Young Adolescents' Perceptions of Environmental Issues: Implications for Environmental Education in Urban Settings

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Justification, background and method

Constructivist approaches of learning

Despite good intentions, many environmental education (EE) projects seem to fall short in realising ambitious learning goals such as "helping citizens become environmentally knowledgeable, skilled and dedicated people who are willing to work individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between the quality of life and the quality of the environment." (Harvey cited in Hungerford et al., 1980). Without always challenging the nature and content of these goals, many researchers and practitioners are trying to resolve this discrepancy between the theory and practice of EE. Some have tried to instrumentally structure EE content matter by using hierarchical levels of universal goals and objectives (e.g. Hungerford et al., 1980; Marcinkowski, 1990) whereas others who question the value or the status of universal goals and objectives, have put emphasis on contextual development of EE within the school community (e.g. Bull et al., 1988; Robottom, 1987). However, relatively little attention has been paid to the way young people come to make sense of their own environment through their everyday interactions with(in) the lifeworld.[1]

For more than fifty years constructivist approaches to learning have suggested that the pre-instructional perceptions (also referred to as "mini-theories" and "misconceptions") of the learner play a key role in successful learning or lack thereof (Ausubel, 1968; Driver and Oldham, 1986; Freyberg and Osborne, 1981; Gilbert and Watts, 1983; Hasweh, 1986; Novak and Gowin, 1984, Wals, 1987) Yet, unlike the English teacher who is very capable of determining at what "level" her students are, environmental educators have little understanding of students' perceptions of the environment and environmental issues, and the "mini-theories" to which they lead.

The need for contextual development of EE

While working on environmental education projects in the Detroit metropolitan area[2] it became clear to me that our -- that of the university facilitators -- understanding of education in general and environmental education in particular, was very different from that of the people with whom we worked. It was striking to discover that we knew very little about the way the students from the city of Detroit experience their world and perceive the role of

education in a so-called "inner-city" environment.[3] Paulo Freire once suggested that it is not our role to speak to people about our own view of the world or to attempt to impose that view on them, but rather to dialogue with the people about their view and ours. Their view of the world, manifested in their actions, reflects their situation in the world. "Educational and political action which is not critically aware of this situation runs the risk either of banking or of preaching in the desert." (Freire, 1986; 85).

If we do not adapt schooling to the context in which it takes place, students in the inner-city will not get the chance to transform their lives through their education. On the contrary avoiding to do so will reinforce the status quo of their situation. If environmental education is not only education *about* and *in* the environment, but also -- and perhaps foremost -- education *for* the environment, then it is inevitably education for change. Education for social and environmental change requires an understanding of the way people "define" their own situation. Hence, it is important to become critically aware of the way people perceive their world. Ideally, through their education, students learn to interpret their situation as requiring intervention, especially their own intervention. If it is important to build upon students' preconceived notions, "naive" ideas and their experiences with the environment, then it is crucial to find out what these notions, ideas and experiences are.

Environmental education for the disadvantaged

An important reason for putting children from some of the poorest neighbourhoods in the city of Detroit on the centre stage of this study flows out of research that supports the claim that many African-Americans and working-class people live in areas that are more directly exposed to environmental threats (McCaul, 1976; West, 1989; Russel, 1989; Bullard, 1983; Bryant and Mohai, 1992). I contend that those who are most directly exposed to environmental threats -- whether it is because of race, class or both -- are also the ones who receive very little environmental education or education for change. If this is true, then environmental education constitutes an elitist form of education that serves those who have the luxury (money, time, community support, and resources) to spend time to resolve environmental issues.

If the change component of environmental education is ignored, for whatever reason, then environmental education projects inevitably fall short in helping students understand the roots of inequality and environmental deterioration. In order to move beyond the symptoms of environmental problems, we need to get better insight in how students, particularly those who live in depressed areas, perceive their environment.

Questions driving the study

Bearing in mind the context of the EE projects I participated in, the following questions made up the guiding framework of the research: What do students from urban middle schools see as "environmental problems"? What kind of

relationship do they see between themselves and these problems? How do the different physical and social environments of middle school students, influence the perceptions of their environment? How can environmental education projects better build upon students' perceptions and be true to the contextual differences that can be found within the different school communities?

