

Teachers' Conceptions of Environment in Sarawak, Malaysia

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Abstract

The biodiversity of Sarawak, Malaysia with a very original nature under a tropical climate, despite having one of the most extensive protected area networks in the country is constantly threatened by development. The environmental components in the education system exist in various sources on a multidisciplinary infusion method into single subjects. As teachers play a key role, more knowledge of the teachers' conceptions of environment is therefore a crucial goal to improve their training and their involvement in Environmental Education. A study was conducted to identify if the teachers' conceptions of environment are diversely related to three poles: *anthropocentrism*, *ecocentrism* and *anthropomorphism*; and analyze if their variation can be correlated with some demographics and characteristics. Questionnaires from the Biohead-Citizen research project (Carvalho et al. 2008) were used with a total sampling of 263 teachers. Classical statistics and multivariate analyses used the free software "R" with thirty questions related to Environment consisting of eight for ecocentred attitudes, seven for anthropocentred attitudes, five related to opinions about GMO, three about anthropomorphism and seven to practices for environment or for environmental education based on a Likert scale. Fifteen questions related to each teacher's demographics and characteristics. A Principal Components Analysis shows diversity of conceptions, structured along three oppositions: firstly, an axis pro or against Preservation indicating ecocentric attitudes; secondly, an axis pro or against Utilization indicating anthropocentric attitudes and pole Utilizations being correlated with several opinions pro-GMO and less involvement in some practices for the Environment and thirdly, an axis for more or less anthropomorphism, some opinions anti-GMO being correlated with more anthropomorphism. Inside the same environmental and socio-cultural context, diversity of conceptions related to environment is not correlated with most of the controlled teachers' characteristics as age, gender, instruction and religion but is linked to some of their social or political opinions.

Keywords: Environmental education; anthropocentrism; ecocentrism; anthropomorphism

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Introduction

Sarawak is located in the island of Borneo with a very original nature under a tropical climate. Despite having one of the most extensive protected area networks in Malaysia, the biodiversity of natural resources is constantly threatened by development. The National Policy on Environment 2002 states that the nation shall implement environmentally sound and sustainable development for the continuous economic, social and cultural progress and enhancement of the quality of life of Malaysians. Among the seven green strategies that are directed towards sustainable development, one of the key areas relates to education and awareness. Accordingly to Zarrintaj Aminrad et al. (2012), there are environmental education components existed in various sources on a multidisciplinary infusion method within the existing educational system into single subjects such as geography, integrated sciences, biology, chemistry and humanities. They observed that the concept of environmental education is still developing and waiting to find a right place in the educational systems. In consequence, environmental education is a priority, mainly at school where teachers are key-actors.

In recognizance of today's students who will inherit a world fraught with challenges, from environmental degradation to armed conflict, on a scale that has never been seen before, among the eleven shifts of Malaysian Education Blueprint 2013 – 2025, Shift 3 is documented on the development of value-driven Malaysians. The students will be navigated to have strong universal values such as integrity, compassion, justice, and altruism, to guide them in making ethical decisions. More knowledge of the teachers' conceptions of environment is therefore a crucial goal to improve their training and their involvement in Environmental Education. Thus a study aiming at (1) to identify if the Malaysian teachers' conceptions of environment were diverse related to three poles: anthropocentrism, ecocentrism and anthropomorphism and (2) to analyze if their variation could be correlated with some demographics and characteristics of these teachers.

Literature Review

Environmental attitudes (EA) can be defined as "the collection of beliefs, affect, and behavioural intentions a person holds regarding environmentally related activities or issues" (Schultz et al., 2004). These conceptions are generally characterized by two poles: *anthropocentrism* and *ecocentrism* (Callicott, 1984; Larrère, 1987) respectively called utilization and preservation in the 2-MEV model proposed by Wiseman & Bogner (2003) with further references to Bogner & Wiseman (2004) and Munoz et al. (2009).

Anthropocentrism essentially holds that the human being is at the centre of the world view, of all

earth and even the solar system or cosmos, which has a strong element among the Abrahamic tradition that consists of Judaism, Christianity and Islam relating to the belief that the human being is the purpose of the existence of everything made by God (Rai et al., 2010). In addition, anthropocentric approaches maintain that everything non-human in the natural world should be considered ethically in terms of its instrumental value to humans (Palmer, 2003). According to White (1967), anthropocentrism has been blamed for the boldness with which human beings have populated large tracts of the earth, exploited and used its resources and created environmental disasters such as climate change, desertification, and extinction of some species. However, inherently in modern anthropocentric idealism is the belief that human beings can resolve and overcome these adverse climate changes through reason, research and scientific breakthroughs (Rai et al., 2010).

