Environmental Sustainability Knowledge, Attitude and Practices among Pre-school Students

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Abstract. The study aimed to examine the knowledge, attitude and practices of environmental sustainability of pre-school students in Malaysia. This study applied a quantitative method comprising questionnaires with 500 pre-school students. Research variables were knowledge of recyclable and non-recyclable materials, sustainability knowledge, sustainability attitudes and sustainability Reuse-Reduce-Recycle (3R) practices. Most variables including knowledge of recyclable and non-recyclable materials, sustainability knowledge, sustainability attitudes and sustainability Reuse-Reduce-Recycle (3R) practices were at high levels. While, the analysis of correlation test explained that there was a significant relationship between every variables. It can be concluded that a high level of knowledge does not give effect in increasing the sustainability practices of students. Therefore, a strong commitment from teachers are required to improve the knowledge, attitude and practice of sustainability in the early stages of education. The readiness of early childhood education teachers in respect of continuous training in various sustainability activities is a vital requirement to systematically and effectively apply sustainability practices.

1. Introduction

Environmental management is an important element in ensuring continuance in the quality of human life. However, the current greed in pursuit of modernization has unfortunately resulted in deterioration of environmental quality. Consequently, imbalances have occurred in the ecological system, such as global warming, air pollution, water pollution, ozone layer depletion, dwindling of natural resources and an increase in residual waste. Under these circumstances, education is one of the best methods to create a generation with knowledge, awareness and strong implementation of the practice of sustainability [1, 2]. This is because education is the biggest agent of change in influencing the behaviour of a community. In fact, education is perceived as important because, through the learning process, individuals or communities that are intellectual, active, understanding and able to recognize good or bad can be produced [3, 4]. Importance Environmental education is part of a national strategy to sustain sustainability around the world [5] and it is parallel to the international awareness movement through Sustainable Development Goals (SDGs).

Correspondingly, education for sustainable development (ESD) has been created and implemented with the purpose of developing all aspects of learning and encouraging behavioural change towards a more sustainable and equitable community, with the purpose of integrating principles, goals and sustainable development practices in all aspects of education, with the drive to overcome social, economic, cultural and ecological issues in the twenty-first century, and to inspire behavioural change to create a good sustainable life globally [6]. A study by Agut et al. [7] found that early childhood education must be perceived as the first step towards learning to live in a sustainable way. Because of that, basic knowledge building, attitude and sustainability development values have to be established from an early age, because children are seen to be competent individuals building their own identities and own lives [8]. Therefore, exposure and early education in pre-school and kindergarten is an important approach to ensure the effectiveness of sustainability education to achieve the standard balanced human capital [3].
Consequently, the practice of sustainability application through the National Pre-school Curriculum Standard (NPCS) in Malaysia is an effort that is very appropriate. Based on NPCS, there are six core elements of learning that have to be achieved: communication, spirituality, attitudes and values, humanity, science and technology [9]. Consequently, this study gauges to what extent sustainability awareness among Ministry of Education (MOE) pre-school and private kindergarten students has been successfully implemented through NPCS execution. To measure sustainability awareness, four variables have been used: knowledge of recyclable materials and non-recyclable materials; knowledge of sustainability; attitude towards sustainability; and practice of sustainability, covering practice of reducing, reusing and recycling (3R).

2. Literature Study

According to Salonen and Tast [6], sustainable development can be understood as a process, objective or value which addresses global sustainable good life. In other words, sustainable development concerns people’s abilities and opportunities for the next generation so that they can have the same or even better ability and freedom in having a better life [10]. Through the message conveyed by the United Nations’ Decade of Education for Sustainable Development, declared for the period of 2005 to 2015, education is evidently the medium to change a community to a dimension which is more sustainable [11]. Therefore, the main short-term goal is to develop an educated community that will possess main values such as knowledge and critical creativity, and also possess analytical thinking to be able to solve problems that arise from the negative implications of industrial and urbanization. Thus, early childhood education has an important role in the achievement of sustainable development [12].

Research by Gulay [13] emphasizes that the pre-school period up to six years of age is very appropriate to start introducing environmental concepts and developing environmental awareness among children. In this period, children’s curiosity towards the environment is at its highest level [14]. In the meantime, it is generally known that a pre-schooler learns through spontaneous, concrete and, most importantly, interpersonal experience. Therefore, sustainable education is designed to help raise awareness among communities to develop a decent lifestyle as an act to maintain the earth’s ecosystem [13]. Because of that, Lampa et al. [15] stated that education for sustainable development has to be implemented actively, creatively and smartly so that learners will be able to put theory into practice. Correspondingly, the classroom approach has to focus on students, and teachers need to encourage students to create and develop distinctive ideas and values. Thus, an encouraging social environment is vital for early childhood education. Children need a chance to play, talk and explore the world, and they need to be encouraged within safe boundaries, not limited in their activity or punished when making mistakes [16].

