WATER RESOURCE SUSTAINABILITY AWARENESS AMONG UPPER SCHOOL STUDENTS IN MALAYSIA

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ABSTRACT

This study aimed to analyse students' level of awareness regarding water resource sustainability among Form Six students in Pasir Mas, Kelantan, Malaysia. This study employed a quantitative method, administering a questionnaire to 242 Form Six students. A combination of stratified and simple random sampling was used to select the study sample. The study analysis was conducted to determine students' levels of knowledge, attitude, and practice regarding water resource sustainability. Besides, inferential analysis techniques such as the t-test and Pearson correlation were used to compare the knowledge, attitude, and practice of male and female students and examine the relationship between each variable. The descriptive analysis findings revealed that students' levels of knowledge and practice regarding water resource sustainability were high. While the students' level of attitude was moderate. Furthermore, the t-test analysis showed that no gender differences in all variables related to water resource sustainability. In comparison, the Pearson correlation analysis indicated that knowledge and attitude had a moderately positive relationship and a strong relationship with water resource sustainability practice. Hence, water resource sustainability education across the curriculum and extracurricular activities must be strengthened to ensure that students know the importance of water resource sustainability in their daily activities.

Keywords: awareness, sustainability, water resource, knowledge, attitude, practice

INTRODUCTION

Malaysia is one of the world's fastest-growing economies and the most competitive developing country in Asia based on the Global Competitiveness Report. However, as the country's development progresses toward becoming a developing country, the physical environment, particularly the water quality, has been impacted (Nasir et al., 2009). Water is an indispensable natural resource for humans, plants, animals, and microbes on Earth as it is necessary for the maintenance of a healthy food supply and environment (Makki et al., 2013). It is also a critical component of human life; humans cannot survive without water, and yet at the same time, water scarcity results in drought, while excess results in flooding.

The United Nations Decade of Education for Sustainable Development (2005-2014), administered by UNESCO, aimed to raise awareness about education as an essential element of achieving more sustainable development. Therefore, Malaysia has promoted sustainable developmental education through formal and informal environmental education to support UNESCO's effort (Hanifah et al., 2013). Students are exposed to water resource sustainability in their formal education through core subjects such as Science, Malay Language, Civics and Citizenship Education, Moral Education, and Geography. Furthermore, public awareness about water resource sustainability has been raised through mass media, influencing how the community thinks. For example, advertisements promoting water-saving and water management tips can attract and encourage consumers to conserve water resources. Advertisements in the media should be frequent in serving as a constant reminder to consumers, thereby influencing their attitudes and behaviours toward water resources (Mujirah & Hamirdin, 2016).

Education is regarded as crucial in educating the community about the significance of water resource sustainability. Moreover, parental education plays a vital role in instilling in students the importance of water resource sustainability (Mahat et al., 2019; Nurul Hidayah et al., 2013). Hence, this article will examine the level of awareness of water resource sustainability among Form Six students related to their knowledge, attitude, and practice.

LITERATURE REVIEW

Education Awareness of Water Resource Sustainability

To ensure the continued availability of safe and high-quality water resources, Malaysia's Ministry of Science, Technology and Environment adopted the National Environmental Policy in 2002, stating that environmental conservation and preservation in Malaysia are implemented in the context of sustainable development in the areas of economic development, social development, and environmental sectors (Ministry of Science, Technology & Environment Malaysia, 2002). The concept of sustainable development demonstrates the importance of balancing economic development efforts with environmental stewardship, particularly concerning resource exploitation and post-exploitation environmental

stewardship. Thus, whether formal or informal, education is critical for the development of sustainable consumers (Siti Khadijah & Christopher, 2016).

Knowledge about water education is the cornerstone of establishing a society that uses water sustainably. Therefore, such knowledge must be instilled in students from the beginning of their education. Students are the most vital human resource for future environmental stewardship, and their awareness of water resource management strengthens their commitment to resolving water resource issues (Seehamat et al., 2014). Indeed, water education can help students become more aware of water scarcity and instil attitudes and behaviours consistent with prudent water use (Samaltani & Christidou, 2013).