Research as a subjective enterprise

Human ideas, experiences, and intentions are not objective things like molecules and atoms. Nevertheless many educational researchers attempt to use "objective" methods that allow for the control, predictability and "generalisability" needed to uncover the "laws" or "patterns" that guide human behavior and the "systems" in which that behavior occurs. The scientific method constructed to do this, has long been claimed to be a value free tool of inquiry that can be used to objectively study an objectifiable world.

An alternative way to approach social scientific research is to regard all knowledge to be subjective. Subjective not as the opposite of objective but, rather in the sense that knowledge finds its origin in a "subject" that is at the core of a world which is [partly] shared with other "subjects". (Margadant-van Arcken, 1989). Human science can not exclude the knowledge of the inquirer from an understanding of how knowledge is generated. Researchers have a consciousness, world view and language as well that are a product of the history of ideas, social and cultural development and their individual encounters with the world. Much like reading a good novel, what we bring to the text [research] is as important as the text [research] itself (Smith, 1985). Many so-called qualitative research traditions acknowledge this by maintaining that the immediate subjective experience is the basis of knowledge.

Hence, a challenge in human research is to minimise the constraints of preconceptions by recognizing and making explicit one's own preconceptions, biases and prejudices in relation to the subject and the participants. It is not until then when another's experience can be communicated in a relatively undistorted fashion. From this vantage point there is a conscious effort on the part of the researcher to come to share participants' perspectives without using a theoretical model to judge these perspectives (Roche, 1973; Spiegelberg, 1972, 1975; Van Manen, 1975; Beekman, 1984). I therefore neither tested hypotheses nor used observation matrices. This does not mean that "theory" did not play a role; existing theories re-emerged after the data had been collected.

Phenomenology and action research

The research approach used here fits best in the traditions of action research and phenomenology which require the researcher to take the role of observer, interpreter and participant. In researching education within these traditions, one continuously tries to make sense of an ongoing process that may go in many directions--making initial observations, developing tentative general

conclusions that suggest particular types of further observations, making those observations and thereby revising one's conclusions, and so forth. This "research spiral" is very similar to the spiral of action and reflection the learner ideally follows in an action research project (Lewin, 1946; Kemmis, 1980; Carr and Kemmis, 1986; Wals et al., 1990).

I not only engaged in participant observation, but I also interviewed students and kept a research journal. The majority of the research findings reported here resulted from thirty in-depth interviews with students from the four schools. The interview transcripts, classroom observations and journal entries were analyzed and compared with the intention to discover some structure and coherency in the reflections. After several rounds of interpreting, a deep-structure of common themes emerged. The writing process itself became the making sense of data. Throughout the writing process the interpretations were subject to constant modification as a result of confrontations with the rough data themselves and feedback from a panel of reviewers.

Non-random sampling and generalisability
Within this type of investigation it is more important to have good informants who are capable of providing insightful information than to have a statistically representative group of people obtained through random sampling. Nevertheless, it is important to have some strategy in mind when selecting students in order to get the most out of relatively short interviews. The strategy used was based upon Glaser and Strauss' "theoretical sampling design" which is a compromise between pragmatic sampling and probability sampling (Glaser and Strauss, 1967). This is an open sampling design in that you only stop interviewing informants when you feel you have reached the "theoretical saturation point." This is the point where patterns seem to repeat themselves and the interviews don't seem to reveal anything new anymore (Agar, 1980).

The findings that emerge from this study are only transferable to other settings when the act of generalising is viewed as a process of dialectic interacting between the reader and the author. This process requires the reader to relate the findings of a study to his or her own experiences. At the same time it requires the author to present the findings as subject to interpretation, adaptation and rejection. This approach differs from the "what research says" approach which tends to be more prescriptive. What one learns about one student's or a small group of students' thinking about environmental issues, for instance, can raise one's consciousness of features that *might* be found among other students. This study does not pretend that other students will share identical or even similar features but rather that these are features one might look for among other students. Philosophically speaking, one cannot generalise from one situation to another when the situations are identical, only when they are different (Eisner, 1991).