In an effort to promote the practice of sustainability, application in outside the classroom activity is an important part as a daily routine in pre-school. Outside the classroom activity refers to the pre-school playground, which involves an environment connected to students. Such activities are seen to have a positive effect on children [17]. For example, in the study by Braithwaite [18], the forest kindergarten programme that was conducted in Greytown in New Zealand was viewed as a precise step in raising awareness of sustainability among children. The main reason for the implementation of the programme was to form an association between children and the environment in reality and practically. In this programme, children were left in the forest all day to explore the uniqueness of the environment independently, to experience the weather events themselves and to interact with forest inhabitants such as birds, spiders and worms while observing the forest surroundings, which boast trees, fungi, mushrooms and mosses. Therefore, this early exposure will indirectly cultivate a passion and love for nature among the children of today and tomorrow.

To attain this objective, teachers are important individuals working towards and taking responsibility for the implementation of sustainability in learning. Thus, the topic of sustainability has to be addressed in teachers’ education and their preparation of a specific programme. Creating a teacher of sustainability requires a teacher who is committed to the sustainability challenge and its solutions in a meaningful and
a goal-oriented way to fulfil people’s needs, facilitate equity between generations and protect the earth’s regeneration capacity. Therefore, teachers’ education and training is an important component that needs to be addressed, rated and improved so that teachers can fulfil their responsibility in facilitating a significant and positive change [19].

3. Methods

This is a quantitative study that uses a survey method for data collection purposes. The study focuses on six year old pre-school students in Hulu Langat, Selangor, Malaysia. Based on Education Statistic of Malaysia [20], the total number of pre-school and kindergarten students in Hulu Langat, Selangor, is 86,384. The sample size has been stipulated based on Krejcie and Morgan [21] sample size determination table. Based on that table, the student sample size needed in this study is approximately 382. However, this study has been conducted with a sample size of 500 respondents representing only six year old students, using purposive random sampling involving 250 pre-school students from urban schools and 250 students from rural schools.

3.1. Study Location

The study involves pre-school students under the administration of the Hulu Langat District Education Office. Based on information from the data unit of the Educational Planning and Research Policy Department of the Ministry of Education Malaysia (MOE), there are 64 MOE pre-schools in the Hulu Langat district education office. However, this study chooses only 20 MOE pre-schools, incorporating ten pre-schools categorized as urban and ten rural pre-schools that involve MOE schools from national, Chinese and Indian streams (town and rural schools are determined by the MOE).

3.2. Study Instrument

The study instrument is a questionnaire that involves three variables focusing on knowledge of sustainability. For the first two sub-variables, knowledge of recyclable and non-recyclable materials, there are ten items submitted in the form of coloured pictures. For the next sub-variable of knowledge, which is aimed at evaluating knowledge of sustainability, items are in the form of coloured pictures that involve three components of sustainable development—social, economic and environmental. There are 18 pictured items that require an answer of 2 = Yes, 1 = No and 0 = Not sure. Next, we address the attitude to sustainability variable that involves 20 items in statement form that are assessed by 3 = Agree, 2 = Slightly Agree and 3 = Disagree. Lastly, the behaviour of sustainability variable involves 18 items—namely six items of reducing practice, six items of reusing practice and six items of recycling practice. An example of a picture can be seen in Appendix. All the items that are submitted to evaluate the practice of sustainability are in coloured pictures. The evaluation scale is 2 = Always, 1 = Sometimes and 0 = Never. The creation of these pictured items is based on situations and surroundings in Malaysia (Appendix A gives some examples of the pictured items used). However, in producing the items, previous study guides were the main foundation. We credit Leeming et al. [22] who created the Children’s Environmental Attitude and Knowledge Scale (CHEAKS) and the study by [23].
4. Results and Discussion

4.1. Student Demographics

Table 1 shows the frequency distribution of respondents’ demographics. The total number of respondents from urban and rural areas is equal. In terms of gender, there are 203 male students (40.6 per cent) and 297 female students (59.4 per cent). Regarding race, 397 are Malay (79.4 per cent), 44 are Chinese (8.8 per cent) and 59 are Indian (11.8 per cent). Most respondents received pre-school education at the age of five (395 people; 79 per cent), while a total of 105 respondents (21.0 per cent) did not go to pre-school at the age of five.

