Knowledge to Action: Understanding the Relationship between Knowledge and Pro-environmental Behaviors among Bachelor of Education Students

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Abstract
The purpose of this study was to explore the relationships among environmental knowledge; desire to take action; and perceptions about environmental issues and the role of schools in developing sustained pro-environmental behaviors among youth. The study participants were Bachelor of Education students at a small university in Northern Ontario, Canada. Data were collected through an electronic survey and focus group interviews. Findings from the study showed that although the study participants demonstrated superior understanding of ecological concepts, the only environmental knowledge they could recall from school was related to environmental actions they participated in. The participants rated both their environmental knowledge and their desire to participate in pro-environmental actions as average. Interview data revealed a general concern among students about schools talking the talk and not walking the walk in mitigating the environmental crisis. Implications for teaching strategies that
lead to self-determined environmental motivation are discussed and suggestions for transforming knowledge to action are provided.

**Introduction**

The environmental challenges confronting our world today require active participation by all citizens and preparation of youth to ensure a more sustainable future. Since schools play a significant role in equipping young people with an understanding of ecological and environmental knowledge, there is need to adopt teaching strategies that promote sustained pro-environmental behaviors among students. This study sought to explore the relationships among the level of environmental knowledge among Bachelor of Education students, their involvement in pro-environmental actions and their perceptions about environmental issues and the role of school in developing pro-environmental behaviors among youth. The following questions guided the study: a) What relationships exist among ecological knowledge, environmental knowledge and desire to take action; and b) What are education students’ perceptions about environmental issues and the role of schools in supporting pro-environmental behaviors among the youth? A mixed methods research design was used and data were collected through an online survey and focus group interviews.

Most young people care about the future of our environment and demonstrate passion for making a difference in the world (Foutz et.al. 2011). Supportive environments help youth gain social skills, build confidence and contribute to their communities (Lerner et. al., 2005). Since education play a vital role in promoting environmental sustainability efforts, schools need to make concerted efforts to ensure that environmental education is taught in ways that promote such skills among youth. Environmental education traditionally focused on teaching about the natural world and particularly how ecosystems work. More recently, environmental education
courses focusing on understanding natural systems and human impact on the environment have been introduced in some school systems and universities. Although the aim of environmental education is to change people’s perceptions about the value of the natural world and to teach how to change environmental behaviors, such as getting people to recycle, how to build eco-friendly dwellings and driving energy efficient cars; there does not seem to be a clear relationship between the knowledge people possess and their involvement in environmental initiatives (Madruga & da Silveira, 2003; Matthews and Taylor, 1999).

Lack of participation in pro-environmental initiatives among youth has been attributed to several reasons, including: a) a weak foundation of young people’s opinions when it comes to understanding science and technology and how it affects their lives; b) individual resistance to behaviour change, including behaviours that lead to environmental protection; c) overwhelming and unprecedented levels of environmental and social destabilization worldwide, which makes individual action seem insignificant; and d) fewer opportunities provided for youth to engage in discussions and expression of their ideas about social and environmental issues in adult-dominated institutions (Madruga & da Silveira, 2003; Matthews and Taylor, 1999). Translating theory into practice is a critical process if the goal of environmental education is to empower young people to take leadership and ensuring a more sustainable future. In order to develop an enduring understanding about the environment, students need to be given opportunities to: a) develop ownership of the school knowledge from the curriculum; b) engage in concrete experiences as an integral part of environmental education courses; c) work on action projects dealing with environmental issues in their communities; and d) participate in policy and decision making processes (Gwekwerere, 2011; Matthews & Taylor, 1999). Creating place-based identities (Orr, 1994) as part of the environmental education by linking local problems with the big picture is also a critical way to helping students understand the concept of thinking globally
and acting locally. There is an urgent need for schools to re-consider ways of teaching ecological and environmental content in order to have a significant impact on youth who will participate in mitigating the current environmental crisis. This study contributes to our understanding of the relationships among young people’s knowledge about the environment, their involvement in pro-environmental initiatives, and their perceptions and beliefs about what schools need to do to help young people become more actively involved in creating a more sustainable future.

