

Exploring Students' Views on Orientations of Environmental Education at the University of Namibia

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Abstract

This study explored the neo-classical or behaviourist, liberal-progressive and socially-critical educational orientations, from the perspective of the students at the University of Namibia. It is argued that educational orientations are important in environmental education, because they propound teaching methods, used to teach environmental education topics. Students urged educators to apply each of the educational orientations depending on the students' ability, previous experience and existing knowledge on the topic. The results show that the teaching methods propounded by these educational orientations contributed to behaviour development, because students were solicited to apply eco-management actions and persuaded others to address the environmental challenges in own settings. It is recommended that the institutions of higher education operationalises a multi-dimensional social ecology in which the solicited environmental actions are shared with the university community and the wider public using the institution's communication channels. In this way, change-oriented learning, which contributes to behaviour development necessary to address the environmental challenges, will be fostered.

Keywords

Environmental Education, Education for Sustainable Development, Higher Education and Training, Participatory Action Research

1. Introduction

The discourse of Environmental Education (EE) has gained prominence since the 1972 Stockholm Conference (Arthur, 2011; Calder & Clugston, 2005; McKeown & Hopkins, 2005). In this paper, EE is conceived of as

teaching and learning process that develops the behaviour required to address environmental challenges such as climate change, water scarcity, land degradation and the decline of ecosystems and species.

The analysis of the EE discourse and practice reveals educational orientations which place emphasis on an explicit set of values (Sauvé, 1996). The word “orientation” is used to refer to a philosophical view that guides educators’ understanding of the teaching and learning process in EE while an “explicit set of values refers to the assumptions, and methods that are believed to be important in each of the orientations. Some of the educational orientations revealed in the EE discourse and practice are the neo-classical or behaviourist, the liberal-progressive and the socially critical orientation (Fien, 2000; Stevenson, 2007; Stonyer, 2001; Wals & van der Leij, 1997). The neo-classical or behaviourist promote *teacher-centred methods* such as the *lecture and presentation, show and tell, demonstration and direct instruction*, which emphasize that the knowledge that learners have is important in addressing the environmental challenges. It assumes that once the learners have the knowledge, they will be able to address the environmental challenges. The role of the educators is to transfer knowledge, which is believed to develop their behaviour necessary to address environmental challenges. The liberal-progressive orientation promotes *learner-centred methods* such as *group discussion, case study, group problem solving, symposium, and field visits*, which emphasize that the values of the individual learners are important in addressing the environmental challenges. Its orientation assumes that learners are not empty vessels into which an educator can transfer the environmental knowledge. The role of the educator is to facilitate learning and expose learners to beautiful nature, practical activities, so that they develop experiences which would shape their personal life-choices and promote practices that address the environmental challenges. The socially critical orientation promotes *community-oriented or society-oriented method*, such as *interactive and social inquiry encounters*, which recognize that learners are active constructors of knowledge and have values and experiences which they bring into the educational process. This orientation assumes that learners should not only construct the knowledge in isolation but also bring culture and the experiences of the social surroundings to the learning situation. The role of the educator is to use a range of approaches and methods to engage the learners in discussing, assessing and relating learning to broader social contexts and develop actions necessary to address the environmental challenges (Fien, 1999; Kristensen, 1999; Le Grange, 2002; Stevenson, 2007). This discussion does not show lack of consensus in the discourse and practice of EE, but a diversity of EE teaching methods, which are the means to teach EE topics required to address the environmental challenges.

The practice and discourse of the educational orientations in EE also reveal some criticisms which do not only boil down to differences of opinion, but also reality. For example, behaviourist teaching methods promotes knowledge. It is commonly known that environmental problems are complex issues which are not only compounded by lack of knowledge but also by poverty. Firstly, the emphasis on knowledge negates access to the acquisition of knowledge outside the classroom. Secondly, the knowledge of environmental issues is often contested because environmental knowledge that may be regarded valid in one context may be discounted in others. The liberal-progressive orientation promotes individualism. The environmental issues are collective problems and too much emphasis on the individual student may isolate them from the social context. The criticism of the socially critical orientation pertains to much critical thinking and debating at a theoretical level that often leads to little actual change or action in practice. It is also about learners and teachers who may be critical of others in ways that deny the self-reflectivity and self-critique that are central aspects of the socially-critical positioning in EE (Connell, 1997; Fien, 2000; Hart, 2003; Kristensen, 1999; Le Grange, 2002; Stevenson, 2007). Despite the criticisms, the researcher is of the view that the educational orientations are important in the practice and discourse of EE because they promote a diversity of teaching methods used to deliver the EE concepts and to address the environmental challenges. The importance of educational orientation in EE raises one fundamental question: How should these educational orientations be organised at the University of Namibia (UNAM) to support change-oriented learning?