Ecocentrism incorporates the perspective of a whole ecosystem which holds that the ecosphere inclusive of everything organic and inorganic, rather than individual life forms and is the source of all existence, thus promoting a holistic approach towards the environment, politics, culture and lifestyle as described by Rai et al. (2010). According to them, traditional ecocentric philosophies are intertwined with religious or cultural outlooks, giving a strong faith-based approach, thus tends to encourage people to be in awe of the world around them. In addition, it limits human encroachment on the environment and upholds that the ecosphere will punish those who have damaged the environment. They further mentioned that modern ecocentrism generally tends to construct its theory on human reason as an argument, calling for voluntary action on the part of human society to recognize it and act on it.

Quinn et al. (2015) added a third attitude, when for some people, any animal can feel and think as human beings do: "*anthropomorphism*". Anthropomorphism is the attribution of human characteristics or behaviour to a god, animal, or object (Soanes & Stevenson, 2005). In the universal understanding, anthropomorphism is defined as the attribution of human characteristics or behaviour to any other nonhuman entity in the environment. Use of anthropomorphism in conservation must take into account how people engage with species and attribute value to their characteristics (Root-Bernstein et al., 2013).

Methodology

Questionnaire built and validated by the Biohead-Citizen research project (Carvalho et al., 2008) were used for the study. The total sampling was 263 teachers:

- 59 in-service biology teachers in secondary schools

- 10 pre-service biology teachers in secondary schools
- 30 in-service language teachers in secondary schools
- 8 pre-service language teachers in secondary schools
- 24 in-service teachers in primary schools
- 132 pre-service teachers in primary schools

Their answers, written in a context of total anonymity, were grouped in an Excel file and then analyzed in France, using classical statistics and multivariate analyses (Munoz et al., 2009), using the free software "R". Thirty questions related to environment were selected consisting of eight for ecocentred attitudes (A1, A5, A7, A11, A22, A28, A40, A50), seven for anthropocentred attitudes (A4, A16, A17, A18, A32, A54, A23), five related to opinions about GMO, three about anthropomorphism (A10, A29, A45) and seven related to practices for environment or for environmental education (A61, A56a, A56b, A56c, P6, P7, P8). Each of these questions used a Likert scale, located just after each affirmation. In addition,

15 questions related to each teacher's demographics and characteristics that included gender, age, training level, religion, political or religious opinions were also used.

Results and discussion

A Principal Components Analysis, realised from the answers to the 30 questions, shows a diversity of conceptions, structured along three oppositions as shown in Figure 1:

- An axis pro or against Preservation (ecocentric attitudes)
- An axis pro or against Utilization (anthropocentric attitudes), the pole Utilizations being correlated with several opinions pro-GMO and less involvement in some practices for the Environment.
- An axis for more or less anthropomorphism, some opinions anti-GMO being correlated with lore anthropomorphism.