| Variable                   | N    | %   |
|----------------------------|------|-----|
| School location            |      |     |
| Urban                      | 250  | 50.0|
| Rural                      | 250  | 50.0|
| Sex                        |      |     |
| Male                       | 203  | 40.6|
| Female                     | 297  | 59.4|
| Race                       |      |     |
| Malay                      | 397  | 79.4|
| Chinese                    | 44   | 8.8 |
| Indian                     | 59   | 11.8|
| Pre School during 5 years old |  |    |
| Yes                        | 395  | 79.0|
| No                         | 105  | 21.0|

4.2. Analysis of Knowledge Frequency, Attitude and Reduce, Recycle and Reuse Practice

Figure 1 shows the responses to knowledge of recyclable and non-recyclable materials. The item that showing the lowest accurate percentage is food polystyrene at 50.8 per cent, followed by glass bottles at 63.6 per cent and packet drinks at 66.4 per cent. The highest correct percentage is newspaper, at 75.2 per cent, followed by medical items (73.4 per cent) and raw food (71.2 per cent). This clearly shows that respondents did not have good knowledge to enable them to recognize recyclable and non-recyclable materials.

![Fig. 1. Knowledge of recyclable and non-recyclable materials](image)

 meanwhile, analysis of sustainability knowledge for 18 items (Figure 2) clearly shows overall respondents’ knowledge of sustainability is quite good based on the ‘yes’ option. However, there are items with a low percentage of ‘yes’ responses, including item 10, referring to the attitude of “do not care about cleanliness of house”, where ten per cent of respondents agreed with that attitude, while 83.4 per cent of respondents chose ‘no’, meaning they disagreed with the attitude. The same goes to for item
which is “do not want to cooperate in any cleaning activities”: 18.2 per cent of respondents chose ‘yes’ to support that attitude, while 81.4 per cent chose ‘no’.

Next, analysis of the aspect of sustainability attitude, which consists of 20 items (Figure 3), shows that respondents’ overall attitude to sustainability is good based on the answers ‘never’, ‘sometimes’ and ‘always’. However, one item shows a negative ‘agree’ attitude among respondents: for item 2—“I will leave the fan on even it is not warm”—a total of 72.4 per cent agreed, compared to just 20.8 per cent who disagreed with that attitude. Similarly, item 4—“I will not donate my money to maintain cleanliness”—shows a high percentage of disagreement, only 10.0 per cent agreeing with that practice. Basically, the study findings imply that the efforts towards application of sustainability have to be in line with UNESCO’s (2012) recommendation. Agut et al. [7] agree that children as members of a community need to be equipped with knowledge, and education towards sustainability development needs to be implemented. Siraj-Blatchford [12] further agrees that early childhood education plays an important role in achieving sustainable development and this educative role is best played by teachers. [24] emphasize that such education should be ongoing until they reach adulthood so that they really understand and are aware of the importance of preserving the environment.

The next analysis is of the frequency variable, which determines the practice of sustainability that involves reducing, recycling and reusing practices by using a Likert scale measurement of ‘never’, ‘sometimes’ and ‘always’. Study findings (see Figure 4) show that reduce item 3—“electricity conservation practice by switching off the lights when not in a room”—shows a high percentage of
agreement with 90 per cent stating that they always practise that. For reduce item 4—wastage of electricity practice by “not switching off the lights when not in the room”—87 per cent stated that they never did that. Next, with reduce item 2—wastage of water practice by “not turning off the water when brushing teeth”—75.8 per cent said they never practise that. Meanwhile, reduce item 5—“usage of tissue practice to usage of handkerchief”—shows that 66.4 per cent say they always using a handkerchief rather than a tissue. For reduce item 6—“minimizing plastic usage”—a total of 45.4 per cent said they always follow that practice.

![Fig. 4. Frequency of reduce practice among pre-school students](image)

Referring to Figure 5, the item showing the highest percentage of recycling practice is recycle item 3—“positive behaviour: picking up trash and throwing it in the dustbin”—where 89.2 per cent of respondents declared they always do that. For recycle item 1—“old newspaper burning practice”—89.2 per cent of respondents said they never did that. As for recycle item 2—“selling old newspapers to be recycled”—49 per cent of respondents said they always practised this, while 30.2 per cent of respondents stated that they never did.

