

Exploring the Professional Characteristics and Contexts of School-Based Environmental Education “Leaders”

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Our study explored the professional characteristics and contexts of school-based environmental education (EE) leaders within elementary and secondary schools. Using complementary mixed-methods (surveys and focus groups) we detail the characteristics of EE leaders in these schools. Our analyses revealed that these leaders were predominantly classroom or subject-based teachers and experienced practitioners. They demonstrated the ability to negotiate the constraints of schools and implement school-wide EE initiatives due to their personal commitment to student learning about and for the environment. With our findings and using distributed leadership principles, we provide recommendations to support and enhance EE leadership in schools.

Notre étude a porté sur les caractéristiques et contextes professionnels des leaders en éducation à l'environnement dans les écoles élémentaires et secondaires. Nous appuyant sur des méthodes mixtes et complémentaires (sondages et groupes de discussion), nous présentons de manière détaillée les caractéristiques des leaders en éducation à l'environnement dans ces écoles. Nos analyses ont révélé que ces leaders étaient surtout des enseignants titulaires ou spécialisés et des praticiens expérimentés. Forts de leur engagement personnel face à la conscientisation des étudiants à l'environnement, Ils faisaient preuve de la capacité de composer avec les contraintes des écoles et de mettre sur pied des initiatives portant sur l'éducation à l'environnement à l'échelle de l'école. Nous nous basons sur nos résultats ainsi que sur des principes de distribution du leadership pour offrir des recommandations visant l'appui et l'amélioration du leadership en éducation à l'environnement dans les écoles.

In many international reports--such as the *Belgrade Charter* (1976), *Tbilisi Declaration* (1977), *Agenda 21* (1992), and the *Bonn Declaration for education for sustainable development* (2009)—environmental education (EE) is recommended to deal with the growing concern of global environmental issues (UNESCO-UNEP, 1976; UNESCO, 1978, 2009). These reports have espoused the need to amend our relationship with our environment through *formal* EE in schools. The development of policy, resources and curricula for schools in many countries by governing bodies (e.g., California Environmental Protection Agency, North American Association for Environmental Education, Ontario Ministry of Education, Ministry of Education New Zealand) have been positively influenced by these charters and declarations. Overall, the importance and efficacy of school-based EE has become more prevalent in the literature (Cutter-Mackenzie, 2010; Ernst, 2007; Mei-Chun, Cowie, Barker, & Jones, 2010). Whereas recent reviews show that important work has occurred over the last decade in this area (Reid & Scott,

2006; Rickinson, 2006), more rigorous empirical research is required that is focused upon schools, the role K-12 educators can play in promoting environmental literacy and examines the dire warnings science has provided about our environmental health (Chawla, 1998; Rickinson, 2009). Certainly, public reports of the status of environmental literacy (Coyle, 2005; Volk & McBeth, 1997) have established that being environmentally literate is not commonplace in schools or society.

In a recent report, *Green at 15* (Organization for Economic Cooperation and Development [OECD], 2009) provided evidence from the 2006 Programme for International Student Assessment (PISA) that while there is no single way students learn about the environment, students identified schools as the *most common* foundation for such learning. Although some researchers (Barrett, 2007; Rickinson, 2009) have examined particular aspects of EE practiced in schools while others (Hart, 2007; Gruenewald & Manteaw 2007; Stevenson, 2007) have discussed the challenges of teaching environmental literacy in schools, there still is a need to research the detailed nature of school-based EE and, in particular, the qualities of the practitioners responsible for supporting and leading school-based EE initiatives.

Many pronouncements have provisions for EE to promote *environmental literacy* in schools. Most definitions of environmental literacy include dimensions concerning environmental knowledge, skills, dispositions, and action (Disinger & Roth, 2003; McBeth & Volk, 2010; Roth, 1992; Stables & Bishop 2001). The knowledge facet includes understanding local and global ecologies of place (e.g., waste and water flows and processing), interrelationships (e.g., ecology and human interactions), and sustainability principles underlying the environment. Examples of environmental skills and dispositions include systems and evidence-based thinking skills, along with creative and empathic dispositions. Action for the environment includes learning through and from activities that address environmental issues of concern. This operational definition of environmental literacy is the framework we used to orient our research about the professional characteristics of EE leaders in schools. The broad aim of our study was explore the characteristics and contexts of school-based environmental education, which was investigated through a detailed analysis of school-based EE programs and resource characteristics, school governance, and teaching and learning characteristics within elementary and secondary schools found in one school district. This paper elucidates from our study an important yet overlooked topic regarding EE; specifically, the professional characteristics of EE leaders in these schools.

