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Investigating Students' Environmental Knowledge, Attitude, Practice and Communication

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Abstract

This study investigated the relationship between students' knowledge, attitude and practice of the environment and effective communication of environmental messages. For this purpose, a knowledge, attitude and practice (KAP) survey was conducted, involving 895 students from 16 higher learning institutions in Malaysia. The findings revealed that students in general, have a good level of environmental knowledge. However, knowledge does not necessarily lead to practice. There was a weak relationship between students' level of knowledge and sustainable environment practices. Similarly, there was a weak relationship between students' attitude and sustainable environment practices. Hence, attitude is not a good predictor for sustainable environment practices. These findings highlight the complexity of the relationship between students' knowledge, attitude and sustainable environment practice. The findings of this study also suggested that, the internet is regarded as students preferred choice of media which can be utilised to disseminate environmental information. It is important, however, not to disregard the roles of more traditional media such as television and newspapers, as they can also be effectively used to deliver environmental information. Besides media, educational institutions and family also have crucial roles to disseminate environmental information and encourage good practice. Since many of the earlier studies of this nature have been conducted in at other places, particularly in the first world countries, this study is expected to contribute to the knowledge based on Malaysia's own experience as a developing nation that aspire to champion sustainable environment.

Keywords: environment, students, higher learning, knowledge, attitude, practice and communication

1. Introduction

Malaysia's outstanding economic growth over the last decades has negatively impacted its environment (WWF, 2014). As results of uncontrolled development, Malaysia has to deal with crucial issues related to deforestation, soil and coastal erosion, air and water pollution, and waste management problem (WWF, 2014). Realising the needs to address these environmental issues, Malaysia embraces the sustainable development concept with the aim of promoting balanced development and preserving the environment and the ecology for the future (Rosly, 2012). Malaysia's proactive effort in promoting sustainable development is evidenced in the environmental awareness programmes that are carried out at all levels including youth (UN, 2014).

The government's emphasis on youth's involvement in promoting sustainable development is evident in the inclusion of the concept in the country's education system at all education levels (Foo, 2013). The goal is to nurture the younger generations and to educate them on the importance of sustaining human needs and preserving the environment for the future (Foo, 2013). In line with the government's efforts, leading higher educational institutions in the country including Universiti Sains Malaysia (USM), Universiti Kebangsaan Malaysia (UKM) and Universiti Teknologi Mara (UiTM) take proactive actions in promoting sustainable development (Foo, 2013). USM for instance, established the Centre for Global Sustainability Studies (CGSS) to ingrain the concept into the philosophy of the institution and aspires to become a world class sustainability led institution (Kaur & Chapman, 2008; USM, 2014). In the same vein, UKM's sustainability initiative is demonstrated in the formation of the Institute for Environment and Development (LESTARI). Established in 1994, LESTARI aims to instil sustainability through research and capacity development (UKM, 2014). Such initiatives indicate how educational institutions in Malaysia strive to inculcate knowledge and awareness of sustainability among youth, and to realise government's aspiration, which is to ensure sustainable development

in the country (MPC, 2010; Rosly, 2012).

Nevertheless, despite continuous efforts to promote sustainable environment among youth in Malaysia, their engagement in sustainable practice is found to be below expectation (Ahmad, Rahim, Pawanteh, & Ahmad, 2012; Said, Yahaya, & Ahmadun, 2007). This may possibly be due to the way in which the sustainable information is delivered. According to Stamm, Clark and Eblacas (2000), in order for a sustainability programme to be successful among youth, it needs to be effectively communicated. Hence, this research aimed to, first, examine the relationship between students' knowledge, attitude and practice of the environment, and second, investigate how to effectively communicate environmental information to increase their awareness pertaining to the issue.