The research setting and participants
The schools and their communities

Thirty students, age 12-13, from four middle schools located in the Detroit metropolitan area were the central focus of the study. Because of the importance of context in qualitative studies, much space in the actual research report is devoted to describing the different schools and students (Wals, 1991). At the risk of doing some injustice to the schools and the students, I will provide a brief description of the schools, the students and their communities.

The four schools represent a range of different student populations, communities and physical locations. Socio-economically, the continuum stretches from the upper-class families who send their children to a private school, via the middle- and working-class families at the other suburban school to the working-class and the "out-of-work" class families in the two Detroit schools. One of the Detroit schools is located in one of the poorest neighbourhoods of the city. Racially the continuum shifts from the virtually all white schools in the two suburbs to the virtually all African-American schools in Detroit.

Physically the school buildings and their locations differ as well. On the one extreme there is the private school which is located in a park-like setting on the banks of the Rouge River, and on the other extreme there is one of the Detroit schools which can be regarded as bunker in an urban war zone. The organisational structures and the curriculum of the schools appear to be the same, but the problems that permeate the neighbourhoods in the Detroit schools force these schools to focus on safety issues, and to teach a double curriculum which in essence includes performing many tasks which ordinarily are considered to be the tasks of parents and/or guardians. Additionally, budget constraints, lack of equipment a perceived need to teach students the basic subjects, before they drop out of school, make for a far more limited curriculum in the Detroit schools.

The students

When looking at the Detroit students' descriptions of their world, we see a dynamic world full of contrasts and extremes. On the one hand many of the students find themselves fortunate; they live on a relatively nice block, have some parental guidance, are not involved in drugs and are still in school. On the other hand they find themselves in a community that is almost saturated with often drug-related problems such as street violence, teen pregnancy and, what they regard as, a failing justice system. To cope with the violence in their community they have developed a variety of survival strategies: they know what to do when they hear gun shots, are able to suppress their emotions and to ignore parts of their reality, know how not to draw attention to themselves when alone in public, know what places to avoid, spend a lot of time indoors -- often using the outdoors exclusively to get from one place to another -- and

they have developed their own dreams and fantasies which provide a mental shelter (Wals, 1991).

School is important to many of the city students interviewed, but not for school learning which appears to be mostly irrelevant. Instead, school performs many other functions for them; it brings some stability to their lives, it provides a shelter in a troubled neighbourhood, it is a place where groups of students can socialise -- something which they can hardly do outside -- and, finally, it provides the education needed, if not to fulfill their dreams, then at least to keep them out of the cycle of drugs, gangs and violence. So, even though many students criticise some of the content of the subjects they are taught and the way some teachers teach, they still value school. They are definitely at an advantage compared to their peers who already have left school.

The students from the north suburban schools have different concerns and a physical environment that is more inviting than that of the Detroit students. Unlike the Detroit students in this study, many of the suburban students have not been deprived of a basic right of childhood --the right to experience and explore the world around them safely, spontaneously, and on their own terms (Berg and Medrich, 1980). Their lives are not influenced existentially by neighbourhood crime, violence and drugs, although these problems can be found in their communities as well.

Physically, the surroundings of the suburban students are different from those of the Detroit students, but more noticeable than the physical differences -- although less bright and green, the Detroit students also have parks, back yards and play grounds in their neighborhood -- are the social differences that determine the degree to which the physical surroundings are used and the extent to which they form an integral part of the community and the lives of the children. For various reasons, many of the suburban students have been able to leave their own neighbourhoods to visit other places either with school, friends or family, while many of the Detroit students have hardly ever left the city.

In summary, we have a mosaic of different contexts with overlapping elements which makes it difficult, if not impossible, to pinpoint any causal relationship between any one variable and possible differences and similarities among the students. In keeping with the research approach described earlier, it is assumed that the context as a whole influences the way students interpret and make sense of their experiences and not any one element or variable in isolation.

