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Developing positive attitudes towards environmental management: constructivist approach

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Abstract

This study is aimed to systematically design an environment constructivism module based on constructivism approach and to measure its effectiveness in instilling positive attitudes towards environment. This study involves secondary students, from two different schools in Pekanbaru, Riau Indonesia. This quasi-experimental study employs pre and post control group design involving 152 Level Seven students segregated into two; experimental and control groups. Each group is also stratified in terms of students' cognitive ability (high and low). Throughout intervention process, students in the experimental groups are exposed to environmental constructivism experience using the designed module, while their counterparts in the control groups undergo constructivist and conventional routines. Findings generated from this study proved that there is no relationship between the students' groups and constructivism approach with attitudes towards environmental management. However, it has shown that constructivism approach can increase positive attitude towards environmental management. © 2010 Elsevier Ltd. All rights reserved.

Keywords: Students' attitude; environment education; interaction; groups; constructivism

1. Introduction

United Nations has determined that the period from 2005 to 2014 as the decade of sustainable development in education (Mohd Zohir, 2009; Severino, S., & Messina, R., 2010). This means that educators starting from primary education level have to include ecological literacy and environment in the curriculum to establish students' attitude in relation to environment.

Based on Hewson and Hewson (1992), constructivists view knowledge as not something objective but is tentative and keeps changing. Brooks and Brooks (1993) stated that the world is in the state of global uncertainty.

Future generation needs to be prepared with ecological and environmental knowledge, skills and attitudes. Thus elementary school is the core element in developing the next generation who are concern with their ecological surroundings (Buxton & Provenzo, 2007). It has been proved that constructivist approach, embedded in science lesson has significant contribution towards students' ecological literacy and their surroundings, however, its result is still very low (Feasey, 2004; Fien, 2004). In addition, teachers' roles in establishing learners' literacy is still very small (Gilbert, 2004; Gough, 2002). Abdurrahman and Bintoro (2000) and Noraziah (2009) have argued that constructivism leads to creative problem solving and scientific thinking. Its main philosophy is that every student

has a role in determining what he or she wants to learn. The emphasis is given to the learners to construct their mastery as well as knowledge by connecting previous knowledge with its future usage, whilst teachers or instructors act as facilitator. Analysis of literature signifies Piaget's developmental theory called intellectual development or cognitive developmental theory which states that a learners' readiness for learning is organized according to their intellectual development from the time they are born and up to adulthood. According to Sudibyo (2008), one of the factors which influences constructivism process is age, culture and characteristics. Characteristics can be manipulated by teachers and one of them is attitude. Sanjaya (2006) has revealed that the goal of education is not only to develop the cognitive dimension but also to develop the attitude dimension. For the purpose of this study, a module was created using a constructivist approach which aims at building positive attitudes towards environmental management.

2. Research Methodology

The quasi-experiment approach (Cook & Campbell, 1979; Bas, G., 2010) was conducted at the Junior High School in Pekanbaru, Riau Indonesia from March until September 2008. There were 75 students in the constructivism group and 77 students in conventional group. The dependant variable is attitude towards environmental management which covers two topics; the ecosystem components and dependency in the ecosystem and the human role in managing the environment pollution and destruction. The experimental group used the constructivist module, while the control group used the conventional method. The research instrument is a questionnaire which aims to determine these attitudes: cleanliness, health, purity, preservation and maintenance which reliability index ranged between 0.904 to 0.950. Data obtained will be analyzed descriptively which later followed by ANOVA and MANOVA.

3. Research Findings

Table 1. *Estimated Marginal Means* attitude with groups

Attitude	Ability Group	Mean	Sdv	95% Confidence Interval	
				Lower Bound	Upper Bound
Environmental Cleanliness	High	4.451	.085	4.284	4.618
	Low	3.846	.081	3.686	4.007
Environmental Health	High	4.087	.105	3.879	4.296
	Low	3.688	.101	3.488	3.888
Environmental Purity	High	4.046	.110	3.829	4.263
	Low	3.683	.105	3.475	3.892
Environmental Preservation	High	4.278	.092	4.095	4.460
	Low	3.891	.089	3.716	4.067
Environmental Maintenance	High	4.357	.085	4.189	4.524
	Low	3.953	.082	3.792	4.114

Table 2. *Estimated Marginal Means* attitude with Approach learning (Constructivism Conventional)

Attitude	Approach	Mean	Sdv	95% Confidence Interval	
				Lower Bound	Upper Bound
Environmental Cleanliness	Constructivism	4.487	.083	4.323	4.651
	Conventional	3.811	.083	3.647	3.974
Environmental Health	Constructivism	4.386	.103	4.182	4.590
	Conventional	3.389	.103	3.185	3.594
Environmental Purity	Constructivism	4.362	.108	4.149	4.575
	Conventional	3.368	.108	3.155	3.580
Environmental Preservation	Constructivism	4.540	.091	4.361	4.719
	Conventional	3.628	.091	3.449	3.808
Environmental Maintenance	Constructivism	4.594	.083	4.430	4.759
	Conventional	3.715	.083	3.551	3.880

Table 3. *Estimated Marginal Means* combination attitudes with groups and constructivism approach