The study investigated Malaysian youth, specifically students at higher learning institutions for three important reasons. First, youth including those who are currently enrolled as students in higher learning institutions consist of 45% of the entire population, and they are highly regarded as the future of the nation (Bernama, 2012). As of 2013, there were more than 1.1 million students enrolled in public and private higher learning institutions throughout the country (Badroddin, 2014). Second, realising their crucial role in shaping Malaysia's future, the government and higher learning institutions, particularly public institutions, emphasise on efforts to nurture students' potential through the implementation of youth-related policies, holistic education and programmes particularly those related to sustainable environment (Bernama, 2012; Foo, 2013; Rosly, 2012; UKM, 2014; USM, 2014). Third, as stated above, youth's engagement in everyday sustainability practices in general is found to be low and unsatisfactory (Ahmad et al., 2012). Since many earlier studies of this nature have been conducted in other settings, particularly in the first world countries (Chaplin & Wyton, 2014; Too & Bajracharya, 2015; Zwickle, Koontz, Slagle, & Bruskotter, 2014), this study is expected to add to the literature and contribute to the body of knowledge based on the Malaysian unique experience as a developing nation committed to rapid, yet sustainable development.

This study specifically focused on sewage or wastewater management as one of the important aspects of the environment. If sewage is not properly treated, it could potentially harm public health and the environment (Hamid & Narendran, 2004). In the Malaysian context in which this study was conducted, wastewater production is estimated at 2.97 billion cubic meters per year (Mat, Shaari, & How, 2013). According to Mat, et al. (2013), one of the challenges faced by a developing nation such as Malaysia is to make the public aware of the importance of sewage management in ensuring good public health and safe environment.

2. Measuring Students' Knowledge, Attitude and Practice of the Environment

Knowledge, attitude and practice (KAP) surveys were first used in the 1950s to explore how the concept of family planning was received, understood and practiced by different populations across the globe (Launiala, 2009). The basic premises of the KAP surveys are that knowledge forms attitude, and that both knowledge and attitude are the building blocks for practice. KAP surveys are used for three general purposes: as a diagnostic tool to describe the population's current knowledge, attitude and practice; to provide insights on a current situation in designing specific interventions; and as a tool to evaluate the effectiveness of certain interventions or programmes (Vandamme, 2009).

KAP surveys have been widely employed to explore human behaviour in different fields including health (Launiala, 2009), community development (IIDS, 2006), child protection (Holman, 2012) and education (Goutille, 2009). In the area of environmental studies, KAP surveys have been extensively used to measure public's knowledge, attitude and practice on issues related to environmental awareness (Besar, Hassan, Bolong, & Abdullah, 2013; GIZ, 2013), wastewater management (Emanuel, 2010), water, sanitation and hygiene (Sibiya & Gumbo, 2013), sustainable agriculture (Khoram, Shariat, Azar, Moharamnejad, & Mahjub, 2006), solid waste disposal and recycling (Ehrampoush & Moghadam, 2005), and land degradation and sustainable land management (Akpinar-Elci & Roberts, 2011).

Even though KAP surveys have been criticised in the past for its reliability, validity and measurement that relates to the intensity of opinion or attitude (Vandamme, 2009), the surveys in general are well accepted, as a conceptual framework to measure public's understanding, awareness, willingness and participation on a certain issue (Launiala, 2009; Vandamme, 2009).

KAP surveys have also been utilised to investigate youth's knowledge, attitude and practice of the environment. For instance, in a study conducted to measure medical sciences students' understanding and practice pertaining to solid waste disposal and recycling, it was indicated that, 65% of the students possessed higher than moderate understanding, with male students reported to have significantly better knowledge of the issue compared to female students (Ehrampoush & Moghadam, 2005). Knowledge, however, was found not to necessarily lead to better practice (Ehrampoush & Moghadam, 2005). In another KAP survey conducted to explore the level of the

environmental knowledge, attitude and practice of among 244 young civil servants in Malaysia, it was found that although respondents in general had good knowledge and attitude towards the environment, their recycling practice was only moderate (Besar et al., 2013). Both findings indicate that having environmental knowledge does not necessarily lead to sustainable environment practices. As such, the question addressed in this study is:

RQ1: What is the relationship between students' level of knowledge and sustainable environment practices?

The insights on students' knowledge, attitude and practice towards sustainable environment practices would provide a useful framework for communicating environmental information effectively to students at higher learning institutions.

3. Communicating Environmental Messages to Students

Without doubt, communication is crucial in increasing public awareness and improving practice related to the environment (Stamm et al., 2000). This is further elaborated by Stamm et al. (2000):

...our results suggest that the media are already making some contribution to public understanding of global warming. The crucial understanding of the connection between fossil fuel consumption and climate change was significantly related to use of major media (television, newspapers, magazines, and books) and to communication through interpersonal channels (family/friends). Communication behavior was also linked to support for key solutions, such as driving less, reducing home energy use, and using more energy-efficient technology. (p. 234)

Effective communication is regarded as a key to the success of many environmental programmes involving youth including the COM-U project, Eco-Animation project and the Ocean Project (Animate-eu, 2015; EU, 2014; Ocean, 2015).