**Literature Review**

People may question whether there is need for environmental education to go beyond just preparing for knowledge to preparing for action. The answer to this question lies in research which suggests that information is not always enough to lead to long lasting behavioral change (Corraliza & Berenguer, 2000; Culen and Mony, 2003). In a study of ecological knowledge, Armagan & Koksal (2010) found that elementary 7th and 8th grade students lacked proper environmental knowledge in spite of living in the city and having various media, such as TV, radio, and newspapers, to obtain information from. These authors suggested that when teaching students about the environment, teachers should place experiences before narration and that concrete examples should be used. However, in order to design more effective environmental education programs, educators need to gain a better understanding of human behaviour in terms of what motivates people to get involved in social issues that may not affect them directly in the short term and the ways to get the best out of youth during their developmental stages. Literature from psychological studies has been used to understand reactions to environmental campaigns and in education this literature can inform us about human nature, values and motivations that are critical if school is to have a significant impact on developing future leaders in mitigating the environmental crisis.
In an effort to understand environmental human behavior, and why environmental campaigns are failing to get people actively involved in environmental initiatives, some researchers have focused on the behaviorist perspective and positivist approaches (Darner, 2009). One theory that has been used to understand environmental behavior is the self-determination theory proposed by Ryan and Deci (1985; 2000). The self-determination theory states that people feel self-determined when their basic psychological needs such as competence, relatedness and autonomy are satisfied. This theory addresses not only the central questions of why people do what they do, but also the costs and benefits of various ways of socially regulating or promoting behavior. Pelletier (2004) observed that people who have self-determined motivation towards the environment behave more voluntarily and maintain their behavior in the long term. Self-determination theory provides a broad framework for exploring human motivation and personality. When considering ways to bridge the gap between environmental knowledge from school and pro-environmental behaviours among youth, the self-determination theory can help provide a lens through which we can determine the type of environmental learning that can lead to pro-environmental behaviours.

Crompton and Kasser (2009) examined ways that environmental campaign strategies can successfully engage people. They demonstrated how human identity plays a critical role in environmental behavior changes. They showed that environmental campaigns that use fear tactics fail to lead to the expected behavior change because people have ways of dealing with fear. They also showed that campaign tactics that orient towards materialistic goals fail because when humans are reminded of their own mortality they strive to enhance their self-esteem by orienting towards self-enhancing materialistic values such as acquiring more possessions which is environmentally destructive. These authors showed how humans can be encouraged to empathize
with non-human nature in order for them to become more involved in supporting environmental actions.

Other environmentalists concerned about the lack of civic participation in efforts to mitigate the environmental crisis have condemned the focus on simple acts in the hope that if everyone does a little it will add up and this is clearly highlighted in the following passage from their report:

The cumulative impact of large numbers of individuals making marginal improvements in their environmental impact will be a marginal collective improvement in environmental impact. Yet we live at a time when we need urgent and ambitious changes. (Crompton and Thøgersen (2009) p 6).

Crompton and Thøgersen (2009) argued against piece-meal behavior change which focuses on simple and painless behavior change which they believe to work against self-determined motivation. They do not believe in the myth that one pro-environmental behavior will lead to adoption of other environmental behaviours. However, they agree with Crompton and Kasser that, an appeal to environmental imperatives is more likely to lead to spill over into other pro-environmental behaviours than an appeal to financial self-interest or social status. These authors believe that real change can be brought about by developing greater public activism where people participate in direct action; active citizenship where people influence policy by writing letters to political decision-makers and passive acceptance of government intervention. Although the perspectives mentioned above are directed at environmental campaigns, an understanding of human identity and meaningful ways of engaging people in environmental actions is needed to help design environmental education courses and teaching methods that lead to more sustained pro-environmental behaviours among youth.