Conceptual Perspectives

Environmental education in schools and leadership

Formal EE necessarily involves administrators, teachers, and students in school contexts engaging with nature and environmental issues. In particular, we recognize school-wide EE as systemic, project-based initiatives that are inter- or multidisciplinary and that comprehensively foster environmental literacy, with students and practitioners participating in activities that permeate classrooms, hallways, school grounds, and local environs. These characteristics resonate with Ernst's (2009) conceptualization of environment-based education in schools.

In schools, EE is demanding work due to school aims, the curriculum, and pedagogical practices that often conflict with the dominant purposes, structures and practices of schooling (Stevenson, 2007). In reality, these challenges are most likely to be addressed by administrators,

teachers and students in the context of each school and its unique circumstances (May, 2000; Powers, 2004). Indeed, it is the pedagogical and organizational structures of schooling (e.g., curriculum, timetables, testing) that partially explain why EE has not flourished in schools regardless of its importance (Saylan & Blumstein, 2011). Finding volunteer school practitioners who are “working against the grain” and leading school-wide EE may not be uncommon, but formal recognition of EE leadership, given school contexts, is rare. While there have been some studies addressing the development of EE leaders (Fortino, 1997; Palmer, 1993), recent research regarding school-based EE leaders is sparse.

For all intents and purposes, school-wide EE is considered peripheral to educational programs found in schools (Saylan & Blumstein, 2011). In many cases, teachers, rather than formal school leaders like principals, have become the *de facto* leaders of school-based EE initiatives. Other traditional teacher leadership roles that relate to curriculum and pedagogical reform, such as department heads and parent-teacher liaisons, have been generally performed by teachers over and above their teaching responsibilities (Leander & Osborne, 2008). Thus, questions are raised about the characteristics of these teacher leaders and their ability to support school-wide EE. As recognized by Hart (2003) in his study of EE and teachers’ thinking and practice, and Stevenson’s (2007) commentary of EE and the regularities of schooling, many goals of EE present challenges for practitioners given the dominant structures and cultures of schools. For instance, Hart (2003) demonstrates that teachers felt isolated and discouraged even though there were tangible efforts to support EE in their schools. The role of an EE teacher-leader is often “caught in the middle” of school political hierarchies with competing educational and management aims (e.g., assessment practices, scheduling). Thus, the EE teacher-leader role is fraught with ambiguity and tension.

In recognition of the important role of teacher leadership and school effectiveness, leadership research is currently preoccupied with the idea of *distributed leadership*; that is, extending or sharing leadership practices in schools beyond the formal leader (Harris, 2008). Distributed leadership has caught the attention of researchers, policy makers, and practitioners (Harris, 2008; Leithwood, Mascall, & Strauss, 2009; Spillane, 2006). A distributed leadership perspective recognizes that there are multiple leaders and that leadership activities are widely shared within organizations (Harris & Spillane, 2008). This model of leadership bodes well to meet the organizational demands of school-wide EE. In this model, the idea of a “heroic leader” is replaced with one that is focused upon collaborative groups, and greater emphasis is on the activities and interactions of teachers, students, and support staff (Harris, 2009). For this study, the focus on distributed leadership (i.e., teacher leaders) highlights the importance of the professional characteristics of these EE “leaders,” and the school contexts that support them. A distributed leadership model provides a lens to examine our findings and provide suggestions along with future research opportunities that can support EE leadership development in schools.

Research Methods

Our research incorporated a mixed-methods research design (Teddlie & Tashakkori, 2009), using both qualitative and quantitative data to produce knowledge claims about the characteristics and contexts of EE leaders. Our study focused upon one school district which we defined as our case. A case study is an empirical investigation of a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context

are not clearly evident (Yin, 2009). Because case study research can be challenging, setting boundaries is an important part of data collection (Stake, 2000; Yin, 2009). The spatial delineation of our study within one school district (versus many disparate school districts) allowed for an informed characterization (Elger, 2009) of the schools affected by the contextual nuances of this school district.