This paper builds on the debate of the educational orientations in EE from the perspective of the students in the Department of Lifelong Learning and Community Education at UNAM. The researcher takes this approach because he discussed these educational orientations, methods and their criticisms with students. Secondly, the researcher also used methods suggested by these educational orientations to teach concepts such as sustainable development in Namibia, basic ecology, people and the environment, as well as waste management. Therefore, the researcher assesses not only the educational orientations, but also examines the environmental actions solicited after using the teaching methods suggested by these educational orientations. The researcher uses this understanding to suggest a mechanism to organise the educational orientations to support change-oriented learning.

Change-oriented learning is important in EE because the researcher believes that it is a type of learning that is captured in the notion of behaviour development. Behaviour development is the process that improves and increases the environmental knowledge and skills, attitudes and values and environmental actions, to the point where the social, economic and environmental challenges are adequately addressed. In light of this background, the followings are specific objectives of this paper:

- To discuss students' views about the educational orientations revealed in the practice and discourse of EE,
- To explore the contribution of educational orientations to student behaviour development through assessing students' environmental actions,
- To explore the student perspectives regarding the key components that can promote the organization of educational orientations in EE to foster change-oriented learning at UNAM.

This paper has five parts. The first part shows some critical reflections about UNAM's response to the national commitments for EE in higher education. This part is followed by the theoretical disposition and the research design and methods. The presentation of data will ensue followed by discussion. The final section deals with the way forward, in which the researcher shall reflect his view of how to enhance and organise the educational orientations revealed in EE so that change-oriented-learning is supported.

2. Some Reflections on UNAM's Response to National Commitments for EE in Higher Education

The government of the Republic of Namibia asserted that higher education institutions should promote EE because it provides scientific knowledge and skills, attitudes and values needed to ensure that the environment is respected and sustained, and to develop the ability to make environmentally wise choices in terms of family development, as well as in economic activities (Government of the Republic of Namibia, 1992; Ministry of Education, 2009). The *Outputs of the First National Consultative Seminar on Education for Sustainable Development in Namibia* seems to have called on Higher Education Institutions to educate and train people who will have the capacity to innovate and provide appropriate solutions for sustainable development (UNESCO, 2008). Additionally, the *Namibia's National Self-Capacity Assessment* (n.d.) for Global Environmental Management also expressed the need to enhance EE to promote the implementation of the Multilateral Environmental Agreements (MEAs) on climate change, land degradation and biological diversity. The statements outlined above seem to advise environmental educators at UNAM to implement EE to help individuals, groups and organisations to address the tenets of sustainable development in specific contexts. They also advise educators at UNAM to implement EE to help individuals, groups and organisations to cooperate with the international community on climate change, land degradation and protecting the biological diversity.

UNAM has been implementing environmentally related modules in the B.Ed (Secondary), as one of the ways to respond to the above requirements. Some of the modules include biology, environmental biology for educators, chemistry, geography and environmental Studies, home economics, business studies and economics (UNAM, 2012). These modules are mainly offered in UNAM's academic departments of the *Faculty of Science, the Faculty of Humanities and Social Sciences and Faculty of Economics and Management Sciences*. The *Department of Curriculum Studies, Instruction and Assessment* of the Faculty of Education provide training pertaining to methods of teaching the various modules after students have completed their academic training (UNAM, 2012). It seems that the training on methods of teaching specific modules that are environment related have, over these years, provided students with capacities to deliver EE in primary and secondary schools as well as in non-formal education settings in Namibia.

Education Departments at UNAM have recently started to include modules called EE in various specializations of the B.Ed. degree. This seemed to have gained momentum following the incorporation of former Colleges of Education into UNAM, because it led to the development of a new B.Ed (pre-primary phase and lower primary phase), in which three EE modules were introduced (UNAM, 2012). UNAM also introduced one EE module in 2008 in the BEd [Lifelong Learning and Community Education] (UNAM, 2012). There is indication that the numbers of EE courses in these programmes will increase and expand in the 2012 curriculum review.