In an effort to understand youth behaviour, the ‘positive youth development perspective’ has been used as a theoretical lens (Lerner, 2005). This perspective is based on the work of comparative psychologists and biologists who had been studying the plasticity of
developmental processes. The positive youth development perspective has been described by Lerner (2005) as follows:

The positive youth development perspective tries to counterbalance the assumption of broken youth with the perspective that youth are developing individuals who display considerable assets, and who can be guided to develop to become positive and constructive contributors to society. So, while deficits may exist, it is the goal of development to fill the gaps. (Lerner 2005, p.4).

The positive youth development used by Lerner (2005) approach builds upon what have become known as the “Five Cs”: Competence, Confidence, Connection, Character, and Caring. Researchers theorized that young people whose lives incorporated these five Cs would be on a developmental path that demonstrates a Sixth C which is Contributions to self, family, community, and the institutions of a civil society (Lerner, 2008). In a study of youth participation in 4-H programs, (Lerner, 2008) showed the big three features of effective youth-serving programs which include: a) positive and sustained relationships between youth and adults; b) activities that build life skills; and c) opportunities to use these life skills as both participants and as leaders in valued community activities. This perspective is a useful lens for thinking about methods of teaching environmental education that can lead youth to develop the six Cs in terms of the environment.

**Research Methods**

A mixed methods research design was used in this study. The study population comprised of Concurrent Bachelor of Education students in 2nd through 4th year at a small university in Ontario. Education students were selected as participants in this study because they are going to become future teachers, hence it is important to know what environmental education knowledge they possess and how that knowledge relates to their actions as well as the views and perceptions they hold about environmental education. Participants for the study were recruited via an email
message sent to all Concurrent Bachelor of Education students in years 2-4 who were registered for the 2011-2012 academic year. The email message asked participants to provide their consent to participate in the study before completing an online survey. A total of 84 students responded to the online survey and fifteen students participated in the focus group interviews. The survey response rate was 28%. After the surveys were completed, an informational flyer about the focus group interviews was sent to all Concurrent Education students. Fifteen students agreed to participate in the focus group interviews.

Data were collected primarily through the on-line survey as well as focus group interviews. The survey instrument used in this study was adopted from the Young People and Environment questionnaire (Fien et. al., 2002). The survey tool was modified to suite the objectives of this study. The focus group interview questions mirrored some of the survey questions and were designed to gather more detailed information about the students’ knowledge and perceptions about the environment. The questions for both the survey and focus group interviews were classified into the following categories: a) Ecological knowledge and knowledge about the environment; b) concern about environmental issues; c) pro-environmental actions taken; and d) beliefs and perceptions about environmental issues. Three focus group interviews of 5 students each were conducted by a research assistant. The interviews were audio recorded and later transcribed verbatim for analysis. Transcriptions from focus group interviews were read and re-read to find common themes across the three interview groups. Data analysis for survey data involved calculating averages of responses to each of the questions, and further analysis involved looking at emerging relationships across themes.
Results and Discussion

Analysis of the findings revealed the following themes: a) s relationship exists between students’ ecological knowledge and their perceptions of knowledge about environment; b) relationships exist among students’ perceived levels of knowledge, their desire to be involved in improving the environment and actions taken; and c) Students’ believe that in school play a vital role in developing sustained pro-environmental behaviors among youth. A detailed description and discussion of each theme is provided below.

Students’ ecological knowledge and their perceptions of knowledge about the environment

Figure 1 below shows that the majority of students who participated in this study identified school as their source of environmental knowledge. The students demonstrated familiarity with ecological concepts such as: carbon cycle, biodiversity, renewable resources, ecology, interdependence, greenhouse effect and ozone layer. Seventy four percent of the respondents could distinguish between renewable and non-renewable resources and 72% could correctly define the term greenhouse effect.

On the other hand, most of the students were not familiar with environmental sustainability concepts such as intergenerational equity and the precautionary principle. Up to 74% of the students indicated that they had never heard about these concepts and only a few said that they had heard about or discussed them in class. When asked to talk about their memories learning about the environment at school during the focus group discussions, the students did not talk much about content knowledge but they mostly remembered environmental actions they participated in at school such as, environmental clean-ups on earth day, re-use recycle and turning off lights.
Although 60% of the students identified school as their source of environmental knowledge, data from focus group discussions showed that students did not remember learning anything about environmentalism as indicated in the following quotation from the interview:

I think there could have been more done on sustainability and environmentalism than there was. I remember clean ups up until high school doing clean ups outside but I don’t remember a teacher ever talking about environmentalism. (Mary, student; fall, 2011).