Perceptions of environmental issues

The analysis of the qualitative data revealed that all students in the study, regardless of the very different context they come from, are concerned about "classic" environmental issues, but think about these issues differently. Three distinct ways of thinking about pollution and environmental problems emerged.

I. The personalistic view

Pollution can be touched, smelled, tasted and seen. Once it can no longer be sensed, pollution is no longer a threat to our health. People contribute to pollution directly when they litter, put garbage in the garbage can without closing the lid properly, when they do not keep up their lawn -- even when they cough without putting their hand in front of their mouth. Pollution is mostly a local problem and does not have the ability to spread out to far away places. Out-of-sight is out-of-mind, in the eyes of these students. The effects of pollution are immediate upon impact and are mostly a concern for humans and not for other animals or plants.

Environmental problems are mostly physical problems that are a direct result of our own individual polluting behavior which is subject to our own individual control. Environmental problems are not viewed as problems of human nature or as cultural problems. Solutions to pollution are found in changing our own "polluting behavior" (e.g. stop littering) and helping "clean up" polluted areas (e.g. pick up litter).

II. The technocratic view

Pollution cannot always be detected by our senses for it can be present without being noticed. Pollution can spread to far-away places via water and air, and poses a threat to humans and other species on a global scale. Pollution accumulates over time and does not disappear when it is out of sight. There are many indirect ways, e.g. using electricity, in which people contribute to pollution. Pollution is an inevitable result of the way we live. Students are able to talk about specific global environmental problems such as acid rain, ozone depletion, and global warming, but have only a fragmented understanding of these issues which makes it difficult for them to distinguish one from another. While talking about these global issues, students use words such as habitat, ecosystem, carbon-dioxide, "fluoro-carbons," and biodegradation, without comprehending their meaning. Students seem to think that environmental issues have the potential to destroy all life on earth. Industry symbolises an inevitable evil: the price we pay for our modern lifestyles. By developing new technologies that filter pollution from water and air, it may be possible to have both industry and a clean environment. Students do not challenge the presence of industry or our lifestyles, and emphasise cooperation between people along with technological solutions as the proper responses to addressing environmental problems. Environmental problems are not seen as problems of human nature or as cultural problems. Nevertheless, there appears to be a broader notion of pollution and the students' expressions of their concerns is more coherent or less disparate.

III. The politicised view

Pollution manifests itself in many visible and non-visible forms and does so on

a global scale. Students see environmental issues as global issues and link pollution problems to rapid population growth. When discussing global environmental problems, students display a coherent understanding of problems such as acid rain, ozone depletion and global warming, and are able to distinguish them from each other. Students are able to see current pollution problems in a historical context as products of the evolution of rural and tribal forms of living toward the modern society we live in today. It is suggested that earlier societies did not have pollution problems. Pollution is seen as the result of our modern industrial society that people themselves have shaped by their decisions, actions and values.

Students see environmental problems not as natural occurring phenomena without any possible form of ethical control, nor as mainly technological problems, but instead as politicised problems: problems of conflicting interests, choices and values. They suggest that in addition to exploring new technologies, we change our lifestyles to accommodate reducing, re-using and recycling. They hint at the idea of "limits to growth" when suggesting that we should show constraint in taking advantage of the perks of a modern society. Students also suggest that the interests of industrialists contradict environmental interests. Environmental issues become political issues. People can send a message to industry by boycotting polluting products. Not surprisingly, none of the students consider the unequal distribution of wealth and natural resources as possible contributors to global environmental problems.

These three perspectives of pollution and environmental issues (Table I) can be found in all four schools with the technocratic view point being the most frequent one, followed in descending order by the personalistic view and the politicised view. Some students adhere to different perspectives depending on the topic of discussion. There is a hierarchy in the three perspectives. As one moves from the personalistic perspective to the politicised perspective, students' level of knowledge and understanding becomes more sophisticated; the pieces of information are less disparate and their thinking becomes more holistic; they become better able to see local issues as the local manifestations of global problems, and finally, they develop a greater propensity to view environmental problems as problems that lie within ourselves.