In June 2010, the UNAM's Office of the Pro-vice Chancellor: Academic Affairs and Research supported the participants of the Mainstreaming of Environment and Sustainability in African Universities (MESA), at UNAM in a bid to popularise MESA, to inform the nation-wide stakeholders about the change projects, in which the participants were engaged in (UNAM, 2010). The launch was attended by the Minister of Education, the United

Nations Resident Representative, MESA representative from Nairobi, Kenya, United Nations Educational, Scientific and Cultural Organisation (UNESCO) programmes specialist on Education for Sustainable Development (ESD), the Dean and Directors of Faculties and Centres at UNAM, representatives of the various ministries and students from UNAM. At the launch, the representatives, including students, expressed the need for UNAM Faculties to work together in developing ESD, which is the concept that converges with EE in terms of methods, goals and outcomes. They also expressed support and willingness to take part in the change projects of MESA participants, which were to develop the ESD for policy for UNAM and the Master of Education (MEd) in ESD. Although stakeholders expressed the desire to take part in the change projects, they did not form steering committees to help them move forward.

3. Theoretical Disposition

To explore the views of students' on orientations of EE at UNAM, the researcher followed some of the characteristics and principles of Participatory Action Research (PAR). Ragsdell, (2009: p. 568) defines PAR as a process that simultaneously aims to bring about change in organizational practices and increases understanding of social science through researchers and organizational members working as partners in situations that are perceived problematic. This definition shows PAR is not only about change but also to increase understanding about the practice. Therefore, PAR captures the logic of behaviour development because EE practitioners can use it to change and also increase understanding of the discourse and practice of EE.

Pennuel and Freeman (1997); Walter (2009) show that the basic characteristics of PAR are participation and action, in **Figure 1**.

Given the above characteristics, PAR is relevant to this study because it follows the five strategies of the action component outlined in **Figure 1**. Researchers and practitioners would conclude that PAR includes defining the problem, collecting data, analyzing data and writing reports about a particular problem. While author acknowledge that the involvement of students in defining the problem, collecting data, analyzing data and writing reports about a particular educational problem is important, he also hold the view that embracing the strategies of the action component is important on its own because it explores how the teaching of EE concepts engenders environmental action through the application of active learning, reflection on learning and reporting of actions. In this way, the positive improvement and increasement in the understanding of environmental knowledge and skills, attitudes and values and environmental actions, to the point where the social, economic and environmental challenges are adequately addressed, could be observed. For this reason, the researcher followed the five strategies of the action component of PAR to bring him to the environmental actions taken by students in different situations.

The action approach discussed above culminates into the second way in which researcher followed PAR in this study, which is to follow some of its principles to assess the views of the students about educational orientations at UNAM. Therefore, the following principles of PAR, borrowed from Robottom and Sauvê (2003) guides this study:

- PAR is *context bound* because it guides individuals to participate and act on workplaces and the workplace issues of individuals. The researcher followed this principle to explore the orientations, teaching methods, criticisms and EE concepts that were discussed, in our own classroom contexts, and explore the environmental actions that were engendered.
- PAR is *responsive* in that it guides individuals and groups to participate and act on issues of interest and

Adapted from Pennuel and Freeman, (1997) and Walter (2009)

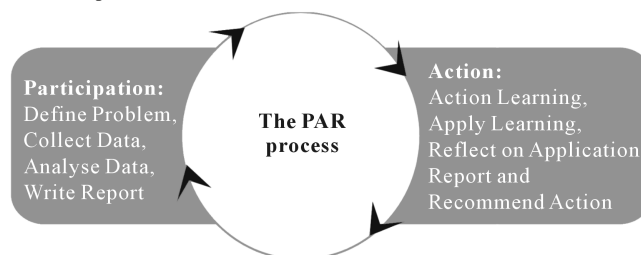


Figure 1. Some characteristics of the PAR process.

concern to the individuals and groups in workplaces. The researcher followed this principle to examine the actions that were of interest to students, with the hope that they could be used to inform the teaching of environmental education.