Although some students also identified television, commercials; the internet, parents; and community activists as their sources of environmental knowledge, they still felt that they learned most of the environmental knowledge on their own, as shown in the following quotation from the focus group interview:

I think I figured most of my environmental stuff has come around on my own, my own research. Although sometimes other people influenced it too: my friends, acquaintances, family but I wouldn’t say school had a humungous impact. It made me recycle and I still recycle but I don’t know if it’s done that much for my views on environmentalism and sustainability. (Lyan, student; fall 2011).
The results highlighted above show a mismatch between students’ familiarity with the ecological concepts they learned in school and the perceptions about their own environmental knowledge. It was clear that students had learned ecological concepts in high school as they were able to define all the terms presented and they noted that these were discussed in class. However, the fact that students did not show familiarity with environmental-specific concepts shows that they may not have taken specific courses in environmental education. What is intriguing about these findings is that, although students clearly indicated that they acquired most of their environmental knowledge from school, they did not mention specific environmental concepts when probed to recall their experience learning environmental education in school, instead, they only recalled environmental actions they participated in, such as recycling and picking up garbage, and no specific links were made to the environmental content they learned.

These findings can be explained by the fact that, many schools do not offer specific courses in environmental education, and Biology is one course where students learn about ecosystems. Since ecological concepts have traditionally been taught as biological facts, in some cases connections to real-life issues are limited to the examples provided in textbooks, hence students may not automatically make the connections between ecological concepts they learned and environmental issues and actions. It is clear from the findings that there is value in engaging students in action-oriented practical activities when teaching ecological concepts as they could easily remember the environmental activities they participated in and they could easily equate these actions to environmental knowledge. Since it is not easy for schools to add new courses to the curriculum, these findings demonstrate the need to integrate environmental action-oriented activities when teaching content that relates to the environment. As the Chinese proverb goes “I
hear I forget, I do I remember,” findings from this study show that students can easily remember environmental knowledge that is directly linked to action.

Another contradiction in these findings is that, although students identified school as the source of environmental knowledge, they still felt that they learned most of what they know about the environment on their own. It seems from these findings that, the students did not feel like there was a ‘spill over’ effect in terms of what they learned in school and what they now know about the environment. These findings are in agreement with Crompton and Thøgersen (2009) who do not believe in the myth that one pro-environmental behavior will lead to adoption of other pro-environmental behaviours. In keeping with these environmentalists, maybe students could have identified a spillover of the school knowledge to their current environmental knowledge if they had been engaged in more actions than just recycling and cleaning up, for example engaging in community initiatives and writing letters to political decision makers.

**Level of knowledge and desire to be involved in improving the environment and actions taken**

Figure 2 below shows that a majority of the students (81.7%), who responded to the survey, rated their level of environmental knowledge as average, with only a minority rating their knowledge as above average (12.7%) or below average (5.7%). Data also shows that 63% of students rated their desire to be involved in improving the environment as average, with 32.8% indicating that they have an above average desire and only 4.9% indicating below average desire. The data shows a direct relationship between the students’ perceptions of their level of environmental knowledge and their desire to be involved in improving the environment.

Another relationship that emerged from the data was a direct relationship between the level of desire to be involved, what students have done to help the environment and their reasons for taking action. Student who rated both their desire to be involved in helping the environment
as above average had taken some form of action to improve the environment. When asked whether they have taken specific actions such as deciding to re-use and recycle, encouraging someone else to change an activity that is harmful to the environment, or choosing household products that are better for the environment; about half of them said that they had taken some action, 42% said they would consider doing so, and only 8% said they would not consider doing so. In other words, it seems those who have the desire to be involved have tried to take some action or would consider doing so. Sixty percent of students who have taken action to improve the environment either said that they understood the importance of doing so or feel obliged to do so and 30% either said it saves money or they do so because their family does it.