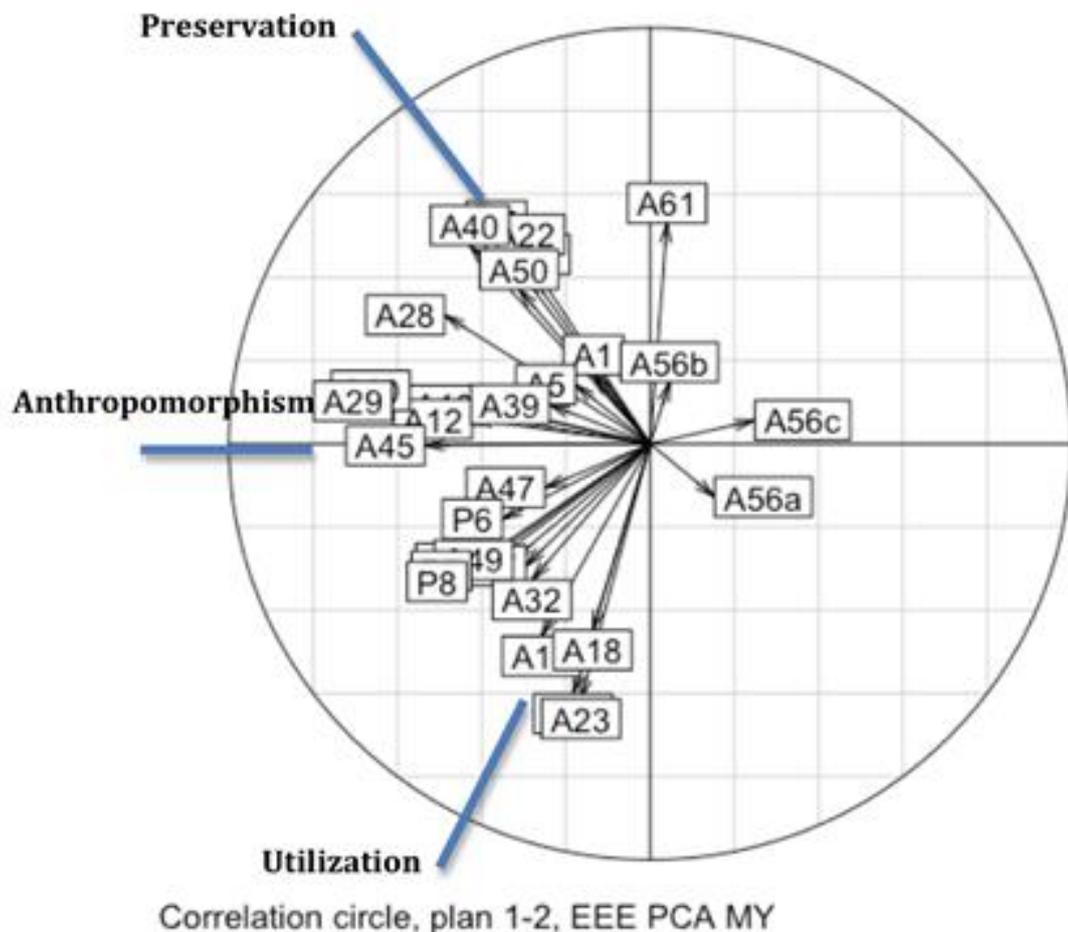


Figure 1- PCA (Principal Components Analysis): Correlation circle

A hierarchical cluster analysis, done from the results of the PCA, clearly identifies three clusters of conceptions as shown in Figure 2. There were three groups of conceptions being identified located at the left and projection of these conceptions on the pan 1-2 of the PCA: each point corresponds to one teacher and is linked to the centre of gravity of each group.

A between-class analysis differentiating these three groups (Figure 3) shows very significant differences among them ($p < 0.001$: randomization test Monte-Carlo type, randomly attributing one of the three cluster to each teacher: the observed

variance is totally outside the randomly obtained variances from 1000 essays. This between-class analysis shows the answers correlated to each of the three clusters: The cluster 1 is less anthropocentric, less anthropomorphic and more involved in practices for environment than the clusters 2 and 3. The cluster 2 is more ecocentric than the cluster 3, and less anthropocentric for some questions (the cluster 1 being in the middle between 2 and 3 for these topics).

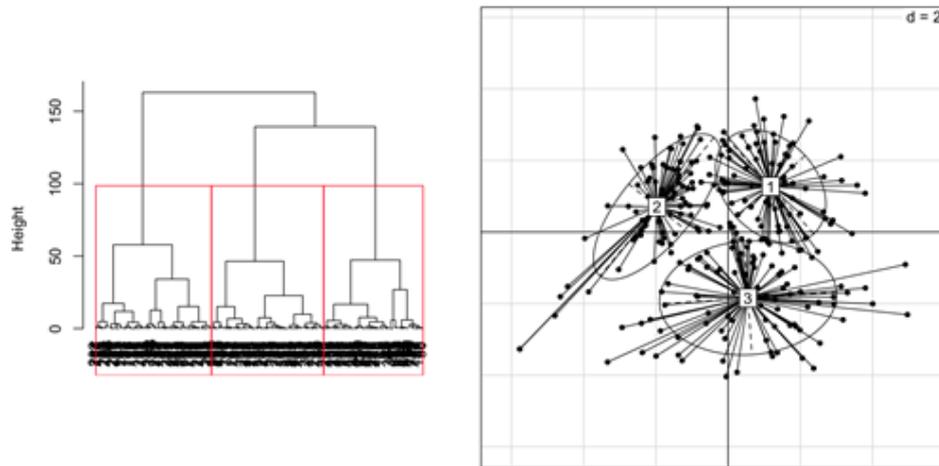


Figure 2 - Hierarchical cluster analysis from the PCA, identifying 3 groups of conceptions (at left) and projection of these conceptions on the pan 1-2 of the PCA: each point corresponds to one teacher and is linked to the centre of gravity of each group.