- PAR is *emergent* because it guides researchers, individuals and groups to participate and act on ideas and views that come from the research participants. The researcher used this principle to ask students about how the educational orientations should be organised at the University of Namibia (UNAM) to support change-oriented learning, with the hope that it could be used to inform the teaching of educational orientations in environmental education.
- PAR is *critical* because it looks beyond the surface layers of activity at the policy, organization and practice to identify and appraise the values that justify educational orientations. The researcher followed this principle because the researcher advised students to be critical by looking beyond the educational assumptions, by providing own reasons for emphasizing the educational orientations.

Therefore, the researcher launched this study following the above theoretical disposition.

4. Research Design and Methods

PAR frameworks follow the mixed method of research because they embrace both the qualitative and quantitative methods. For example, James, Milenkiewicz, and Buckman (2008); Kindon, Pain, and Kesby (2009); state that the survey, phenomenological inquiry and participatory evaluation are some of the methods of PAR. These are explicitly and implicitly embraced in this study as follows. The survey uses a questionnaire to collect qualitative and quantitative data (Creswell, 2009). The two data sets were collected simultaneously in a questionnaire, which consisted of close ended and open ended questions. The questionnaire has a qualitative dimension, which is phenomenological in that it explored the experiences of students, after learning educational orientations. Furthermore, participatory evaluation is implicitly embraced in this paper because it documents the environmental actions that come about through participation in social and economic activities in own settings. The quantitative method is that part of the questionnaire that collected data about students' background and the degree to which the educational orientations were favourable to students.

4.1. Population and Sampling

The population of the study is all the students at UNAM in the Department of Lifelong Learning and Community Education, who were registered for the EE module in 2009-2011. The students enrolled in the department were on full-time study as well as distance study. These students who were enrolled for these academic years were chosen because they had all read the one study guide and were perceived to have had a similar experience of the EE course.

Random sampling techniques were used as follows. Firstly, the cluster sampling (Schutt, 2006; Walliman, 2005) was used because the participants were drawn from distance and full-time students. The researcher had to embrace this strategy to ensure that students from both full-time and distance study participated in the study, as a simple random sampling technique, to ensure that all students had the opportunity to participate in the study. Secondly, the researcher randomly chose students from both modes to participate in the study.

4.2. Data Collection Process and Analysis

The quantitative and qualitative data were collected from students at UNAM during the period 10th to 27th of April 2012, following the "concurrent mixed method strategy" (Creswell, 2009). This refers to a procedure in which the researcher converges and merges quantitative and qualitative data in order to promote a comprehensive analysis of the research problem (Creswell, 2009: p. 15). This strategy was followed because the data collection instrument collected statistical data about the educational orientations in EE and qualitative data to derive opinions about the various aspects of these orientations. These would then provide comprehensive data to address the question about how the educational orientations could be organised at UNAM to support change-oriented learning, and transform its delivery.

These quantitative data was captured by North-West University's (NWU) Statistical Consultation service using the Statistical Package for Social Sciences (SPSS). The SPSS software was used to work out the number and percentage of participants who responded to questions that were asked. The qualitative data was transcribed into

a word-processing document by the researcher and analyzed using “continuous comparison of data” (Walliman, 2005). This technique allowed for the use of strategies for “labeling collected data, discovering categories and naming the data” (Schurink, Fouché, & de Vos, 2011), to compare all the sentences of the transcribed data to discover the similarities. Finally, a name that represents a group of sentences or paragraphs was chosen.

5. Presentation of Results

The following results are presented, representing a logical presentation of the topics from the questionnaire.

- Demographic information,
- The favourability of educational orientations in environmental education,
- Students’ reasons for emphasising the educational orientations in environmental education,
- Contribution of educational orientations to change by assessing the environmental actions solicited after learning EE concepts,
- Key components essential in the promotion of educational orientations to foster change-oriented learning in environmental education.

The first set of data gave an indication of the backgrounds of the students who participated in the study. **Table 1** shows the results.

Table 1 depicts that the participants were drawn from both distance and full-time students. The majority of which were students on full-time study. This can be explained since full-time students were readily available during the data-collection period while it was difficult to find distance students because some of them might not have attended the vacation school. The other reason is that some of them might have gone to collect the study guides from the UNAM’s Centre for External for Studies at the time the researcher came to collect data from them.

The second set of data gave an indication of the favourability of the educational orientations in on students. The results are shown in **Table 2**.