Fig. 2: Level of knowledge about the environment and desire to be involved in improving the environment

The findings described above show a direct relationship between level of knowledge and level of desire to be involved in taking action. These findings suggest that the type and level of environmental knowledge that students are equipped with in school could have an impact on adoption of pro-environmental behaviors later in life. These findings are in agreement
with Crompton and Thøgersen (2009) who do not subscribe to the notion that if each does a little bit it will add up. The findings show that students’ average level of environmental knowledge only led to average desire to participation in environmental actions later in life. However, those with desire to participate in environmental action showed that they did participate or were considering participate. Therefore it could be extrapolated from these findings that if students’ level of knowledge is above average, their desire to be involved would also be above average, leading to more actions being taken. In light of these findings, it is important for educators to aim at equipping their students with above average environmental knowledge in order for them to adopt above average pro-environmental behaviors. The ‘simple and painless’ environmental behaviours students engaged in at school such as recycling and cleaning up the school yard could have led to their perception of having average level of environmental knowledge. Engaging students in greater public activism such as participation in direct action and influencing policy by writing letters to political decision-makers may be necessary to help students develop above average levels of environmental knowledge which will lead to above average levels of participation.

The findings also show the importance of adults as positive role models in supporting development of pro-environmental behaviours. This is supported by the following quotations from focus group interviews showing students’ understanding of the fact that although schools are important for providing environmental knowledge, family support is important for students to develop more sustained pro-environmental behaviours.

I think if a younger student is saying ‘oh Mom we should do this’ and the mom is saying ‘that’s too much work, you do it but I’m not doing it’ the child would just brush it off and be like ‘ok, well it can’t be that important.’ (Eileen, student; fall 2011).
I find it really does help to have supportive friends and family members. Uh, for the most part my family has been supportive of my environmental pursuits. But um…you can change their minds I find. (Gina, student; fall 2011).

These findings are in agreement with Corraliza&Berenguer (2000) and Culen&Mony (2003) that information is not always enough to lead to long lasting behavioral change. According to Lerner (2008), supportive environments help youth gain social skills, build confidence and contribute to their communities (Lerner et. al., 2005). In order for students to develop above average pro-environmental behaviours, schools, parents and other adults in the community need to work together to ensure that they are receiving the same pro-environmental message. The findings show that the efforts being made in school may not lead to development of pro-environmental behaviours if students do not get the support to take appropriate action at home. Schools need to be more proactive in communicating with parents about what students are doing in school and showing how they can help their students in order to ensure that students get the support they need. There is also need to connect students with other adults in the community through engagement in community environmental projects. Making all the connections explicit for students would help them develop a more sustained appreciation of the environment. This may lead to development of self-determined motivation where individuals will behave more voluntarily and maintain their behavior in the long term (Pelletier, 2004).

**Students’ perceptions about the role of school in developing pro-environmental behaviors**

Data from focus group interviews showed that the education students who were interviewed in this study believed that school can have a positive impact in developing pro-environmental behaviors among students. The students also felt that participation in environmental initiatives would empower and motivate students to adopt more sustained pro-
environmental behavior choices that would help transform their knowledge to action. One student clearly highlighted how environmental actions taken in schools can make a huge impact:

I think that schools have an impact, even if the students are only acting on being environmentally friendly at school, I think that makes a huge impact because you’ll get how many students who are in a school and how big school buildings are, I think that even the kids go home and do whatever they feel like, as long as they’re doing it at schools I think it still has an impact so I think schools play a big role in that. (Celia, Education students; fall 2011)

The students also showed their belief that, teachers as environmental activists can be role models and that they could make a huge impact on developing the students’ pro-environmental behaviors as shown in the following quotation:

I think you can create change when you’re teaching especially since you have a captive audience of 30 students everyday for 6 hours. I think if a teacher’s dedicated to environmentalism it really works to work it into the curriculum and work it into our lessons and has a helper in the class to sort the recycling bin and explains why we recycle and really becomes very active with the environment in the classroom I think that you’re going to create a bunch of mini-environmentalists. If only for the year, maybe but it’s going to stick with some of them. And some of them are going to take it home. (Whitney, Education student; fall 2011).