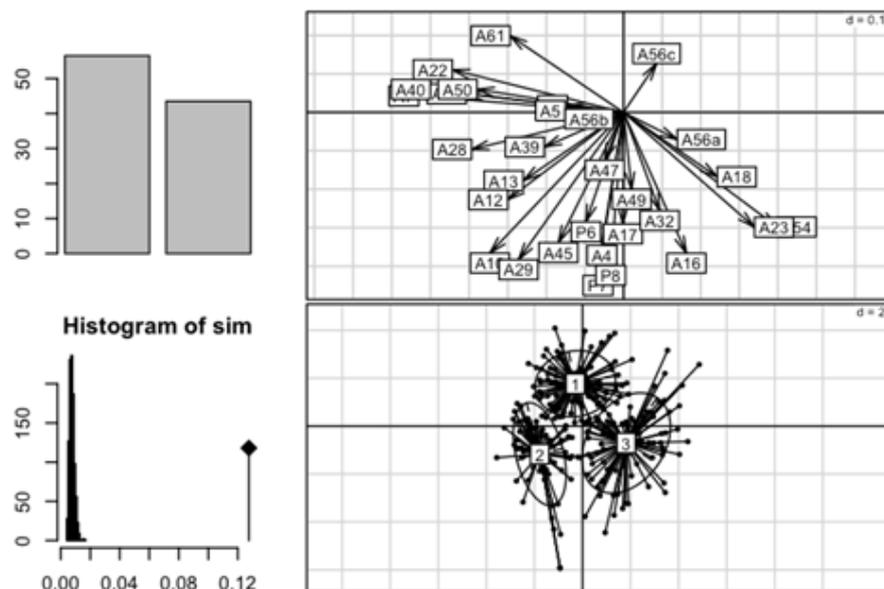


Figure 3 – Between-class analysis differentiating the three groups defined by the hierarchical cluster analysis.

From several between-class analyses on whether diversity of conceptions is or not correlated with one of the controlled characteristics of the teachers, it illustrates the total absence of differences between female and male teachers, from a Monte-Carlo test randomly attributing a gender to each teacher: the observed variance is in the middle of the histogram of the variances related to 1000 random tests (Figure 4). Similarly, there are no differences among the six samples of teachers from Primary or Secondary Schools, teaching Biology or Language. No one of

the other parameters differentiates the teachers' conceptions of environment: their age, their level of instruction, presence or absence of training in biology, or also their religion, while, for the topic evolution, the same teachers have very different conceptions depending on their religions (Chan et al., 2015).

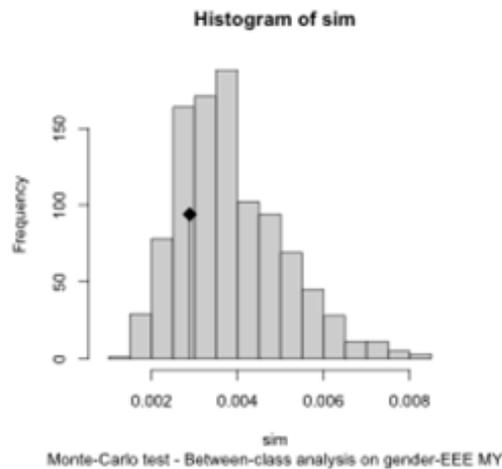


Figure 4 – Randomization test after a between-class analysis differentiating the teachers' gender, showing no significant differences related to the gender.

Nevertheless, a Co-Inertia Analysis showed interesting correlations between some teachers' conceptions of environment and some of their social or political opinions. For instance, the anthropocentric attitude "*Only plants and animals of economic importance need to be protected*" is correlated with a social opinion ("*It is acceptable that poor people not have access to the same health care quality as rich people*") and with two political positions ("*Direct democracy, without government involvement, is the ideal solution to managing our society*" and "*Science and religion should be separated*"). Inside the same environmental and socio-cultural context, diversity of conceptions related to environment is not correlated with most of the controlled teachers' characteristics as age, gender, instruction and religion but is linked to some of their social or political opinions.

Conclusion

Inside the same environmental and socio-cultural context in Sarawak, Malaysia, teachers present a diversity of conceptions related to environment. This diversity must be taken into account when training teachers to Environmental Education. This diversity is not correlated with most of the controlled teachers' characteristics (as age, gender, instruction, religion)

but is linked to some of their social or political opinions.

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