A benefit to case study research is the ability to study a phenomenon using multiple data sources (Baxter & Jack, 2008; Creswell, 2012). Our study recognized all schools within the school district in the original sample (N = 98); however, only schools implementing EE (i.e., a whole school approach to EE) participated in the data collection as this was a contingency of completing the survey. The school board representative estimated that 90% of schools in the district were implementing some form of EE. In summary, our research was delimited by two interrelated data collection methods: a) analytical survey representing multiple schools within a school district, and b) in-depth focus groups with EE leaders, opportunistically sampled from the district's schools.

Context and participants

The study was located in a geographically large school district found in Ontario, Canada. It is characterized as a diverse district with urban, suburban, and rural-setting schools with an ethnically and socioeconomically diverse student population. There were (N = 80) elementary schools and (N = 18) secondary schools initially in the study. School settings were allocated as suburban 60.8%, urban 33.3%, and rural 5.9%. The analytical survey involved soliciting key site data from individuals who were involved in leading or coordinating EE initiatives at their school. These individuals were recognized by the school district to be *the* EE contact for their respective school. Most participants were classroom teachers responsible for many subjects, or taught a single subject area (e.g., science, social sciences). In many schools, the teacher-representative for the school's "eco-club" liaised with external EE groups. A small minority of the participants were formal school leaders (e.g., principals). For this study, there were two key criteria for being classified as an EE leader: (a) participants were not directly remunerated for their role; and (b) they had volunteered to act as a lead and coordinator for school-wide EE initiatives above and beyond their regular professional responsibilities.

Data collection and analyses

The analytical survey consisted of an on-line questionnaire (see Appendix for sample questions) designed by adapting other surveys used in school based EE studies (Ernst, 2007; Ministry of Education New Zealand, 2004). The questionnaire consisted of 35 questions, both open and closed-form as well as quantitative and qualitative. The questions were categorized into six conceptual categories: (a) school demographic information; (b) respondents' teaching and academic background; (c) respondents' characterization of environmental literacy and education; (d) description of current EE practices at the school; (e) respondents' capabilities in implementing EE practices in classrooms and the whole school; and, (f) the supports and resources used. The survey was originally piloted with a sample of elementary and secondary environmental educators in a local school district to improve its external validity (Fowler, 2009).

The survey was administered online to all schools within the school district. Key contacts,

pre-identified and designated school EE leaders at all the schools ($N = 98$), were sent an e-mail invitation to complete the online survey. These contacts were asked to complete the survey on behalf of the school. As well, a section of the survey solicited respondent's personal views and practices regarding EE at their school. A total of ($n = 51$) 52% of schools in the district (represented by one EE leader for each school) participated in the survey. This is considered a high return rate for online surveys (Fowler, 2009). All quantitative data from the survey was analyzed using *SPSS* and MS Excel software packages.

The second data collection method used was focus groups. Focus groups have advantages over individual interviews because they provide a way of collecting large amounts of data in a short period time, and are more dynamic than interviews in that they involve a range of group communication modalities that more closely mimics everyday conversation (Wilkinson, 2004). Eight EE leaders from different schools (four elementary and four secondary teachers) were opportunistically selected from a volunteer pool of survey respondents to participate in separate elementary and secondary school focus groups. An equal selection of elementary and secondary school representatives were chosen. The separate elementary and secondary focus group sessions occurred two months after the survey was administered, and were approximately 2 hours in duration. The focus group discussions were guided by a series of questions based on the survey questions, and facilitated by the authors of this paper. The discussions from the focus group sessions were audio recorded and transcribed soon afterward.

All qualitative data responses from open questions within the survey and the focus groups were organized, coded, and categorized according to the conceptual frameworks described above, and specific EE practices in school (Creswell, 2003; Miles & Huberman, 1994; Giorgi, 2009). Data was initially bracketed into meaning units, coded for relevant categories and then the codes were refined and related to enable the development of themes. Thus, the analyses of qualitative data, combined with the descriptive quantitative analyses saturated our data set, helping to produce descriptive knowledge about EE leaders and their school leadership contexts.