Table 2 clearly indicates that behaviourism is strongly favourable to students, followed by the socially critically orientation. This result implies that students prefer to use of the knowledge-oriented teaching methods to present EE. It also implies using methods that develop a range of approaches and methods that draw on learners’ prior knowledge and links the learning to broader social contexts, is important in delivering EE content. Although the behaviourist and the socially critical orientation are more strongly favoured by students, a significant number of them also chose the liberal-progressive orientation to EE. This result implies that environmental educators should emphasise the use of all educational orientations in the teaching of EE because different students have preferences for different orientations.

The second set of data gave an indication of the favourability of the educational orientations in environmental education. **Table 3** presents the results.

Table 1. Demographic characteristics.

| Demographic characteristic | Programme | | | Mode of tuition | | |
|----------------------------|-----------|--------|-------|--------------------|-----------------|-------|
| | Diploma | Degree | Total | Distance education | Full time study | Total |
| Number of students | (3) | (58) | (61) | (20) | (41) | (61) |
| Percentage of the total | 5% | 95% | 100% | 33% | 67% | 100% |

Table 2. Students perceptions about the favourability of educational orientations in EE.

| Orientations | Unfavourable orientation of EE | Undecided | Somewhat favourable orientation of EE | Strongly favourable orientation of EE | Missing values | Total |
|---------------------------------|--------------------------------|------------|---------------------------------------|---------------------------------------|----------------|--------------|
| Neo classical or behaviorism | (4) 7% | (5) 8% | (12) 20% | (37) 61% | (3) 5% | (61) 100% |
| Socially critical orientation | (1) 2% | (4) 7% | (21) 34% | (33) 54% | (2) 3% | (61) 100% |
| Liberal-progressive orientation | (3) 5% | (9) 15% | (19) 31% | (25) 41% | (5) 8% | (61) 100% |

Table 3. Students' reasons for emphasizing the educational orientations in environmental education.

| Orientation | Reason for emphasis |
|------------------------------------|--|
| 1) Neo-classical or behaviourism | <ul style="list-style-type: none"> • It begins with the teachers to sensitize and inform/teach students about the importance of conserving the environment. • Educators are experts so they must pass that knowledge on to community members. |
| 2) Liberal-progressive orientation | <ul style="list-style-type: none"> • It allows facilitators to identify their learner's potential and embrace the experience of learners. The learners should bring their own understanding and engage in a dialogue with teachers. • Promotes self-directed learning because learners have the right to make their own decisions. They should apply theory to practice. • It promotes critical thinking and helps learners relate to the next person. |
| 3) Socially critical orientation | <ul style="list-style-type: none"> • It is good to involve the community in environmental education so that they are environmentally conscious so that they are able to give information that can be used to draw up a lesson plan. • It is within the community that the problems can be started and solved, like addressing the issue of floods and other natural disasters. Bringing community into environmental education will enable them to have a broader understanding of issues and finding collective solutions to environmental problems. • Students can acquire views from societies on how to care about the environment. If people solve environmental problems from an individual perspective it might be hard to reach the outcome. • The use of an EE orientation should be dependent on the learner's ability to comprehend the information and their previous experience and existing knowledge on the topic. It is necessary to exercise each EE orientation accordingly to cater for all learners. |
| 4) All the above orientations | <ul style="list-style-type: none"> • Each educational orientation should be applied differently depending on the nature and the target audience. Issues to be addressed and lessons to be conducted. Issues should be specific. • All these educational orientations for EE have got their own critical function to play, therefore they should be emphasized equally according to context and setting. |

Table 3, provides reasons for emphasis on behaviourist, liberal-progressive and socially critical orientations and a combination of all these to support change-oriented teaching. Although the students specify reasons for each educational orientation, it also demonstrates the need for the educators to use the educational orientations in EE depending on the nature of the target audience. More importantly, this shows that all educational orientations have a role to play in the teaching of EE concepts.

The fourth set of data gives an indication of the environmental actions that students took after learning EE concepts using the teaching methods propounded in the orientations. **Table 4** presents the results.

