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An Annotated Bibliography of Research Relevant to Environmental Education

1998-2013

The Humane Society Institute for Science and Policy

Compiled by Erich Yahner

(All Abstracts and Summaries from Authors or Publishers)

JOURNAL ARTICLES

Awasthy, M., Popovic, A. Z., & Linklater, W. L. (2012). Experience in local urban wildlife research enhances a conservation education programme with school children. *Pacific Conservation Biology*, 18(1), 41-46.

The "extinction of [ecological] experience" is a concern for children in urban centres. Urban environments, traditionally the refuge of exotic human-commensal species, are being increasingly colonised by native species. We used a native bird as a focal species for integrating urban biological research and environmental education (EE) in conservation. We tested whether incorporating biological researchers into classroom teaching and hands-on experiences with radio-telemetry of wild birds increased wildlife knowledge, environmental awareness and intentions to act amongst children from local schools. We found no significant increases in knowledge after our EE programme. However, those children who participated in exercises with researchers in local green space demonstrated a greater level of nature awareness than groups who participated in the schoolyard, and retained this level three months after the programme completion. We illustrate the importance of incorporating biological research in conservation education in urban centres.

Ballantyne, R., & Packer, J. (2005). Promoting environmentally sustainable attitudes and behaviour through free-choice learning experiences: what is the state of the game? *Environmental Education Research*, 11(3), 281-295.

Environmental education, both in and outside of the classroom, aims to facilitate adoption of sustainable practice by both school students and the general public. This paper explores the role of free-choice learning experiences in this regard. An overview of theoretical approaches underpinning free-choice learning research is provided, examples are presented of the ways in which informal educational settings can promote environmentally sustainable attitudes and behaviour, and the factors contributing to the effectiveness of these endeavours are discussed. By reviewing research evidence in relation to these issues, the paper identifies the current 'state of the game' and areas where new research is needed.

Ballantyne, R., Packer, J., Hughes, K., & Dierking, L. (2007). Conservation learning in wildlife tourism settings: Lessons from research in zoos and aquariums. *Environmental Education Research*, 13(3), 367-383.

Zoos and aquariums have shifted their focus over recent years, taking a much more active role in wildlife conservation and in promoting conservation learning among their visitors. Research in these settings provides a valuable foundation for the emerging field of non-captive wildlife tourism. In particular, valuable lessons regarding the potential impact of wildlife encounters on visitors' conservation attitudes and behaviour can be drawn from research in zoos and aquariums. This paper explores those aspects of wildlife encounters that appear to contribute most to conservation learning. These include observing animals in their 'natural' environment; opportunities for close encounters with wildlife; opportunities to observe animal behaviour; engaging visitors emotionally; connecting with visitors' prior knowledge and experiences; using persuasive communication; linking conservation goals and everyday actions; and providing incentives and

activities to support visitors' behaviour change. The extent to which wildlife tourists may be receptive to conservation messages is also considered, in light of research in zoos and aquariums. The implications of these findings for conservation learning in the context of non-captive wildlife tourism are discussed and suggestions for future research in this area are made. Several methodological challenges facing the field are also discussed.

Ballard, H. L., Evans, E., Sturtevant, V. E., & Jakes, P. (2012). The evolution of Smokey Bear: Environmental education about wildfire for youth. *Journal of Environmental Education*, 43(4), 227-240.

Many environmental education programs in the United States educate youth about the prevention of wildfire and its role in ecosystems. We reviewed 50 wildfire education programs for youth (WEY) in the U.S. through an Internet search and interviews with program providers. We investigated whether they reflect current wildfire science, environmental education (EE) instructional strategies, and place-based education (PBE) approaches. We found that while one-third of the programs focus exclusively on wildfire prevention, suppression, and safety topics, one-third focuses on fire ecology, management, and science, and one-third includes all these topics, mirroring evolving scientific approaches to wildfire. Also, while state and federal agencies design and disseminate much of the curricula used, 60% of WEY programs incorporate local social and ecological contexts, revealing the close relationship between WEY and PBE.