On the other hand, there was a general concern among the students that there is more talk about what needs to be done about the environment and less doing. In the quotation below, one student clearly highlights the fact that there is no evidence of how schools are taking action to mitigate the environmental crisis:

…..my fear is that we talk about, like from a teacher’s perspective, we talk about in schools about the environment but there’s not that much proactive stuff going on to actually do stuff in the community. Um, but I know that some schools are doing it, like Valley View Public School in the Valley. They have a really good, um, like there whole school is based around like um low-flush toilets and they have a green roof and stuff like that. And I think that more schools and more buildings should be leaning towards that. (Barbara, student; fall 2011).
From the findings described above, it is clear that the education students believe in schools as places where young people can develop sustained pro-environmental behaviors. However, they felt that schools and teachers could have a more positive impact on students if they acted as role models, leading by showing examples of how students can be actively involved in the process of mitigating the current environmental crisis. These findings are in agreement with Lerner (2008) who showed that youth development programs can play a major role in promoting positive youth development. In a study of youth participating in 4-H programs, Lerner showed that effective youth-serving programs provide youth with the opportunities to use the life skills they gain as both participants and as leaders in valued community activities. Findings from his study showed that those children who had higher levels of Positive Youth Development in fifth grade were more likely during the next year to contribute to their family and community. Hence it follows that, if the environmental programs offered by schools are designed to provide students with the opportunities to decide and take leadership on school wide environmental projects such as greening the school buildings, re-greening the school yard, or writing letters to their member of parliament about their concern for pollution emitted by the nearby coal mine and the need to reduce it would give students the opportunity not just to develop leadership skills but to become active participants in their communities as well. In this case teachers need to act as coaches and role models. Thus schools will help model pro-environmental behaviours that they can continue to be engaged in.

**Implications for teaching**

- Explicit connections should be made to the current environmental crisis when teaching topics related to environmental education and practical components of the subjects should include actions to mitigate a local environmental issue e.g. greening a local park or writing letters to the city mayor with suggestions on how to reduce pollution in the
city. Teachers should therefore place experiences before narration and concrete examples should be used.

- Schools need to aim at providing above average knowledge about the environment to all students. At all levels in schooling, environmental education should focus on empowering young people to take leadership by engaging them in public activism such as participation in direct community action projects and actions that can lead to policy changes.

- The enormity of global environmental problems has been found to be one of the reasons for resistance to behaviour change. Individuals tend to view environmental challenges as something very far away from their reality. It is important for environmental education programs in schools to connect the local issues with the global environmental crisis by engaging students as active participants in local environmental issues that are connected to the global issues. For example helping students to understand how climate change is impacting them on a local scale in addition to how it is affecting other parts of the world.

- In order for schools to play a significant role in developing more sustained pro-environmental behaviors among young people, there is need to understand human attitudes and behaviors and find ways to integrate these understandings in the way we teach ecological concepts and environmental education in schools. Schools and teachers should act as role models in environmental activism and they should make an effort to make the school, home and community connections explicit in order to develop more sustained pro-environmental behaviors among youth.

**Conclusion**

Findings from this study showed that, although the education students demonstrated superior knowledge of ecological concepts and credited school as the source of their current
environmental knowledge, all they could recall were the specific environmental actions they participated in school. This demonstrates the need for integrating action-oriented activities in ecological and environmental courses to ensure that students transfer the knowledge later in life. The findings also showed that the level of knowledge students’ gained was related to their level of desire to be involved in environmental actions. Students believed that schools and teachers should be role models, leading by showing examples of how students can be actively involved in the process of mitigating the current environmental crisis. In order for schools to develop more systematic pro-environmental behaviors among young people, there is need to provide opportunities for students to develop ownership of the school knowledge through engaging in concrete experiences as an integral part of environmental education.

References:


