	I easy to implement every activity.	3.25
3	I will try this activity with teacher and friends in class.	3.39
4	I will use knowledge achieved this for my learning process in class.	3.55
5	These activities add more my interest infield STEM (Engineering Technology Science and Mathematics).	3.80
Overall Mean Score		3.57

Table 6 show mean score respondent according to year 3, 4 and 5 for module assessment in accordance with STEM practice.

Table 6. Mean score respondent according to standard for module assessment in accordance with STEM practice.

Bil	Item	Mean Score for Standard		
		3	4	5
1	I understand every activity procedure	3.52	3.64	3.45
2	I know ways to resolve every activity	3.24	3.69	3.36
3	I can solve every activity successfully	3.33	3.64	3.27
4	I can explain this activity clearly	3.46	3.50	3.18
Overall Mean Score		3.39	3.62	3.31

Table 7 show mean score respondent according to standard 3, 4 and 5 to 'Science to Action' module effectiveness evaluation to students.

Table 7. Mean score respondent according to standard to Science to Action module effectiveness evaluation assessment to students.

Bil	Item	Mean Score for Standard		
		3	4	5
1	I am fun to perform every activity given	3.79	3.90	4
2	I easy to implement every activity	3.27	3.54	3.45
3	I will try this activity with teacher and friends in class	3.78	2.64	2.91
4	I will use knowledge achieved this for my learning process in class.	3.78	3.64	3.27
5	These activities add more my interest in field STEM (Engineering Technology Science and Mathematics).	3.91	3.86	3.82
Overall Mean Score		3.71	3.52	3.49

Apart from that, this study also involving respondent comparison the different gender. It involves male student respondent of 22 people meanwhile female student respondent is 28 people.

Table 8 show means core respondent according to gender for module assessment in accordance with STEM practice.

Table 8. Mean Score respondent according to gender for module assessment in accordance with STEM practice.

Bil.	Item	Mean Score for Male student	Mean Score for Girl Student
1	I understand every activity procedure	3.5	3.57
2	I know ways to resolve every activity	3.24	3.50
3	I can solve every activity successfully	3.43	3.39
4	I can explain this activity clearly	3.18	3.59
Overall Mean Score		3.34	3.51

Meanwhile Table 9 shows mean score respondent according to gender to Science to Action module effectiveness evaluation to students.

Table 9. Mean score respondent according to gender to 'Science to Action' module effectiveness evaluation to students.

Bil.	Item	Mean Score for Male student	Mean Score for Girl Student
1	I am fun to perform every activity given	3.95	3.81
2	I easy to implement every activity	3.45	3.22
3	I will try this activity with teacher and friends in class	3.09	3.63
4	I will use knowledge achieved this for my learning process in class.	3.41	3.67
5	These activities add more my interest in field STEM (Engineering, Technology Science and Mathematics)	3.82	3.88
Overall Mean Score		3.54	3.64

Mean score for module assessment in accordance with STEM practice overall is 3.42 where in medium level. This show module produced need improvement. This is because module produced is first attempt by student club.

Communication between facilitators and students involved should be improved to ensure students able to work something out activity clearly. Meanwhile, mean score value for 'Science to Action' module effectiveness evaluation to students is 3.57 (high level). This

indicate the student's interest toward with STEM activities that have been carried out.

Mean score value for year 4 student is higher compare to year 3 and 5 student for both evaluations. Mean score value for female students is higher compare to male students for both evaluations. This show female students have more interest towards field STEM. Meanwhile mean score value for happiness involvement of the activities is high level. This indicate that 'Science to Action' activities are relevant to the school students and need to be implement continuously in future. From the study, it is clearly shows that active learning have to be practiced in school to enhance the soft and hard skills amongst the students. [12][13]. Besides, students is given chances to give their feedbacks and opinion towards all of the activities that have been carried out in the programme. [14]

Fig.1 shows the school student in the group.

Fig.1. The school student in the group.



Fig. 2 shows some of the activities in this programme.

Fig. 2 . The activities in this programme.



(a) Valcano



(b) Density



(c) Dimensioning



(d) Draw Me



(d) TV ROSAK



(e) KLCC



(f) Mystery Box



(g) Puzzle

#### 4.0 CONCLUSION

Overall results shows that the carried out activities had successfully infuse the interest among the rural student in Science and Technology by using the STEM modules. However we will improve the modules in future so that it also reliable for Standard 6 students and can be implement in daily school activities.

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