Table 4 highlights six actions that relate to concepts that we discussed. Action 1 relates to waste management because it emphasises the need to raise awareness about waste management methods such as land filling and recycling of cans and plastics, while action category 2 and 3 relate to the role of basic ecology in strengthening the growing of more trees, explaining the benefits of trees and establishing community gardens to help nutrition. Action 4, 5 and 6 seem to go along with the notion of sustaining Namibia's resource base, which is one of the themes discussed in sustainable development. These results imply that students have taken some environmental actions. The fifth set of data gives an indication of the student's suggestions about key components responsible for improving the delivery of educational orientations in EE. **Table 5** presents the results.

Table 5 highlights strategies for delivery of EE directed to UNAM as an institution of higher learning, students' leaders, lecturers and EE subject content, as well EE methods. These results indicate that the role of institutions and the participation of a variety of stakeholders should be emphasized. It also advises educators to use a variety of methods to improve the delivery of EE orientations and concepts at UNAM.

6. Discussion

The study has provided an opportunity to explore the views of both distance and full-time students. In general students showed preference for all educational orientations (**Table 2** and **Table 3**). Students recognized that behaviourism promotes socialization, education and training and seeks to help students find their place in society with the skills to fulfill their work roles while the liberal/progressive orientation seeks the development and improvements of society through the education of autonomous individuals. They also recognized that the socially-critical orientation is founded upon a belief in the need for education to play a role, along with other social institutions and agencies in creating just and democratic societies (Fien, 1999; Le Grange, 2004; Walter, 2009).

Table 4. Some environmental actions solicited after learning EE concepts.

| Specific actions taken |
|---|
| 1) Raise awareness about waste management methods such as land filling and recycling of cans and plastics |
| 2) Plant/grow more trees and explain benefits of trees |
| 3) Community gardens to help with nutrition |
| 4) Mulching and practice of rotational grazing |
| 5) Arranged rocks to prevent erosion and planted trees on top of those rocks |
| 6) Used the organic manure method for the mahangu field |

Table 5. Students' suggestion about the components that should promote educational orientations in EE concepts at UNAM.

| Components | Suggested strategies |
|--------------------|---|
| 1) UNAM | <ul style="list-style-type: none"> • Start environmental workshops for all UNAM • UNAM should introduce a compulsory core course in environmental education and sustainable development • UNAM should introduce a master's course in EE • Provide dust bins and posters all over campus |
| 2) Student leaders | <ul style="list-style-type: none"> • The SRC for community development must have a better understanding of sustainable development and environmental education. |
| 3) Lecturers | <ul style="list-style-type: none"> • All lectures must be involved in educating students about environmental issues • Involve students more in the recycling process • Lecturers should involve students in a practical observation method of learning |
| 4) Content | <ul style="list-style-type: none"> • The content should move away from history to issues of environmentally sustainable development |
| 5) Methods | <ul style="list-style-type: none"> • More practicals and field trips are required • Every faculty must have a day to clean the campus and local area • Debate with students from other faculties on environmental issues |

This demonstrates that the orientations should be emphasized because they have different roles to play in the practice and discourse of EE at UNAM.

Persuasion and eco-management were some of the environmental actions taken by participants because **Table 5** shows that students educated other members of the public to restore natural areas and also took action to restore natural areas (Chu, Lee, Ko, Shin, Lee, Min, & Kang, 2007; Dourish, 2008; Marcinkowski, 2001). The results display that political action and eco-consumerism were not taken by participants because students did not take actions "aiming at influencing decision makers or changing consumer habits or encouraging others to do so" (Marcinkowski, 1989; Tilbury, 1995). This suggests that shows that more efforts are needed to ensure that all environmental actions are taken by students in different social settings.

Multiple actors and multiple methods of instruction are needed to improve the delivery of EE orientations and concepts at UNAM (**Table 5**). The multi-actors approach supports the use of institutional arrangements, student leaders and students as agents of change while multiple methods relate to outdoor educational approaches that foster socially encouraged interactions between students and society in institutions of higher learning.

7. Way Forward

The researcher argues that the action component as well as the principles of PAR is essential to EE because they can be used to develop understanding of change-oriented learning and inform the operationalisation of the multi-dimensional social ecology in EE at UNAM. Multi-dimensional social ecology is a process by which multi-actors such as lecturers, students, student leaders and the institutions of higher education interact with one another in a dynamic learning environment that uses the educational orientations to deliver EE concepts. Second, the multi-dimensional social ecology engages multiple actors such as lecturers, students, student leaders and institutions about using the educational orientations in addressing the EE concepts. The four dimensions of the

multidimensional social ecology shown in **Figure 2**, (are based on **Table 5**), are suggested to organise the educational orientations in delivering the EE concepts such that change-oriented learning is supported.