Results

The reported and interpreted data in the subsequent sections of this paper use both survey and focus group data from EE leaders, providing an overview of the characteristics and contexts of EE leaders in elementary and secondary schools. The results are presented in two sections. The first section presents data from the survey regarding the characteristics of EE leaders. The second section provides exemplars of the participants' school leadership contexts as reported during the focus groups.

Characteristics of EE leaders

Tables 1 and 2 illustrate the EE leaders' school organization, and their professional role in their respective schools.

Most EE leaders (78.4%, 40/51) worked in elementary schools, with the majority (57.5%) working in kindergarten-to-grade 8 (K-8) organized schools. As a synopsis, 88% of the EE leaders were classroom or subject-based teachers with the small remainder being school administrators, librarians, or special education/resource teachers. Only 8% of the school surveyed had formal leaders as their EE leaders.

Table 1.

Survey respondents' school organization and percentage surveyed

School Organization	Percentage of Schools Surveyed
Elementary (K-5)	14.0%
Elementary (K-6)	12.0%
Elementary (6-8)	8.0%
Elementary (K-8)	46.0%
Secondary (9-12)	20.0%

Table 2.

Official professional role in schools of EE leaders

Professional Role	Percentage of total EE leaders
Principal	8.0%
Vice Principal	0.0%
Curriculum Leader	6.0%
Divisional Leader	4.0%
Head of Department	0.0%
Classroom Teacher/Subject Teacher	88.0%
Other (please specify)	18.0%

Note: Percentage total is greater than 100% because participants could select more than one role.

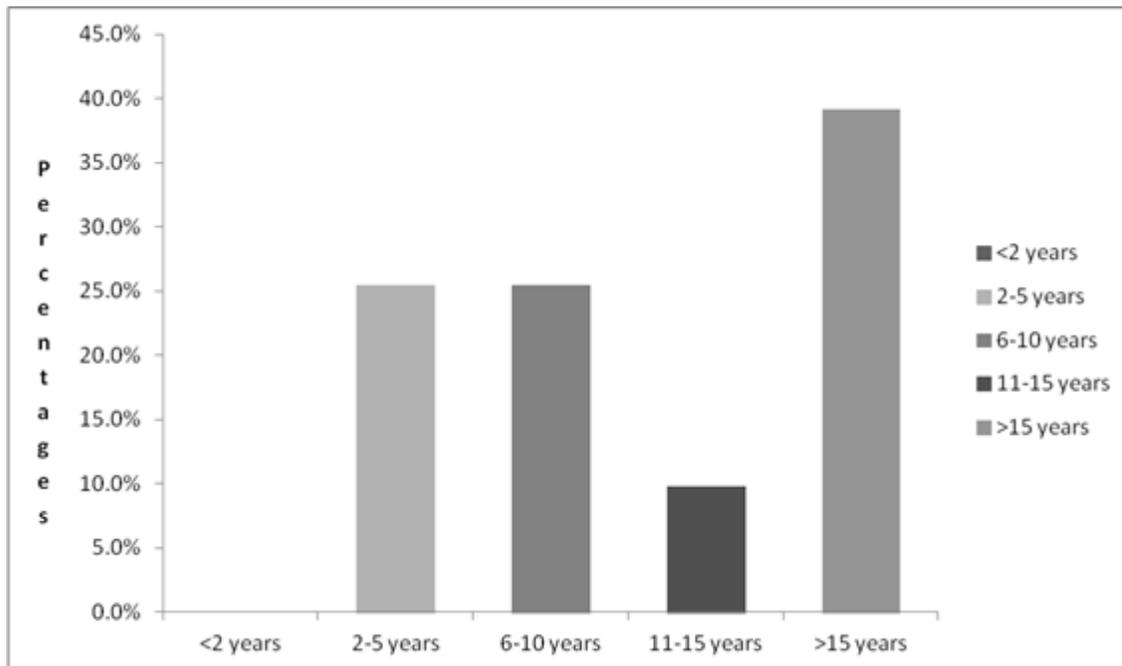


Figure 1: Professional education experiences

When considering their professional educational experience, seen in Figure 1, the majority of survey respondents (over 74%) had 6 or more years of experience in education, with close to 40 percent of these EE leaders having over 15 years of school-based experience. This experience speaks to an important leadership quality of these leaders. The participants’ experience came across as being vitally important, allowing them to negotiate and navigate around school-based challenges surrounding EE programming. Finally, a large majority of EE leaders (78.4%) were female.