The importance to effectively communicate environmental information to youth is evidenced in the conservation projects that were carried out in the European Union's (EU) The EU Life Programme (EU, 2014). For example, the COM-U project was successful in disseminating EU's environmental concerns and related policy to school students in Sweden (EU, 2014). This was accomplished through careful integration of environmental components into the school curricula, the development of training materials and training courses for teachers and school staffs (EU, 2014). In another instance, the Eco-Animation project used cartoon as a medium to educate children aged 5-8 on the importance of preserving the environment (Animate-eu, 2015). A suitable form of communication is necessary to educate children on issues of the environment (Animate-eu, 2015).

Similar to the Eco-Animation, the Ocean Project also emphasised on the importance of utilising a specific form of communication when dealing with a particular target group (Ocean, 2015). In their research, the Ocean Project underlined the internet as the most important communication medium to reach youth aged 12-25, and to disseminate environmental information (Ocean, 2015). This is in line with the increase in access and usage of the internet among youth (Ocean, 2015). Besides the internet, environmental information can also be effectively communicated to youth in person. This can take place in the real-life through participation in activities and programmes organised by environmental youth groups (Ocean, 2015).

While past studies have clearly indicated that it is vital to effectively communicate environmental information to youth (Animate-eu, 2015; EU, 2014; Ocean, 2015; Stamm et al., 2000); it is also important to note that, effective communication with young people is not easy to accomplish due to the complexity of youth's behaviour (Felix, 2004). It is important to take into consideration the fact that, youth want themselves to be heard, they do not want to follow orders blindly and, they demand equality and respect (Felix, 2004). Ordering, threatening, preaching, avoiding, pacifying, and lecturing are identified as major hindrances to effective communication with youth (Sapp & Goh, 2015). These barriers if not effectively addressed, would create a communication gap between young people and adults, and eventually leads to failure in programmes that aim to attract youth's participation (Felix, 2004).

In the Malaysian context, it remains unknown whether the environmental programmes that are carried out take into consideration the complex nature of youth including their concerns, attitudes, beliefs, needs and wants, or if these programmes are effectively communicated using their preferred channel. This is due to the fact that, past studies that have been conducted in Malaysia were mainly focused on youth's role in preserving the environment (Nadeson & Barton, 2013), their awareness and participation (Ahmad et al., 2012; Said et al., 2007), and environment related plans and policies (Foo, 2013; Rosly, 2012). Hence, the following research questions were posed:

RQ2: What is the relationship between students' attitude and sustainable environment practices?

RQ3: What is students' preferred choice of media in their everyday lives?

RQ4: Which medium students believe is most effective in spreading environmental messages?

4. Methodology

4.1 Respondents and Procedure

A total of 895 student respondents from 16 public and private higher learning institutions in Malaysia took part in a KAP survey that was carried out as part of the environmental awareness campaign, organised by the School of Communication, Universiti Sains Malaysia. The respondents were randomly selected, their participation was voluntary, privacy was guaranteed and they may quit at any time during the survey. Each respondent took a maximum of 15 minutes to complete the survey. The data was collected in a period of one week.

At the beginning, a total of 25 institutions were invited to take part in this study. Invitation letters were sent to these institutions and they were given two weeks to respond to the invitation. Out of the 25 institutions invited, 16 agreed to participate in the study. The survey was carried out at different university campuses comprising of private and public higher learning institutions, namely INTI College Penang, KDU College Penang, SEGI College Penang, Island College of Technology, Universiti Sains Malaysia, Universiti Utara Malaysia, International Islamic University Malaysia, Universiti Kebangsaan Malaysia, Universiti Putra Malaysia, Universiti Teknologi Mara, Sunway University, Infrastructure University Kuala Lumpur, International University of Malaya-Wales, Multimedia University Cyberjaya, Universiti Sains Islam Malaysia and Multimedia University Malacca. Survey locations, number of respondents at each location and percentage are summarised in Table 1.