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27(1), 14-25.

The goal of the present paper is a replication as well as an extension of the Hines et al. [(1986/87). Analysis and synthesis of research on responsible environmental behaviour: A meta-analysis. *Journal of Environmental Education*, 18, 1–8] meta-analysis on psycho-social determinants of pro-environmental behaviour. Based on information from a total of 57 samples the present meta-analysis finds mean correlations between psycho-social variables and pro-environmental behaviour similar to those reported by Hines et al. In a second step, the matrix of pooled correlations is used for a structural equation modelling (SEM) test of theoretically postulated structural relations between eight determinants of pro-environmental behaviour (so-called Meta-analytic SEM (MASEM)). MASEM results confirm that pro-environmental behavioural intention mediate the impact of all other psycho-social variables on pro-environmental behaviour (27% explained variance). Results also confirm that besides attitude and behavioural control personal moral norm is a third predictor of pro-environmental behavioural intention (52% explained variance). The MASEM also indicates that problem awareness is an important but indirect determinant of pro-environmental intention. Its impact seems to be mediated by moral and social norms, guilt and attribution processes.

Bradley, J., Waliczek, T. M., & Zajicek, J. M. (1999). Relationship between environmental knowledge and environmental attitude of high school students. *Journal of Environmental Education*, 30(3), 17.

High school students' environmental knowledge and attitudes were assessed from a questionnaire administered before and after exposure to a 10-day environmental science course. Results indicated significant differences in both knowledge gain and attitudes of students after exposure, and that students' environmental knowledge scores increased by 22% after completing the environmental science course. In addition, students' environmental attitudes became more environmentally favorable. A statistically significant correlation was found between pretest knowledge scores and pretest attitude scores and between posttest knowledge scores and posttest attitude scores. In both cases, students having higher knowledge scores had more favorable environmental attitudes compared with students with lower knowledge scores.

Carleton-Hug, A., & Hug, J. W. (2010). Challenges and opportunities for evaluating environmental education programs. *Evaluation and Program Planning*, 33(2), 159-164.

Environmental education organizations can do more to either institute evaluation or improve the quality of their evaluation. In an effort to help evaluators bridge the gap between the potential for high quality evaluation systems to improve environmental education, and the low level of evaluation in actual practice, we reviewed recent environmental education literature to reveal the challenges and opportunities for evaluating environmental education programs. The literature review identified strategies for confronting the challenges in environmental education evaluation, as well as notable opportunities for increasing the quality of evaluation in environmental education.

Castellano, M., Luca, A., & Sorrentino, M. (2011). The interface of environmental and humane education as an emerging and relevant dialogue: A point of view from Brazil. *Canadian Journal of Environmental Education*, 16. 93-105.

This article addresses the interface between environmental and humane education, as a theoretical and practical emerging field in Brazil. We begin by presenting conceptual similarities that, in our view, underpin and justify the need for a growing connection between the two fields of research and educational practice. We then describe an experience of an educational workshop conducted in Campinas-Sao Paulo that sought to bring the two fields closer, involving the screening and discussion of a Brazilian documentary about the meat industry. We consider the possibility that drawing environmental and humane education together may contribute to changes in favour of all forms of life.

Ceaser, D. (2012). Our school at Blair Grocery: A case study in promoting environmental action through critical environmental education. *Journal of Environmental Education*, 43(4), 209-226.

Despite wide agreement on the goals of environmental education (EE), the promotion of action is still considered contentious. Critical environmental education (critical EE) teaches students to combine critical reflection with the ability to engage in local action to address social/environmental problems. This article examines a critical urban farming school in New Orleans' Lower Ninth Ward for how student action is addressed. Results found that critical learning within an egalitarian, youth-centered community located in a disadvantaged area produces students who are more enlightened and empowered to create change. However, concerns regarding funding and safety led staff to not adhere to maintaining an egalitarian ethic, undermining the individualism and unpredictability that critical EE thrives upon and producing "disconnects" in students' education.