Knowledge about Water Resource Sustainability

Personal knowledge gained through education will result in individuals responsible for sustainable water use, ensuring the water resource's long-term viability for future consumers. According to Uma et al. (2018), Form Four students in North Kinta, Perak, had a high level of knowledge about water consumption (M=3.97; SD=0.48). Their findings showed that about 311 students (74.0%) had a high level of knowledge, about 108 students (25.7%) had a moderate level, and only one student (2%) had a low level of knowledge. Meanwhile, students in Baling, Kedah demonstrated a high level of knowledge related to water-saving practices (M=4.03; SD=0.35) (Mohmadisa et al., 2021). Based on this finding, the majority of students were well versed in water resource sustainability. However, there were also students with moderate and low levels. Thus, the respected parties should implement the disclosure in various aspects to expose students to water education to ensure that water resource sustainability was always under sustainable supervision among the communities that use it.

Attitude towards Water Resource Sustainability

Ang (2014) conducted a study on attitudes towards water resource sustainability to determine the potential of moral instruments in sustaining water resources in Malaysia, more specifically among the Malacca residents. Based on the study's findings, the public had a positive attitude towards water resources. In addition, the Pearson Chi-Square (x^2) indicated a significant relationship between gender variables and society's role in protecting Malacca' water resources (x^2=7,869, df=1, p <.05). Furthermore, the study's findings revealed that respondents believed that the role of individuals in caring and respect, the role of loving parents, the role of society in protecting, and the role of education in religious and moral perspectives could serve as a starting point and a critical perspective for ensuring water quality in the Malacca River. Therefore, individuals, parents, and society can all play roles in ensuring the quality of water resources for future generations by emphasising water resource protection.

Practice of Water Resource Sustainability

Hanifah et al. (2017) found that while students possessed a high level of knowledge about water management, their water management practices were moderate. According to their findings, 136 respondents (32.5%) were classified as

low, 264 respondents (63%) as a medium, and 19 respondents (4.5%) as high. Furthermore, Mohd Zaid's (2015) findings revealed that environmental practices were moderate among Form Four students in Terengganu. Indeed, students' knowledge about water management did not correspond to their practices. Other factors might exist, such as psychological factors associated with parents' water management practices as role models for their children (Ai et al., 2014).

An individual's education can profoundly affect his or her knowledge, attitude, and behaviour. Previous researchers have advanced a variety of perspectives related to water sustainability awareness, beginning with education. Strife (2010) asserted that education enables students to demonstrate a better understanding of water conservation facts. Besides, they are more likely to engage in recommended behaviours, which results in developing a stronger sense of responsibility for water management among students. Michelsen and Rieckmann (2015); Yeap et al. (2007) agreed that public education should be made available to raise awareness about water issues and promote sustainable water use. Education can also heighten students' awareness of the importance of sustainable water resource management and assist them in further developing their capacity to address water resource issues (Seehamat et al., 2014). Meanwhile, Missingham and McIntosh (2013) asserted that students who possess a thorough understanding of water education would indirectly develop water management skills, positive values, and abilities. Thus, information about water resource sustainability education should be disseminated to raise awareness and develop students and communities that sustainably use water resources.

METHODS

This study employed a quantitative approach, administering a questionnaire to Form Six students in Pasir Mas, Kelantan, Malaysia to assess their levels of knowledge, attitudes, and practices regarding water resource sustainability. The study sample was selected using a combination of stratified and simple random sampling methods. Two hundred forty-two students were chosen using Krejcie and Morgan's (1970) Table. This sample was limited to Form Six students because they were mature adults who had spent over a decade observing and participating in the teaching and learning processes in primary and secondary schools. The questionnaire consisted of 68 items divided into five parts: six questions about respondents' backgrounds (Part A), twenty questions about respondents' knowledge related to water resource sustainability (Part B), twenty questions about respondents' attitudes towards water resource sustainability (Part C), twenty questions about respondents' practices of water resource sustainability (Part D), and two questions seeking for respondents' comments or suggestions (Part E). The items in Parts B, C, and D were rated using the following five Likert scales: strongly disagree (1), disagree (2), less agree (3), agree (4), and strongly agree (5).

Furthermore, this study used a quantitative approach via questionnaire surveys, after which several critical steps had been completed. Firstly, this study

aimed to determine the level of awareness among Form Six students in Pasir Mas, Kelantan, regarding water resource sustainability. Secondly, it aimed to examine the students' levels of knowledge, attitudes, and practices regarding water resource sustainability and the differences in knowledge, attitudes and practices of water resource sustainability by gender. Thirdly, this study aimed to analyse the relationship between knowledge, attitudes, and practices of water resource sustainability.

A quantitative method design was used to elicit information about the items under study. This study used three research methods, namely descriptive statistics, t-test, and inferential analysis. The descriptive statistics, such as frequency and mean, were used to determine the levels of knowledge, attitudes, and practices regarding water resource sustainability among students based on the setting of large scale (mean score 4.00-5.00), medium (mean score 3.00-3.99), and low (mean score 1.00–2.99). Subsequently, the t-test was used to examine the differences in knowledge, attitudes and practices related to water resource sustainability by gender (male versus female) among students. The difference is visible when there is a difference between the mean (M) and standard deviation (SD), and the reference level of significance is $p<0.05$. Suppose the SD value for one group is greater than the SD value for the other group and is significant at the $p<0.05$ level, it can be implied that there is a difference between the two groups (Uma, 2018).

Finally, inferential analysis was used to assess the relationship between the three variables, namely the Pearson correlation. The correlation analysis was used to determine the strengths and relationships between independent and dependent variables. The interpretation of correlation coefficients in Table 1 was used to determine the relationship strength.

Table 1: Interpretation of Correlation Coefficients

Size of Correlation Coefficients	Correlation Strength
0.91 to 1.00	Very Strong
0.71 to 0.90	Strong
0.51 to 0.70	Moderate
0.31 to 0.50	Weak
0.01 to 0.30	Very Weak
0.00	No Correlation

Source: Chua, 2011

RESULTS

Respondent's Background

This part analysed the respondents' profiles, which consisted of 242 Form Six students from eight secondary schools in Pasir Mas, Kelantan. Male and female students both responded in equal numbers, totalling 121 respondents (50%). The majority of respondents were 240 Malays students (98%). While the remainder were from the Chinese and natives of the Sabah and Sarawak communities, both recorded the same number of respondents, one respondent (1%). Two hundred thirty-six respondents (97%) from the art stream and six respondents (3%) from the science stream. The findings indicated that 76% of respondents responded that they obtained information about water issues via print media, such as newspapers, magazines, and books, 74% via electronic media such as television, the internet, and radio, 41% via talks, seminars, and exhibitions, 37% via school management and administration, and 22% through student associations, environmental club and consumer club.

Levels of Knowledge, Attitude, and Practice Related to Water Resource Sustainability among Students

Table 2 depicts Form Six students' levels of knowledge, attitudes, and practices regarding water resource sustainability in Pasir Mas, Kelantan. As can be seen, students had a high level of knowledge about water resource sustainability (M=4.38, SD= 0.27). The vast majority of students with 241 students (99%) achieved a high knowledge level, and only one student (1%) achieved a moderate knowledge level. Furthermore, the students' level of attitudes towards water resource sustainability was moderate (M=3.60, SD=0.36). One hundred twenty-six students (52%) were classified as moderate, while116 students (48%) were classified as high. In short, their attitudes towards water resource sustainability were at a moderate level. Moreover, students' level of practices regarding water resource sustainability were high (M=4.90, SD=0.41). Two hundred one students (83%) achieved the high level, while 41 students (17%) achieved the moderate level.

Table 2: Levels of Knowledge, Attitude, and Practice of Water Resource Sustainability among Form Six Students in Pasir Mas, Kelantan

Variables	Low Level		Moderate Level		High Level		Mean	SD	Average Level
	N	%	N	%	N	%			
Knowledge	0	0.0	1	1	241	99	4.38	0.265	Strong
Attitude	0	0.0	126	52	116	48	3.60	0.362	Moderate
Practice	0	0.0	41	17	201	83	4.90	0.414	Strong

The T-Test Analysis to Examine the Gender Differences in Students' Knowledge, Attitudes, and Practices Related to Water Resource Sustainability

A t-test was conducted to determine any significant differences in the variables studied, namely knowledge, attitudes, and practices regarding water resource sustainability. Based on Table 3, the results of the t-test for the knowledge variable showed no significant difference between male (M=4.39, SD=0.29, n=121) and female students (M=4.38, SD=0.24, n=121), i.e (t=0.23, df=240, p>0.05). The analysis also revealed that there was no significant difference in the attitude variable between male (M=3.63, SD=0.30, n=121) and female students (M=3.57, SD=0.41, n=121), i.e. (t=1.48, df=218.2, p>0.05). This finding was consistent with Tiwi's (2006) study. Furthermore, the result showed that there was no significance difference in the practice variable between male (M=4.05, SD=0.38, n=121) and female students (M=4.02, SD=0.45, n=121), i.e. (t=0.50, df=240, p>0.616). This result was supported by the study of Uma et al. (2018).

Table 3: Analysis of Differences in Knowledge, Attitude, and Practice of Form Six Students towards Water Resource Sustainability

Variables	Gender	N	Mean	SD	df	*t*	*p*
Knowledge	Male	121	4.39	0.29	240	0.230	0.819
	Female	121	4.38	0.24			
Attitude	Male	121	3.63	0.30	218.2	1.477	0.141
	Female	121	3.57	0.41			
Practice	Male	121	4.05	0.38	240	0.503	0.616
	Female	121	4.02	0.45			

Analysis of Relationship between Knowledge, Attitude, and Practice Related to Water Resource Sustainability among Students

Table 4 shows the relationship between knowledge, attitudes and practices related to water resource sustainability among Form Six students in Pasir Mas, Kelantan. The Pearson correlation analysis revealed a moderately significant positive relationship between knowledge and practices of water resource sustainability (r=0.503**). Meanwhile, there was a strong positive correlation between attitudes and practices related to water resource sustainability (r=0.704**).

Table 4: The Correlation Tests of Knowledge, Attitude, and Practice Related to Water Resource Sustainability among Form Six Students in Pasir Mas, Kelantan

	Correlation Value (*r*)	Significant	Strength
Knowledge-Practice	0.503**	0.000	Moderate
Attitude-Practice	0.704**	0.000	Strong

DISCUSSION

Levels of knowledge related to water resource sustainability among students in this study discovered that students had a high knowledge level about water resource sustainability. Therefore, this indicate that education has the most significant impact on social change in raising awareness of environmental stewardship, particularly regarding water resources (Hanifah et al., 2017; Noraziah & Latipah, 2010). Furthermore, the students' level of attitudes towards water resource sustainability in this sudy at moderate level.

The findings of Mujirah and Hamirdin (2016), who found that students exhibited moderate attitudes about water resource sustainability, were confirmed in this study. Although students' attitudes regarding water resource sustainability were generally moderate, some students expressed positive attitudes. Aside from that, the pupils' knowledge of water resource sustainability was in high level. As found by Mohd Azlan et al. (2012), students' practises of water resource sustainability were satisfactory, allowing for further implementation of water resource sustainability.

The study indicates no significant variations in knowledge, attitude, and practise of form six students regarding water resource sustainability, similar to Dean, Fielding, and Newton (2016) study results. Identifying demographic factors linked to water resource knowledge, attitude, and practise provides a useful starting point. Identifying demographic characteristics associated with water resources knowledge, attitude, and practice provide a foundation for further initiatives or campaigns aiming to build awareness.

According to Ang (2014), Uma et al. (2018), the relationship between knowledge, attitude, and practise related to water resource sustainability among students shows a moderately significant positive relationship between knowledge and practises of water resource sustainability, as well as a strong positive correlation between attitudes and practises related to water resource sustainability. The ramifications of these findings for water practitioners and information producers are numerous. Individuals may be well knowledgeable on some water concerns but poorly informed on others. It is critical to acknowledge that knowledge, attitude, and practise are not binary, but vary in depth and breadth across issues.

CONCLUSION

In conclusion, the study findings indicated that students possessed high levels of knowledge and practices regarding water resource sustainability. Conversely, students' attitudes towards water resource sustainability were moderate. Besides, there were no significant differences in knowledge, attitudes, and practices regarding water resource sustainability between male and female students. While there was a moderate correlation between knowledge and practice variables among Form Six students in Pasir Mas, Kelantan, there was a strong correlation between attitude and practice. This study demonstrates an encouraging level of

awareness among Form Six students about water resource sustainability. It is evident from the prior learning process they underwent. Thus, water resource sustainability education should be integrated into students' curriculum and extracurricular activities throughout their PdPc, to ensure that they understand the critical nature of water resource sustainability in their daily activities. Water resources' importance should be emphasised even more, especially in the subject of Geography.

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