Table 1. Survey locations, number of respondents and percentage

No.	Location	Respondents (N)	Percentage (%)
1	Multimedia University Cyberjaya	55	6.14
2	INTI College	50	5.58
3	Infrastructure University Kuala Lumpur	55	6.14
4	International University of Malaya-Wales	43	4.80
5	KDU College	50	5.58
6	Island College of Technology	64	7.15
7	Multimedia University Malacca	54	6.03
8	SEGI College	55	6.14
9	Sunway University	53	5.92
10	International Islamic University Malaysia	52	5.81
11	Universiti Teknologi Mara	66	7.37
12	Universiti Kebangsaan Malaysia	55	6.14
13	Universiti Putra Malaysia	56	6.25
14	Universiti Sains Islam Malaysia	54	6.03
15	Universiti Sains Malaysia	77	8.60
16	Universiti Utara Malaysia	56	6.25
Total		895	100

4.2 The Questionnaire

The questionnaire was developed based on the KAP model, specifically focusing on students' knowledge, attitude and practice of sustainable sewage management. In the KNOWLEDGE section, the respondents were asked to answer eight items on topics specifically related to sewage management and sustainable environment. Nine items were included in the ATTITUDE section, focusing on students' awareness, beliefs and contribution in sustaining the environment. In the PRACTICE section, respondents were asked to answer five items related to their everyday practice in preserving the environment. All the items were measured using a 5-point Likert scale. The internal consistency based on Cronbach's alpha for knowledge scale was at .837, attitude at .866 and practice at .605 respectively.

In addition to KAP, the questionnaire also included another section to measure students' media preferences and

the way they prefer to disseminate information about the environment. Respondents were asked to answer multiple choice questions in this section related to their media and communication choices.

5. Results

5.1 Respondents' Characteristics

Out of the 895 respondents who participated in this study, 42.2% were males and 57.8% females. Over 98% of them were in the 18-34 age group and only 1.3% were in the 35 or above age group. 53.5% of the respondents were studying in private higher learning institutions, while another 46.5% were in public (government funded) institutions. In term of ethnicity, 54% of the participants were Malays, 33.2% Chinese, 10.5% Indians and 2.4% other races. Respondents' characteristics are summarised in Table 2 below.

Table 2. Respondents characteristics

Variables	Frequency (N)	Percentage (%)
Gender:		
a. Male	376	42.2
b. Female	516	57.8
Age:		
a. 18 - 34	881	98.7
b. 35 and above	12	1.3
Place of study:		
a. Private institution	479	53.5
b. Public institution	416	46.5
Ethnicity:		
a. Malay	480	54
b. Chinese	295	33.2
c. Indian	93	10.5
d. Other races	21	2.4

5.2 Students' Knowledge, Attitude and Practice of the Environment

The findings of this study show that, the respondents in general have high knowledge pertaining to issues related to the environment (see Table 3). They also show good attitude towards the environment. The mean scores for knowledge and attitude were M=4.03 and M=4.13 respectively. When asked about their understanding of sewage treatment as one of the important aspects of the environment, 88.8% of the respondents agree that it helps to protect public health by providing a cleaner and safer environment. 83.1% believe that sewage treatment helps to preserve the country's waste resources. 81% of the respondents agree that sewage treatment helps to clear blockage in underground sewerage pipelines, and 83.7% believe that it ensures wastes are properly treated before being discharged into waterways. When probed about the causes of sewer line blockage, 70.9% agree that it is caused by oil-based wastes that are poured down the sink drain, 81.4% think that it is caused by food scraps that flow into the kitchen sink, 78.1% believe that such problem occurs when toilet is used as a wastebasket, and 87.4% agree that it happens when rubbish is dumped into the system.

These findings reaffirm Besar et al. (2013) and Ahmad et al. (2012) who ascertain that the level of environmental knowledge and understanding among Malaysian youth in general is good. This can be attributed to efforts made by the Malaysian government to incorporate sustainable development component into the country's education system and the proactive roles of higher learning institutions such as USM and UKM in championing sustainability (Foo, 2013; UKM, 2014; USM, 2014).