Again, all three perspectives can be found in all four schools, but the personalistic perspective is more prevalent in the two Detroit schools while the politicised perspective is more prevalent in the two north suburban schools. The technocratic perspective is dominant in all schools. These findings conflict with those of other studies which suggest that there is one coherent view that develops with a certain age or grade level (Rejeski, 1982; Brody, 1991).

Concluding remarks
* It should be expected that within the same classroom, different conceptions of pollution and environmental issues can be found. When teachers engage in

a process of questioning and probing dialogue with the students, perceptions of environmental issues can be elicited. The dissonance that may result from the different ways of looking at environmental issues may lead to better understanding. The role of conflict and confrontation between different ways of looking at the world in ascribing new meaning or re-interpreting to existing concepts or ideas should be explored further.

* All students in this study in one way or another are concerned about pollution, regardless of the context in which they grow up. This is particularly noteworthy when looking at the Detroit students and the challenging circumstances they find themselves in. In addition to their concern with monumental social problems in their community, they are also concerned about classic environmental problems such as acid rain, the atmospheric greenhouse effect and destruction of the rain forests. There is definitely an interest among students in learning more about these issues.

* Many students appear to have so called "misconceptions" about certain environmental issues. Some of these alternative conceptions emerge from their interpretation of cause and effect relationships (e.g. acid rain damages your car), some stem from their evaluation of the seriousness of certain forms of pollution (e.g. the exaggeration of the effect of visible organic and the underestimation of non-visible pollution), and some emerge from the relationship they see between environmental issues (e.g. equating the hole in the ozone layer with the atmospheric greenhouse effect). These are only a few of the so-called misconceptions that emerged from the interviews. We have to be careful with judging these misconceptions. In fact, the word misconception may be inappropriate given that it refers to an alternative interpretation of a phenomenon that is valid in light of the students' own experiences. It is hard to deny, for instance, that acid rain damages your car or your hair. It appears that any environmental education program that wishes to address an environmental issue should explore any potential "misconceptions" or "mini-theories" students might have regarding these issues. There is a wide body of research that shows that many people, even in light of contradictory information, tend to hold on to conceptions that flow out of their own experiences (Snyder and Swann, 1978; Lord et al. 1979; Hasweh, 1986). Conceptual change can occur in a non-threatening, non-condescending and non-judgmental learning environment that will allow students to arrive at a new position through exploration and investigation, in cooperation with their peers.

* How can we teach about environmental issues without overloading students with complexity and the feeling of being overwhelmed that surrounds pollution and environmental issues? The argument that young adolescents should not be burdened with adults' problems can be rejected. This study clearly shows that young adults *are* already burdened with these problems. Not providing them

Table I Young Adolescents' (12-13) Perceptions of Pollution and Environmental Issues (source: Wals, 1991)

