



Primary School Students Attitude Toward STEM Subjects: A case study in Sarawak

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Abstract

The study aimed at investigating the attitudes of primary schools students' attitude towards science, technology, engineering, mathematics (STEM) subjects. Multistage sampling method was used to select the sample of the study. The participants of the study consist of 10,565 primary schools' students in Sarawak region, Malaysia. The quantitative approach was used in the study and the quantitative data was collection via survey on four factors of attitude towards STEM subjects: self confidence in STEM learning, perceived value of learning STEM, enjoyment in STEM learning, and motivation in STEM learning. Results of the study showed that students' attitude towards STEM subjects are at low positive across all four factors.

Keywords: STEM subject, attitude, primary schools

1. Introduction

Sarawak, one of the largest region in Malaysia has 1040 national public primary schools with 83 schools located at urban areas, 614 schools located at rural areas, 114, 83 and 146 schools located at interior area 1 (P1), interior area 2 (P2) and interior areas 3 (P3) respectively. The definition of interiors areas' schools is based on the reachable accessibility, basic facilities and public amenities decided by the *Jawatankuasa Induk Pemantauan Elaun Khas Mengikut Lokasi dan Tahap Kesukaran*, Ministry of Education, Malaysia.

Science, Mathematics, Engineering and Technology (STEM) is an educational initiative to nurture students critical thinking and problem-solving skills in 21st century global market. Malaysia has started STEM initiative in 70s. Many activities and strategies have been carried out for developing nation capacity building and economy. In primary school, STEM subjects refer to Mathematics and Science subjects. The overall performance of primary schools in STEM subjects are still at a low level as compared to other states within Malaysia (Ling et al, 2021). Therefore, the purpose of the study is to identify primary schools' students' attitude on STEM subjects in Sarawak before the intervention program can be planned and carried out.

2. Literature review

Study on attitude is important before any intervention program can be planned and implemented. Unfried, et al. (2014) revealed that data on students' attitudes towards STEM is important for STEM program administrators prior to plan their activities and set goals for STEM.

A few studies on students' attitude towards STEM were reported in literature. Martynenko et al. (2023) carried out a global analysis at different levels of education on 23 studies of students' attitude towards STEM education. Their goal is to examine views on STEM education studies. Altakhynah and Abumusa (2020) investigating the attitudes of students towards STEM to evaluate the STEM approach applied in teaching. Perdana et al. (2021) revealed students' attitudes towards STEM. They recommended teachers or policymakers comprehended student attitudes before implement STEM learning for their students. Similarly, Unfried et al. (2014) also shared the result of their students' attitudes toward STEM study and recommended STEM program administrators consider their findings to plan for the STEM goals and activities.

3. Methodology

A quantity approach was used in the study to collect quantitative data. Multistage sampling method was used to select sample of primary schools' students in the study. All primary schools in Sarawak were divided into 12 strata based on the division of Sarawak. Next, the schools were further divided into 5 strata based on the locations of school namely



urban, rural, P1, P2 and P3. Primary schools were selected randomly from each location and at the last stage, students were selected randomly from each selected school.

4. Findings and Discussions

A total of 10,565 students responded to the survey. Table 1 reveals that out of 10,565 respondents, the percentage of male and female students are 42.3% and 57.7% respectively.

Table 1 Distribution of student respondents according to gender

Gender	Number of respondents	Percent (%)
Male	4680	42.3%
Female	5885	57.7%
Total	10,565	100.0%

Table 2 shows the distribution of respondents based on the locations of school. The five school locations are proportionately represented by student respondents. The number of respondents from each location of school ranged from 180 (1.70%) from P3 schools to 6,043 (57.2%) from rural schools.

Table 2 Distribution of student respondents according to the location of school

Location of school	Number of respondents	Percent (%)
Urban	3,772	35.7%
Rural	6,043	57.2%
P1	328	3.1%
P2	243	2.3%
P3	180	1.7%
Total	10,565	100.0%

With regard to the family income of the student respondents, Table 3 shows that the majority (65.58%) of the overall students are from the B40 group family whose total monthly income per household is less than RM4,851. Based on the location of schools, it reveals that this percentage is the highest for the students from the P1 schools (81.94%), followed by students from the P3 schools (78.72%), P2 schools (76.84%), rural schools (71.77%) and urban schools (55.65%). On the other hand, it is noted that 25.83% of the overall students are from the T20 group whose total monthly income per household is RM10,971 or more whereas 8.59% are from the M40 group whose total monthly income per household ranged from RM4,851 to less than RM10,971. The percentage for the T20 group is the highest for the students from the urban schools (31.20%), followed by the students from the rural schools (22.77%) and the interior schools –P2 (18.64%), P1 (13.66%) and P3 (13.48%).

Table 3 Family income of student respondents

Location	Count/% within location	B40	M40	T20	Total
P1	Count	186	10	31	227
	% within location	81.94%	4.41%	13.66%	100.00%
P2	Count	136	8	33	177
	% within location	76.84%	4.52%	18.64%	100.00%
P3	Count	111	11	19	141
	% within location	78.72%	7.80%	13.48%	100.00%
Rural	Count	4,091	311	1,298	5,700
	% within location	71.77%	5.46%	22.77%	100.00%
Urban	Count	2,404	568	1,348	4,320
	% within location	55.65%	13.15%	31.20%	100.00%
Grand total	Count	6,928	908	2,729	10,565
	Percent (%)	65.58%	8.59%	25.83%	100.00%



Table 4 shows the educational level of the respondents' parents or guardians. It shows that most parents or guardians attained up to *Sijil Pelajaran Malaysia* across the locations (53.75% from P3, 47.91% from P1, 45.92% from P2, 45.74% from rural, and 36.97% from urban schools. The percentage of parents or guardians who attained up to primary school level is the highest for the students from the P2 schools (32.14%) and lowest for the students from the urban school (7.51%). The percentage of students with parents or guardian possessing at least a bachelor's degree (i.e. bachelor degree, master degree and doctor of philosophy) is the highest for the urban schools (18.06%) when compared with other locations (4.08% for the rural schools, 4.18% for the P1 schools, 4.08% for the P2 schools, and 1.25% for the P3 schools,)

Table 4 Educational level of the students' parents or guardians

	Count/ % within location	Ph D.	Ma ster	De gre e	Dipl oma	ST P M	Cer tifi cate	SP M	P r i m a r y	Ph i l o s o p h y	Not edu cate d	T o t a l
P1	Count	0	0	11	11	9	5	126	43	45	13	263
	% within location	0.00%	0.00%	4.18%	4.18%	3.42%	1.90%	47.91%	16.35%	17.11%	4.94%	100.00%
P2	Count	0	0	8	3	4	10	90	16	63	2	196
	% within location	0.00%	0.00%	4.08%	1.53%	2.04%	5.10%	45.92%	8.16%	32.14%	1.02%	100.00%
P3	Count	0	0	2	2	6	1	86	38	23	2	160
	% within location	0.00%	0.00%	1.25%	1.25%	3.75%	0.63%	53.75%	23.75%	14.38%	1.25%	100.00%
Rural	Count	3	24	225	334	284	231	2,520	856	1,017	16	5510
	% within location	0.05%	0.44%	4.08%	6.06%	5.15%	4.19%	45.74%	15.54%	18.46%	0.29%	100.00%
Urban	Count	68	151	801	575	209	178	1,640	468	333	13	4436
	% within location	1.53%	3.40%	18.06%	12.96%	4.71%	4.01%	36.97%	10.55%	7.51%	0.29%	100.00%
Grand total	Count	71	175	1,047	925	512	425	4,462	1,421	1,481	46	10565
	Percent (%)	0.67%	1.66%	9.91%	8.76%	4.85%	4.02%	42.23%	13.45%	14.02%	0.44%	100.00%

The attitudes of the students towards STEM subjects are presents in Table 5. The results obtained for four constructs that reflect the students' attitude towards STEM subjects: self-confidence (ability to succeed in learning the subject), perceived values (beliefs about the usefulness, relevance and worth of learning a subject in their life now and in the future), enjoyment (degree of enjoying working with the subject and attending the classes), and motivation (interest and desire to learn the subject) (Huang & Lin, 2015). The students responded through a 6-point Likert scale ranging from 1- strongly disagree to 6-strongly agree in the survey. Most of the students slightly agreed that they possess a slide positive attitude (mean=4.12, SD=1.33) in learning the STEM subjects. The students slightly agreed on the items related to "Perceived value of learning STEM" (mean=4.15, SD=1.48). They slightly agreed on "Enjoyment in STEM learning" (mean=4.34, SD=1.29), "Motivation in STEM learning" (mean=4.18, SD=1.24) and "Self-confidence in STEM learning" (mean=3.79, SD=1.23). In summary, the results show a low positive level of students' attitude towards learning STEM subjects.

Table 5 Students' attitude towards STEM subjects

Attitude	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree	Total	Mean	Standard Deviation
Self-confidence in STEM	Count	338	1,046	3,212	2,715	2,367	887	10,565	3.79	1.23
	% of Total	3.20%	9.90%	30.40%	25.70%	22.40%	8.40%	100%		



learning										
Perceived value of learning STEM	Count	137	306	2,060	4,321	2,831	909	10,565	4.15	1.48
	% of Total	1.30%	2.90%	19.50%	40.90%	26.80%	8.60%	100%		
Enjoyment in STEM learning	Count	169	447	1,930	2,726	3,634	1,659	10,565	4.34	1.29
	% of Total	1.60%	4.23%	18.27%	25.80%	34.40%	15.70%	100%		
Motivation in STEM learning	Count	211	539	2,250	2,979	3,254	1,331	10,565	4.18	1.24
	% of Total	2.00%	5.10%	21.30%	28.20%	30.80%	12.60%	100%		
Grand total	Count	856	2,338	9,453	12,741	12,086	4,786	42,260	4.12	1.33
	Percent (%)	2.03%	5.53%	22.37%	30.15%	28.60%	11.33%	100%		

Since majority of the students in primary schools are from rural and interiors areas (Table 2) and majority of the parents or guardians with low educational backgrounds (Table 4) which reflected they have limited knowledge to guide their own children in STEM subjects. This is in stark contrast to parents from urban schools where most of them are educated and aware of the importance of education for their children's future. Many of the parents, being better educated, have sufficient knowledge to guide their children.

Primary schools' students' attitude towards STEM subjects are at low positive in all four factors: Self-confidence in STEM learning, Perceived value of learning STEM, Enjoyment in STEM learning, and Motivation in STEM learning. The finding reflected the school-based assessment performance recorded on STEM subjects at Sarawak region. Therefore, school administrators, teachers and the policy maker are recommended to use the findings to plan the activities or teaching methods which are suitable for the students.

5. Conclusion

The results of the study showed that majority of the students are from the B40 family which is the low-income family in Malaysia. The students' parents or guardians in the study are mostly attained up to *Sijil Pelajaran Malaysia* (secondary school level) across all locations. Generally, parents or guardians from interior areas have lower education level. Overall, students' attitude towards STEM subjects are at low positive in all four factors namely self confidence in STEM learning, perceived value of learning STEM, enjoyment in STEM learning, and motivation in STEM learning. Suitable plan to motivate primary school's students to study STEM subjects can be done based on the result of the study.

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