While students' attitude towards the environment in general is good, it is also important to note that lower percentages were recorded on two items: (a) interest to learn more about sustainable environment (78.6%) and (b) interest to join sustainable environment activities (68.9%). These findings may possibly relate to the way the environment related learning activities are planned, carried out and communicated to students. In a way, the findings support Stamm et al. (2000), Felix (2004) and Ocean (2015) in stressing the importance to effectively communicate environmental messages to youth. This study found that, in comparison to knowledge and attitude,

the mean score for students' practice was lower at M=3.34. The findings confirm Ahmad et al. (2012) and Besar et al. (2013) in indicating lower participation in sustainable practices among youth in Malaysia. More importantly, these findings lead to an important question of: what is the relationship between students' knowledge, attitude and practice of the environment? This is further discussed in the following section.

Table 3. Knowledge of the environment

No.	Item	Strongly Disagree & Disagree (%)	Not Sure (%)	Strongly Agree & Agree (%)
1	Sewage treatment helps to protect public health by providing a cleaner and safer environment	1.4	9.8	88.8
2	Sewage treatment helps to preserve the country's waste resources	2.6	14.3	83.1
3	Sewage treatment helps to clear blockage in underground sewerage pipelines	2.2	16.8	81
4	Sewage treatment ensures that wastes are properly treated before being discharged into waterways	2.7	13.6	83.7
5	Sewer line blockage is caused by oil-based wastes that are poured down the sink drain	3.4	25.7	70.9
6	Sewer line blockage is caused by food scraps that flow into the kitchen sink	3.6	15	81.4
7	Sewer line blockage occurs when toilet is used as a wastebasket	2.8	19.1	78.1
8	Sewer line blockage occurs when rubbish is dumped into the system	2.2	10.4	87.4

5.3 Relationship between Students' Knowledge, Attitude and Practice of the Environment

In this study, correlation and simple linear regression statistical techniques were employed to answer research question 1 and 2. Here, correlation coefficient was computed to describe relationship between students' level of knowledge and their engagement in the right environmental practice (RQ1). Simple linear regression was used to measure relationship between two variables, which are students' environmental practice as the dependent variable and their attitude towards the environment as the independent variable (RQ2).

Based on the findings in Table 4, it can concluded that there was a significant, but weak relationship between knowledge and practice, $r = .217$, $n = 854$, $p = <.001$. The findings derived from the simple linear regression test indicate that there was a weak positive correlation between students' attitude and practice $r = .311$. The variation was $R2 = .097$, which means that the regression model predicted 9.7% of the variance. Based on the findings in Table 5, it can be concluded that the relationship between attitude and practice is low but significant at $b = .220$, $p = <.001$.

Table 4. Correlation test between knowledge and practice

		Knowledge	Practice
Knowledge	Pearson Correlation	1	.217**
	Sig. (2-tailed)		.000
	N	867	854
Practice	Pearson Correlation	.217**	1
	Sig. (2-tailed)	.000	
	N	854	867

Note. **Correlation is significant at 0.01 levels (2-tailed)

Table 5. Simple linear regression predicting relationship between attitude and practice

	Unstandardized coefficients		Standardized coefficients	t	Sig.
Model	B	Std. Error	Beta		
(Constant)	8.505	.861		9.876	.000
Attitude	.220	.023	.311	9.617	.000

5.4 Communicating Environmental Information to Students

Descriptive statistics were employed to answer research question 3 and 4 that relate to students' preferred choice of media and medium they believe the most effective to disseminate environmental information. The findings in Table 6 show that 56.8% of the respondents chose the internet, television 16.7%, newspaper 9.9%, radio 3.4% when asked about their preferred choice of media for information. The other 13.3% of the respondents provided more than one answer to this question. When asked about the way they believe most effective to spread environmental messages, 39.9% of the respondents answered the internet, universities and schools 20.3%, family 19.4% and friends 8.9%. The other 11.6% of the respondents provided more than one answer to this question. When probed about the channel that they would use in case if they encounter sewage or wastewater problems, 67.9% of the respondents indicated that that they would either lodge report through sewerage provider's website or Facebook page and the other 26.5% informed that they would call the hotline number. The remaining 5.2% of the percent of the respondents provided more than one answer to this question.

Table 6. Students' communication choices

No.	Item	Frequency	Percentage (%)
1	Choice of media:		
	a. The internet	504	56.8
	b. Television	148	16.7
	c. Newspaper	88	9.9
	d. Radio	30	3.4
	e. More than one answer	118	13.3
2	Channel to spread environmental messages:		
	a. The internet	354	39.9
	b. Educational institutions	180	20.3
	c. Family	172	19.4
	d. Friends	79	8.9
	e. More than one answer	103	11.6
3	Way to lodge report in case of sewage/wastewater problems:		
	a. Sewerage provider's Facebook page	351	39.8
	b. Sewerage provider's website	248	28.1
	c. Sewerage provider hotline	234	26.5
	d. More than one answer	46	5.2
	e. Others	3	0.3

6. Discussions

The findings show that students at Malaysian higher learning institutions in general have good knowledge and understanding of the environment. In a way, these results indicate that the efforts of the Malaysian government and the country's leading higher learning institutions such as USM and UKM to promote sustainable development to youth proved to be fruitful (Foo, 2013; UKM, 2014; USM, 2014).

Unfortunately however, the researchers have found that students' level of knowledge and practice with regard to the environment to be weakly associated. This means, good level of knowledge among students may not necessarily lead them to engage in the right environmental practice. This finding is similar to Tikka, Kuitunen and Tyns (2000), Barrett and Kuroda (2002) and Ehrampoush and Moghadam (2005). It also reveals the environmental knowledge - behaviour gap that exists among youth (Creech, Buckler, Innes, & Larochelle, 1999). According to Creech et al. (1999), youth are aware of the problem but they do not know how to make it "personal" or how to deal with it.

The researchers have also found that, students' attitude or concern of the environment could not be used to predict or explain practice. Here, the researchers suggest that the assumption to relate students' attitude or concern of the environment with practice is over-simplified. Such finding reaffirms Kuhlemeier, Bergh and Lagerweij (1999) who explained:

A substantial relation between knowledge of environmental problems, on the one hand, and attitudes and behaviour, on the other, could not be demonstrated in our study. That finding is somewhat surprising, for what is more plausible than the assumption that students with more knowledge of environmental problems care about the environment more, are more prepared to put up with financial sacrifices, and take the environment into account more in everyday life? (p. 11)

This indicates the complexity in understanding the relationship between students' knowledge, attitude and practice towards the environment (Kuhlemeier et al., 1999). It may possibly be due to the limitation in statistical analyses (Mifsud, 2012). Hence, it is suggested that future studies in this area should strongly consider employing a qualitative component to further understand the complex relationship between students' knowledge, attitude and practice of the environment (Mifsud, 2012).

The findings of this study reveal that students regard the internet as an important medium for communication in their daily lives. This is expected, considering that young people in general, appreciate the liberating nature of new media and how the new technologies make their lives easier (Green & Hannon, 2007; Ismail, 2014; Johnson, 2009). Besides the internet, the role of more traditional media such as television and newspapers remain important in disseminating environmental information. This is referred to by Roxas (2003) as 'the multiplicity of media', where different types of media and stakeholders including government media, mainstream media and alternative media are responsible to deliver environmental information and promote sustainability, with the aim of educating the public and getting them engaged in the right practice (Bird, Lutz, & Warwick, 2008; Roxas, 2003).

In addition, the researchers have also found that the roles of educational institutions and family are also crucial in ensuring that the right environmental information is disseminated. Environmental education should begin at home, as parents teach their children to respect the environment by engaging them in sustainable practice (DECD, 2012). Simultaneously, the education process also takes place in schools and universities, as students are taught knowledge of environmental awareness and necessary skills to sustain the environment (Dawe, Jucker, & Martin, 2005; Foo, 2013).

7. Conclusion

This study investigated Malaysian students' knowledge, attitude and practice of the environment. In general, students possess good knowledge of the environment which can be attributed to the continuous effort made by the government and educational institutions to promote sustainable development. However, it is important to note that students' knowledge and practice are weakly associated. This indicates that high level of knowledge among students may not necessarily leads to good practice. Students' attitude towards the environment also could not be used to predict practice. This is due to the weak relationship between both variables. These findings indicate the complex relationships between students' environmental knowledge, attitude and practice. Environmental information can be effectively delivered to students through the internet as well as other media including television and newspapers. Multiplicity of media is necessary to ensure better environmental awareness and practice among students. In addition, educational institutions and family also play vital roles as agents to deliver environmental information to students.

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