	LEVEL I: Personalistic View	LEVEL II: Technocratic View	LEVEL III: Politicized View
Qualities Attributed to Pollution	Pollution has apparent physical qualities: it can be seen, smelled, touched and tasted. If it cannot be sensed in any way then pollution is not present and therefore not a problem. Students only identify point-source pollution. Environmental problems are physical problems.	Pollution can also be present and pose a health threat when it cannot be sensed. Pollution can move around through rivers, water and soil, and can accumulate. Students only refer to point-source pollution, including cars. Environmental problems are technical problems.	Pollution manifests itself in many visible and non-visible forms on a global scale. Pollution is seen as a cancer that keeps growing out of control. Students recognize both point and non-point pollution. Environmental problems are problems of human nature and the choices people make.
Perceived Causes	People create waste as a by-product of their existence, but they have no place to put it so they just dump it in a river or throw it on the ground. Some examples: not closing the lid on the garbage can, coughing without covering your mouth, using a barbecue and not keeping up the lawn.	Pollution is the result of people's individual "polluting" behavior (driving a car, generating garbage and littering) and the by product of industrial processes (air and water pollution). Students display knowledge of indirect causes of pollution: e.g. using electricity.	A combination of rapid population growth and the price we pay for the transition from a rural/tribal society to a modern industrialized society. In essence pollution is the result of our own decisions, values and actions. A conflict of interest between economy and a clean environment.
Perceived Effects	People and, to a lesser degree, animals will get sick when they have direct contact with pollutants: e.g. breathing in thick smoke and drinking "dirty" water. Effects are acute and immediate. Polluted areas can be unsafe areas to visit; the people who hang out there can be dangerous. Students have little or know under-standing of concepts such as; "bio-degradable," and "global environmental issues."	Eventually we will have no place to put our garbage. Chemicals can kill people, animals and trees. Smoke and chemicals in the air can lead to a hole in the ozone layer, the greenhouse effect and acid rain. No clear understanding of how these issues related or what they mean other than that they are all bad. Students have heard of concepts like "habitat," "ecosystem," and "bio-degradable," but don't really know what they mean.	No more landfill space to put our garbage which will lead to more incineration which pollutes the air. Global environmental problems such as; acid rain, atmospheric greenhouse effects, rainforest destruction, and the hole in the Ozone layer. Students display a coherent understanding of these issues and are able to distinguish them. Effects can also be chronic. Students have some understanding of complex concepts such as "ecosystem" and biodegradable."
Perceived Solutions	Pollution can be avoided since it is a physical problem over which we have control: stop throwing things on the ground, help "clean up," keep your own yard clean, close the garbage can, burry waste in a landfill and cover it to avoid the smell and the rats. Use smokestacks to get smoke out of the factories, away from people.	Pollution is inevitable, but can be limited by being less wasteful, recycling more, planting lots of trees to counter air pollution, and using technology, e.g. filters to clean water and air, incineration to burn waste. People need to cooperate in countering pollution.	Pollution is inevitable but can be curbed by taking technological measures, such as using alternative energy and fuel efficient cars, using legislation to curb industrial pollution, changing personal behavior, e.g. recycling and boycotting certain products, and, finally, changing our lifestyle, e.g. using public transportation.

with an opportunity to deal with their concerns seems unfair. There are ways to keep students from getting bogged down or disillusioned by these issues. Schools could focus on manageable local issues of the students' interest. In finding a local solution a class could spiral outwards to other parts of the world where similar issues have been dealt with. Students should be given opportunities to create solutions by themselves in cooperation with community resources. Finally, the role of success stories in countering feelings of hopelessness and helplessness should be considered as well.

Notes

1 The word "lifeworld" is derived from the German "Lebenswelt" and is used to describe our own individual and socially constructed reality: our orientation towards the world which helps us determine how we define our situation, the way we look at things, what we believe to be true, valuable and real. In short: the kind of world we create for ourselves.

2 I) The Action Research and Community Problem Solving (AR&CPS) project developed by the University of Michigan's School of Natural Resources after an educational exchange with Deakin University (Australia). For a discussion see Wals et al., 1990.

II) The Rouge River Interactive Water Quality Monitoring Program for Schools. In this project, schools located in the same watershed monitor the quality of their river from upstream to downstream in a coordinated, joint program which in interdisciplinary fashion addresses the physical, biochemical, social and political aspects of water quality (Mitchell and Stapp, 1991). The Rouge River project is linked to its spin-off projects and other water monitoring programs from around the world through the Global Rivers Environmental Education Network (GREEN).

3 The terms innercity and suburbs are used somewhat simplistically for convenience bearing in mind the following. The associations I had of *innercity*, at least prior to working there, were: "black," "poor," "working class," "poor education," "garbage filled open spaces," "closed stores," "unsafe," "high crime," "grey," "dirty alleys," "no trees," etc., whereas the associations I had with *suburb* were almost the opposite; "white," "middle class," "better education," "clean parks," "active shopping malls," "safe," "low crime," "broad lawns," etc. Stereotypes like these color our perceptions, easily distorting reality since in either environment associations of both kind can be found. The research aim of this study was not to establish a causal relationship between "innercity" or "suburb" and young adolescents' perceptions of nature or of environmental issues, however tempting that may be.

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