Disinger, J. F. (2001). K-12 Education and the environment: Perspectives, expectations, and practice. *Journal of Environmental Education*, 33(1), 4.

Summarizes perspectives on the appropriate interfaces between education and environment in the context of K-12 education in the U.S. Definitions of environmental education (EE); Societal concerns in the classroom; Challenges of achieving and maintaining objectivity on environmental topics in schools; Efforts made toward the promotion of EE.

Espinosa, S., & Jacobson, S. K. (2012). Human-wildlife conflict and environmental education: Evaluating a community program to protect the Andean Bear in Ecuador. *Journal of Environmental Education*, 43(1), 55-65.

Environmental education is a widespread, yet relatively unexamined strategy to reduce human-wildlife conflicts. We evaluated knowledge, attitudes and behavioral intentions toward bear conservation after five years of environmental education in a Quichua community. Conflicts with livestock predation created mixed attitudes and behaviors toward bear conservation. Some program objectives were achieved, such as 88% of

participants reported satisfaction with environmental knowledge gained. Behavioral intentions to decrease bear conflicts increased, and multiple regression analysis revealed support for the project was associated with program participation. Focus group meetings with teachers, local policy makers and para-biologists provided a context for recommendations to improve program success and revealed new issues for better bear management.

Goralnik, L., Millenbah, K. F., Nelson, M. P., & Thorp, L. (2012). An environmental pedagogy of care: Emotion, relationships, and experience in higher education ethics learning. *Journal of Experiential Education*, 35(3), 412-428.

Field philosophy is interdisciplinary experiential environmental humanities learning. It grows from a community-focused conception of environmental ethics and place-based environmental education, and it aims to help students develop an awareness of the role of environmental ethics in environmental issues, as well as cultivate an empathetic environmental ethic that might enable them to participate in environmental problem solving. The emotional, cognitive, and physical relationships with people, place, and ideas at the core of field philosophy necessitate a pedagogy that attends to affective learning objectives and relationship building. A shared focus connects literature in experiential education, educational psychology research on emotional engagement, and the ethic of care. A synthesis of this literature grounds an environmental pedagogy of care with meaningful potential for field philosophy.

Gralton, A., Sinclair, M., & Purnell, K. (2004). Changes in attitudes, beliefs and behaviour: A critical review of research into the impacts of environmental education initiatives. *Australian Journal of Environmental Education*, 20(2), 41.

This paper reviews research literature on the impact of environmental education initiatives on learners' attitudes, beliefs and behaviours. The review focuses on initiatives involving learners of all ages and school-aged learners in particular. The review shows two things. There is some evidence that environmental education initiatives are associated with changed beliefs and attitudes, and this is mainly in the short-term. There is little evidence that environmental education initiatives lead to behavioural change, especially in the longer-term. The review concludes that there is a need for more and better research evidence that behavioural change in learners follows from involvement in environmental education.

Knapp, D. (1998). Environmental education and environmental interpretation: The relationships. *Essential Readings in Environmental Education*, 293-300.

In 1957 Freeman Tilden wrote a seminal publication entitled *Interpreting Our Heritage*. Thirteen years later the country celebrated its first Earth Day to mark the importance of our planet and the fragility of its biosphere. These events marked the contemporary arrival of environmental interpretation and environmental education respectively. For the past twenty years both of these fields have, for better or worse, been looked upon as similar in outcomes and structure. Certainly, many have used these terms interchangeably. Despite a similar mission of creating an environmental ethic, both of these specialties have their own unique characteristics. This reading will attempt to highlight variables that set environmental interpretation apart from environmental education. Strategies to create successful connections between the two fields will be reviewed along with ways to promote these relationships.

Kruse, C. K., & Card, J. A. (2004). Effects of a conservation education camp program on campers' self-reported knowledge, attitude, and behavior. *Journal of Environmental Education*, 35(4), 33-45.

In this study, the authors examined the effects of a conservation education camp program offered through one zoo education department. The conservation education program included 4 levels of camps with increasing levels of animal husbandry. Campers rated their conservation knowledge, attitude, and behavior prior to, immediately after, and 1 month after the camp experience. Results indicated that conservation knowledge scores increased over the study period, as did attitude and behavior, though

patterns of change were varied in each level of camp. Campers' self-reported knowledge, attitude, and behavior also increased with increased levels of animal husbandry. And, campers with previous conservation education camp experience had higher knowledge and attitude self-ratings than did those without experience. However, as knowledge, attitude, and behavior are complex characteristics and difficult to assess, more research is needed to verify the effectiveness of conservation education programs in effecting change.

McBeth, W., & Volk, T. L. (2010). The National Environmental Literacy Project: A Baseline Study of Middle Grade Students in the United States. *Journal of Environmental Education*, 41(1), 55-67.

The authors discuss environmental literacy in the United States and present a brief summary of the results of a major national study designed to attain a baseline measure of environmental literacy among middle school students in the United States. The authors include events that led up to the study and describe future directions for environmental literacy assessment.

Rickinson, M. (2001). Learners and learning in environmental education: A critical review of the evidence. *Environmental Education Research*, 7(3), 207-320.

Recent analyses of the field of environmental education research have highlighted its rapidly expanding size and increasingly diverse nature (e.g. Hart & Nolan, 1999). This article reports on a review of a particular part of this field - namely, recent empirical studies of learners and learning in primary or secondary school environmental education. The review focuses specifically on the nature and quality of the evidence generated by the work in this area. The concern with evidence is motivated by the tendency of previous reviews to focus on methodological trends more than research findings. Claims have also been made that environmental education theory and research have overlooked 'the children who are the subjects of environmental education' (Payne, 1998a, p. 20). This review contends that efforts to address such shortcomings need to be informed by a thorough and grounded understanding of what studies have, and have not, been undertaken on students and learning, and what is known, and not known, from the evidence that these studies have generated. In its methods, the review seeks to be systematic, comprehensive and analytical. Its findings are based on careful scrutiny of over 100 journal articles, books and reports, published between 1993 and 1999. It proposes that the current evidence base on learners and learning can be understood in terms of six concentrations or nodes of evidence. Three of these are well established (students' (i) environmental knowledge (ii) environmental attitudes and behaviours, and (iii) environmental learning outcomes), while three can be regarded as emerging (students' (i) perceptions of nature, (ii) experiences of learning, and (iii) influences on adults). The recent research evidence and key messages associated with each of these nodes are discussed in successive sections of the review. Overall, the review suggests that the evidence base on learners and learning, while considerable in size, is less diverse in terms of methodological and theoretical approaches than the wider environmental education research field within which it is situated. The evidence base also provides more information about students' environmental knowledge and attitudes than about their educational experiences and preferences, and more about learning outcomes than about learning processes. These characteristics, however, are not static. The research and evidence base on learners and learning is developing and changing as new foci emerge, bringing with them different methodological and conceptual approaches. The review identifies issues and challenges arising from the recent evidence on learners and learning for research users, researchers and future reviews of the field. As well as highlighting possible practical implications of the research, it makes a case for studies focused more explicitly on learning and the role learners play within this process. It also suggests a need for user reviews as well as academic reviews in the field of environmental education.

Schultz, P. W. (2000), Empathizing with nature: The effects of perspective taking on concern for environmental issues. *Journal of Social Issues*, 56: 391–406.

In this article, I propose that concern for environmental problems is fundamentally linked to the degree to which people view themselves as part of the natural environment. Two studies are reported that test aspects of this theory. The first study describes the structure of people's concern for environmental problems. Results from a confirmatory factor analysis showed a clear three-factor structure, which I labeled egoistic, altruistic, and biospheric. A second study examined the effects of a perspective-taking manipulation on egoistic, social-altruistic, and biospheric environmental concerns. Results showed that participants instructed to take the perspective of an animal being harmed by pollution scored significantly higher in biospheric environmental concerns than participants instructed to remain objective.

Schusler, T. M., & Krasny, M. E. (2010). Environmental action as context for youth development. *Journal of Environmental Education*, 41(4), 208-223.

This study explored the practices of teachers, nonformal science educators, community organizers, youth program managers, and other educators facilitating youth participation in local environmental action, as well as the experiences of some of the youth involved. We conducted narrative interviews with 33 educators facilitating youth environmental action in communities throughout the United States and group interviews with 46 youth participating in nine environmental action programs in New York State. Through interpretation of educators' stories and youths' reflections, we discovered strong parallels with theory and empirical research in the youth development literature suggesting environmental action is a valuable context for positive youth development.

Stern, M. J., Powell, R. B., & Ardoin, N. M. (2008). What difference does it make? Assessing outcomes from participation in a residential environmental education program. *Journal of Environmental Education*, 39(4), 31-43.

The authors explored the influences of 3- and 5-day residential environmental education programs at the Great Smoky Mountains Institute at Tremont (TN) on participants' connections with nature, environmental stewardship, interest in learning and discovery, and awareness of the Great Smoky Mountains National Park and biodiversity. The authors found significant positive, short-term effects on all outcomes of interest. Also, 3-month delayed posttests indicated retention of significant gains in environmental stewardship and awareness, whereas other gains faded. Longer stays and active engagement of visiting teachers in on-site instruction enhanced most outcomes. The authors discuss the influences of previsit preparation and group size on participants.

Vaughan, C., Gack, J., Solorazano, H., & Ray, R. (2003). The effect of environmental education on schoolchildren, their parents, and community members: A study of intergenerational and intercommunity learning. *Journal of Environmental Education*, 34(3), 12-21.

The authors examined the hypothesis that children learn and retain conservation principles in school environments and transfer them to their parents. Elementary school students in a Costa Rican village received a 1-month environmental education course on Scarlet Macaw conservation and natural history. Students, their parents, and an adult control group were given a 21-question pretest and the same test upon conclusion of the course (first posttest) and 8-months later (second posttest). Comparing correct responses between the pretest and first posttest, students improved significantly on 71% of questions, parents improved on 38% of the questions, and the adult control group improved on none of the questions. Comparing correct responses between the pretest and second posttest, students improved significantly on 67%, parents on 52% and the control group on 29%. The authors theorize that parents learned from children and both groups transmitted course information to neighbors (control group) resulting in an increase in control group learning.

BOOKS

Blewitt, J. (2013). *The media, animal conservation and environmental education*. New York: Routledge. ISBN: 9780415522083.

The Media, Animal Conservation and Environmental Education has contributions from filmmakers, photographers, researchers and academics from across the globe. It explores the various ways in which film, television and video are, and can be, used by conservationists and educators to encourage both a greater awareness of environmental and conservation issues, and practical action designed to help endangered species.

Gray-Donald, J., & Selby, D. (2008). *Green frontiers: Environmental educators dancing away from mechanism*. Rotterdam: Sense Publishers. ISBN: 9789087904630.

Environmental education has reached an interesting crossroads. There has never before been such media attention on hard-to-grasp issues such as climate change, nor has there ever been such scientific understanding and agreement about the varied aspects of the environmental crisis, the loss of biodiversity, and the health effects of human-made toxins and pollutants. In addition, there has never been so much high quality research within environmental education, with new journals flourishing in Canada, Australia, and South Africa to give just a few examples. Yet, despite all this knowledge and attention, there has not been a significant shift in the way the economy operates, the way governments govern or the way people live. Consumption of resources continues to increase and these patterns continue to be closely correlated with levels of waste, pollution, environmental ill health, and social injustice. This book showcases the work and thinking of environmental educators who are concerned about the residual mechanism within their field, the guiding symbol of the web of life in all its dynamism notwithstanding. The notion of web recognizes interaction between all elements in a system but falls short of recognizing the flow of the whole through the system and its parts. The notion of dance is used here to convey this fundamental, yet oft overlooked, dimension to wholeness.

Kopnina, H. (2012). *Anthropology of environmental education*. Hauppauge, NY: Nova Science Publisher's, Inc. ISBN: 9781614700333.

This book aims to substantiate the growing body of research of sociocultural contexts in which environmental education, formal or informal, take place. Innovation in environmental education that takes local contexts into account is necessary, in terms of both recognizing global and historical forces that lead to environmental degradation and social and technological changes that could potentially provide solutions to environmental problems. Today, we face some of the greatest environmental challenges in global history, including climate change, deforestation, desertification and the rapid extinction of species of plants and animals. As with many social concerns and issues, the education system is widely seen as the appropriate vehicle for wide scale social reform. Environmental education is becoming increasingly important due to a number of changes in society.

Martin, R. E., Sexton, C. M., & Gerlovich, J. A. (2001). *Teaching science for all children*. Boston: Allyn and Bacon. ISBN: 9780205325337.

The Third Edition continues its emphasis on best practices, constructivism, and learning science through inquiry. *The authors have taken their popular *4E Learning Cycle teaching method from Part III in the second edition and applied it throughout this edition. The chapters are now organized around these four key areas of the learning cycle: Exploration, Explanation, Expansion, and Evaluation. Continuing to integrate the National Science Education Standards throughout, the authors provide ways for future teachers to foster an awareness among their students of the nature of science; implement skills in the classroom using science inquiry processes; and develop in their students an understanding of the interactions among science, technology, and society.

Neal, P., & Palmer, J. (2003). *The handbook of environmental education*. Routledge. ISBN: 97804150931490.

Orr, D. W. (2004). *Earth in mind: On education, environment, and the human prospect*. Island Press. ISBN: 9781559634953.

In *Earth in Mind*, noted environmental educator David W. Orr focuses not on problems in education, but on the problem of education. Much of what has gone wrong with the world, he argues, is the result of inadequate and misdirected education that: alienates us from life in the name of human domination; causes students to worry about how to make a living before they know who they are; overemphasizes success and careers; separates feeling from intellect and the practical from the theoretical; deadens the sense of wonder for the created world. The crisis we face, Orr explains, is one of mind, perception, and values. It is, first and foremost, an educational challenge. The author begins by establishing the grounds for a debate about education and knowledge. He describes the problems of education from an ecological perspective, and challenges the "terrible simplifiers" who wish to substitute numbers for values. He follows with a presentation of principles for re-creating education in the broadest way possible, discussing topics such as biophilia, the disciplinary structure of knowledge, the architecture of educational buildings, and the idea of ecological intelligence. Orr concludes by presenting concrete proposals for reorganizing the curriculum to draw out our affinity for life.

Palmer, J. (2002). *Environmental education in the 21st century: Theory, practice, progress and promise*. Routledge. ISBN: 9780415131971.

Environmental education is a field characterised by a paradox. Few would doubt the urgency and importance of learning to live in sustainable ways, but environmental education holds nowhere near the priority position in formal schooling around the world that this would suggest. This text sets out to find out why this is so. It is divided into six parts: Part 1 is a concise history of the development of environmental education from an international perspective; Part 2 is an overview of the 'global agenda', or subject knowledge of environmental education; Part 3 introduces perspectives on theory and research in environmental education; Part 4 moves on to practice, and presents an integrated model for planning environmental education programmes; Part 5 brings together invited contributors who talk about environmental education in their own countries - from 15 countries including China, South Africa, Sri Lanka and the USA; Part 6 returns to the core questions of how progress can be made, and how we can maximise the potential of environmental education for the twenty first century.

Selly, P. B. (2012). *Early childhood activities for a greener earth*. St. Paul, MN: Redleaf Press. ISBN: 9781605541198.

As many early childhood professionals make efforts to improve the environmental health and safety of their setting, they also want to educate children about the impact and value of these greener choices. *Early Childhood Activities for a Greener Earth* helps teachers connect environmental issues with their daily curriculum in a sensitive, developmentally appropriate manner. This resource includes background information on environmental topics—including waste reduction and recycling, improving air quality, weather and climate change, and energy and toxicity reduction—and one hundred lessons and activities that will excite children, engage families, and encourage communities to be green.