The centre of **Figure 2** is the EE, which should reflect content drawn from local, national and global environmental arenas. It should acknowledge the collective nature of environmental issues, examine the lack of consensus that exists on environmental issues and accommodate the use of scientific and traditional knowledge in social surrounding to address environmental issues. In operationalising the multidimensional social ecology, the researcher emphasizes the role of higher education institutions and the environmental educators because these stakeholders could bring students and student leaders into play.

The following suggestions are made for higher education institutions to promote behavior development, which promotes change oriented learning:

- Dedicate space for EE not only its curriculum but also in its surroundings *i.e.* pedestrian pooling, plant more trees to offset emissions, dedicated space for sorting of waste. This ensures that students and student’s leaders would also aspire to embrace it,
- Encourage students and student leaders to use the knowledge gained from EE to address real-life environmental challenges in own community and social settings,
- Encourage students and students’ leaders to share the environmental action with lecturers and institutions,
- Encourage lecturers to tap students and students leaders environmental actions taken in social setting in which they reside,
- Use the university’s internal and external communication such as brochures and newsletters to share the students and student’s leaders’ environmental actions with university community and the wider public.

The author is of the view that once the students and student leaders know that they have an obligation to report the actions that they have taken to address real-life environmental challenges, they would also change their attitudes and further engage in different forms of environmental action in their own social settings. In this way, change-oriented learning will be fostered.

The following suggestions are made to ensure that environmental educators organize the delivery of EE orientations, to ensure change-oriented learning:

- Explore their own assumptions about educational orientation in environmental education in relation to the wider discussion of the educational orientations,
- Explore the students’ existing knowledge about EE topics before they use a particular teaching method to address an environmental education topic,
- Explore the students’ environmental actions taken in the social settings. In this way the knowledge level and gaps in learning levels could be identified. This process could help environmental educators and students to implement all forms of environmental action. In this way change-oriented learning could be fostered,
- Explore the role players that can help to address the environmental challenges,
- Apply the teaching methods propounded by the educational orientations depending on the students’ ability, previous experience and existing knowledge on the topic,
- Use students’ views to address the environmental concepts in the classroom on some of the contentious environmental issues,

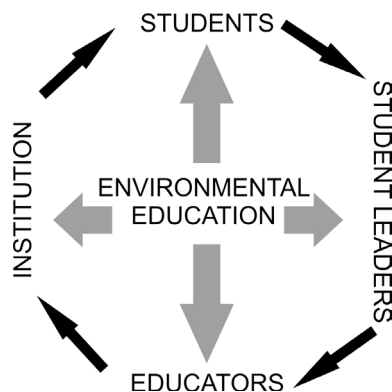


Figure 2. Four dimensions of the multi-dimensional social ecology in EE.

- Educators, should not only promote critical theoretical debate in the classrooms but also work *with* students and students leaders outside the boundaries of a university.

The above suggestions express the operationalisation of the multi-dimensional social ecology in which the institution of higher education, the lecturers, students and student leaders, are equally important. In so doing, it is important to stress change oriented learning. Change-oriented learning comes about when students are encouraged to apply learning not only in the classroom but also in the social settings in which they reside. Change oriented learning would further be enhanced if the students and student leaders are encouraged to report and share the actions with the wider university community. Secondly, the operationalisation of the multi-dimensional social ecology should not be a chance event but an ongoing process that should become part of the culture of the institutions of higher education.

8. Conclusion

In general, this paper reflects on the importance of educational orientations in addressing the environmental challenges. It contributes to the theme by discussing the neo-classical or behaviourist, liberal-progressive and the socially-critical educational orientations from the perspective of students at UNAM and assessing the environmental actions solicited from students, at UNAM, after learning the EE concepts using teaching methods propounded by these educational orientations. In the author's view the application of the characteristics and principles of PAR provide the tools to environmental educators in higher institutions to address the binary split between theory and action and to engage students in addressing the environmental challenges through environmental action. It is emphasised that reporting and sharing the students environmental actions through brochures and newsletters should remain an important part of the process, because it highlights areas where further educational efforts are needed in the teaching of environmental education.

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