Next, recycle item 4—“frequency of practicing recycling”, recycle item 5—“disposal of recyclable material based on colour of the recycling bin”—and recycle item 6—“disposal of recyclable material not according to recycle bin label” show a similar percentage of agreement.

![Fig. 5. Frequency of recycle practice among pre-school students](image)

Looking at the frequency distribution of respondents’ answers towards reuse practice (Figure 6), the highest percentage of reuse practice is reuse item 2—“usage of plate”. A total of 88.2 per cent of respondents say they always use a plate rather than polystyrene. For reuse item 1—“usage of lunch box to bring packed meal to school”—54.4 per cent of respondents said they always used a lunch box, while for reuse item 3—“usage of used paper”—reuse item 5—“bring bag to the mall”—and reuse item 6—“usage of paper on both sides in work book”—the percentage of respondents choosing the answer ‘no’ was higher than those choosing the answer ‘always’. 
4.3. Analysis of Relationships between Variables in the Study

Correlation statistical analysis was used in the research to determine the strength/magnitude and relationship direction between material knowledge, knowledge of sustainability, attitude towards sustainability and practice of sustainability among students. Relationship interpretation in line with [25] will be used. The null hypothesis (Ho) is that there is no significant difference between the variables. The result of the correlation matrix in Table 2 shows that there is a relationship between the material knowledge variable and knowledge of sustainability ($r = .106^*$) and there is a relationship between the material knowledge variable and attitude towards sustainability ($r = .109^*$), but that relationship is weak. Nevertheless, there is no relationship between the material knowledge variable and 3R practice ($r = .007$). In terms of the knowledge of sustainability variable, there is a relationship with attitude towards sustainability ($r = .285^*$), but it is a weak relationship. Likewise, there is a relationship with 3R practice ($r = .128^*$), but this too is weak. Finally, findings show that there is no relationship between the attitude towards sustainability variable and 3R practice ($r = .090$). Based on these findings, it can be said that every variable that was created to recognize the relationship between the dependent variable and the independent variable has a positive relationship that is weakly significant. Thus, Ho is true and partly accepted. Therefore, study findings are in line with the opinion of Edwards and Cutter-Mackenzie [26] who contend that knowledge gain does not necessarily change attitude and attitude does not necessarily change behaviour. Hence, education for sustainability development needs to be implemented actively, creatively and smartly if theory is to be put into practice. Furthermore, the importance of knowledge as a platform for action change, specifically with regard to sustainability, is agreed by most researchers [see 7, 28 and 8]. Furthermore, the correct environmental education will assist in positively developing children [13] to gain information together, make decisions and consequently act towards the environment in a proper manner [28]. Moreover, community engagement in conservation of the environment is the best way to harness a pro-environment attitude [29].

| Table 2. Relationships between practices of sustainability variables |
|---------------------------------------------------------------|
| Variable | Knowledge of sustainability | Attitude towards sustainability | 3R practice |
|----------|------------------------------|---------------------------------|-------------|
|          | r    | p    | r    | p    | r    | p    |
| Knowledge of materials | .106* | .018 | .109* | .014 | .007 | .879 |
| Knowledge of sustainability | .285** | .000 | .128** | .004 |       |       |
| Attitude towards sustainability |       |       | .090 | .045 |       |       |

**significant at p<0.01
5. Conclusion

The study results show a non-parallel relationship between students’ knowledge, attitude, behaviour and practice of sustainability. Based on the analysis, it appears that the knowledge and attitude of students in relation to sustainability is at a good level. However, their practice of sustainability is at a weak level. Thus, to conform to the global agenda and to Malaysia’s own aspiration, which is the practice of sustainability as the fundamental element of sustainability development, education is the best platform. The best method to increase practice of sustainability among students in early education is to implement a variety of live programmes that relate to sustainability. The involvement of early education institutions in recycling, global conservation and other programmes is always necessary. This effort aims to cultivate the practice of sustainability in early childhood and at the same time develop a sustainable generation for the future. In line with this practice of sustainability, teachers should not be held solely responsible for the efforts: parental involvement is also required. Besides receiving education at school, students needs to be educated at home by their parents so that sustainability awareness can be more strongly nurtured at a young age and the practice can be sustained for the future. Evidently, for successful sustainability education across the curriculum at an early age, pre-school needs to provide quality teachers with a high commitment to take responsibility, supported by parents.

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Appendix A
Examples of Sustainability Knowledge Items

Examples of Sustainable Practices Items (Recycle)

Examples of Sustainable Practices Items (Reuse)

Examples of Sustainable Practices Items (Reduce)