Attitude	Group	Approach Constructivism	Mean	Sdv	95% Confidence Interval	
					Lower Bound	Upper Bound
Environmental Cleanliness	High	Constructivism	4.826	.120	4.590	5.063
		Conventional	4.076	.120	3.840	4.313
	Low	Constructivism	4.147	.115	3.920	4.374
		Conventional	3.545	.115	3.318	3.772
Environmental Health	High	Constructivism	4.704	.149	4.409	4.998
		Conventional	3.471	.149	3.177	3.766
	Low	Constructivism	4.068	.143	3.785	4.351
		Conventional	3.308	.143	3.025	3.591
Environmental Purity	High	Constructivism	4.750	.155	4.443	5.057
		Conventional	3.342	.155	3.035	3.649
	Low	Constructivism	3.973	.149	3.679	4.268
		Conventional	3.393	.149	3.098	3.688
Environmental Preservation	High	Constructivism	4.799	.131	4.540	5.057
		Conventional	3.757	.131	3.499	4.015
	Low	Constructivism	4.282	.126	4.034	4.530
		Conventional	3.500	.126	3.252	3.748
Environmental Maintenance	High	Constructivism	4.778	.120	4.541	5.015
		Conventional	3.936	.120	3.698	4.173
	Low	Constructivism	4.411	.115	4.183	4.639
		Conventional	3.495	.115	3.267	3.723

Cleanliness attitude mean is high among the high ability group (Mean=4.451). This is higher compared to the low ability group (Mean=3.846). Health attitude mean show high scores (Mean=4.087) compared to the low ability group (Mean=3.688). This is the same for purity, preservation and maintenance. In conclusion, from five indicators cleanliness, health, purity, preservation, and maintenance, all mean scores are higher among the high ability groups compared to the low ability groups.

Table 2 shows constructivism and conventional approach in relation to the five indicators cleanliness, health, purity, preservation, and maintenance. The mean score for the constructivist approach is higher compared to conventional approach. Table 3 summarizes the interaction between the students' ability and the intervention group. Data from Table 3 is graphically illustrated in Figure 1 and Figure 2 for environmental cleanliness and environmental health. Figure 1 show that cleanliness has interacted with two independent variables (Group and Constructivism Approach) with a steep curve towards low ability group. This shows that the low ability group has low score in cleanliness. Constructivism approach has shown higher score in attitude among the two groups (High Ability Group and Low Ability Group) when compared to the conventional group. However, constructivism has shown higher score among high ability group compared to low ability group. The graph shows that there is no interaction between the two independent variables (Conventional and Constructivism Approach) and the dependent variable (cleanliness). Figure 2 shows that health has similar interaction as shown in figure 1.

The Graphs shown in Figures 1 and 2 has similarities which indicate that there is an interaction between two independent variables (Group and Constructivism Approach) which has a steep curve towards low ability group.

The result of *Post Hoc Bonferroni (Multiple Comparisons)* on the post test of the students' attitude towards environmental management that are obtained from the five attitude indicator showed that: (1) cleanliness attitude indicator is insignificant among the constructivism group, but more significant among the conventional group. But the other four indicators, which are health, purity, preservation and environment maintenance, are significant for both the constructivism group and conventional group among the higher ability. (2) The difference of the five attitude indicators mean scores are significant to the constructivism group and conventional group among the lower ability. (3) Between the higher and lower ability constructivism groups, the difference in their mean score is significant in environmental management. It can be concluded that on the whole, the post test of attitude between the constructivism group and conventional group at a higher ability and at a lower ability are significant.

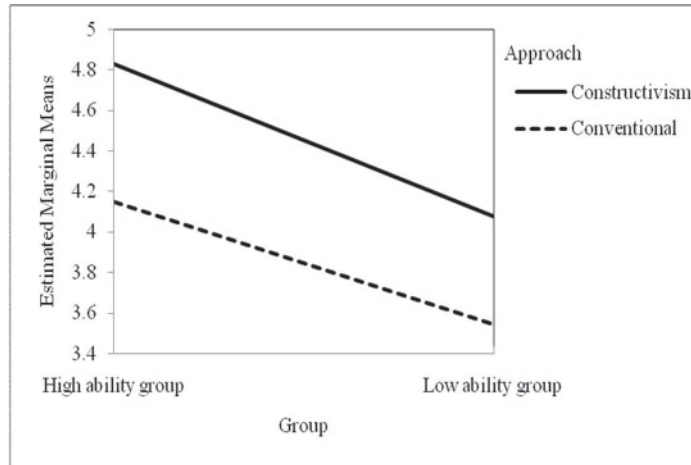


Figure 1. Graphic profile plot interaction group and approach for cleanliness

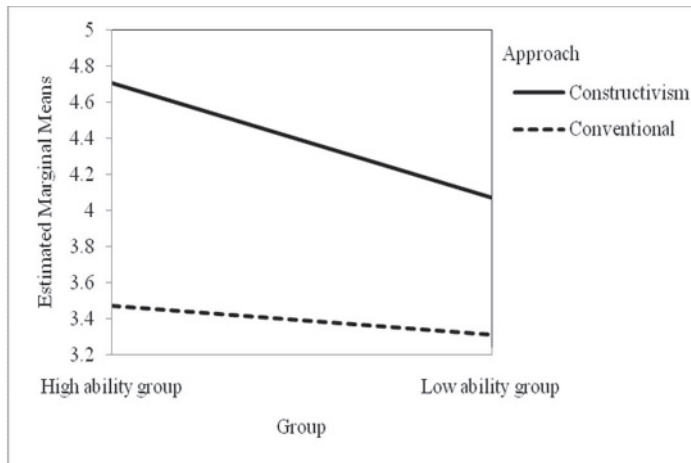


Figure 2. Graphic profile plot interaction group and approach for health

4. Conclusion

The environment learning module intervention in this study has shown that attitudes in the experimental group (constructivist approach) is better than the conventional group, be it at a higher ability level group or the lower ability level group. This study has also contributed to the teaching strategy which is a five-phase constructivist approach integration and active learning strategy. A student's attitude could be built through constructivism, although the time frame would be longer. The process of attitude development is formed through their life experiences. Relating this to factual information which is connected by strategies and learning approaches that increases students' understanding, it is possible to encourage a positive attitude among students towards their environment.

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