The findings summarized in Table 3 illustrate how EE leaders *rank ordering* of student outcomes in terms of how important it is for their school to provide learning opportunities for desired EE outcomes.

The majority of elementary and secondary school respondents perceived environmental attitudes (empathy for nature) and behaviours (actions) *for* and *in* the environment (e.g., community environmental monitoring, recycling project) to be the *most or very* important student outcomes. Learning in curriculum/subject areas (e.g., content knowledge and skills) was the *least* important student outcome to foster through school-based EE.

A *Chi-square* test comparison amongst the results for these five student outcome categories (see Table 3) indicated significant differences when comparing the *attitude/behaviour* and the *knowledge* outcome outcomes to all other categories: *Chi-Square* (attitude/behaviour outcome) 23.1064, DF = 4, $p > 0.0001$; *Chi-Square* (knowledge outcome) 17.0556, DF = 4, $p > 0.0019$. The observed frequency distribution between these two categories vary significantly; thus, we can generalize from this non-parametric analysis that EE leaders considered attitude/behaviour to be a very important outcome for students, and knowledge to be minimally important when comparing outcomes to each other. This EE student outcome pattern was also seen in open-

Table 3:

Number of respondents’ ($n = 48$)¹ and their ranking of environmental education outcomes for students.

EE student outcomes	1 (Most important)	2	3	4	5 (Least important)
Learning in curriculum/subject areas (e.g., content knowledge and skills)	3	5	5	9	17
Development of other academic skills that aren't subject specific (e.g., critical thinking skills, problem solving skills, etc.)	9	5	4	13	6
General youth development outcomes (e.g., character, attitudes, behaviour)	6	9	13	4	5
Environmental (ecological) knowledge and skills about the environment (e.g., interdependence, system thinking)	7	13	7	10	4
Environmental attitudes (empathy for nature) and behaviours (actions) for and in the environment (e.g., community environmental monitoring, recycling project).	22	9	9	2	4

¹ Numbers of respondents did not sum the total respondents for the entire survey because some respondents failed to complete (fill in) certain queries on the web-based survey.

ended survey responses, with most responses regarding important EE student outcomes, categorized into the themes of environmental awareness, empathy, and action. Below are sample responses from the survey to the question, “What are the goals of environmental education/environmental literacy?”

- Create awareness for children to carry through into their lives and to encourage others to do so.
- Promote and create awareness with students about our relationship with the environment and our community.
- Instill an awareness of the issues that negatively affect the environment.
- Develop an appreciation of the natural world with students through experience.
- Educate students about-fostering a love/sensitivity/passion-for the environment.
- Teach children to modify their behaviour to use fewer resources, reuse more materials, recycle as much as possible.

Overall, there were no significant differences in survey responses between elementary and secondary school EE leaders.

Leadership context

While not a preplanned emphasis, focus groups discussion centred on the *Ecoschools* program. Ecoschools is a programmatic approach for schools with certification for EE activities and initiatives occurring at the school site (Ecoschools, 2014). The focus group excerpts in this section captures rich narratives of incidents and experiences of EE teacher leaders, giving insight into their leadership actions and relationships within their school contexts. Below is an example of the benefits of this program as explained by one EE leader in a focus group. The response indicates how the respondent—the coordinator and leader of the *Ecoschools* program in their school—described facilitating leadership roles and activities:

It’s all around this EcoSchools program, which I think is a really great. It does provide us with a structure or a frame to design an [EE] club around. I had some excellent students the first year that really drove it, got other students involved. I just helped manage it, helped them with ideas, did a little bit of encouraging when you needed to get things done, and this year it’s just grown from there (Secondary school EE leader).

Nonetheless, the program was challenging to implement due to the realities of school contexts, as remarked by some teachers:

EcoSchools wants to see a wide range of student enrolment, so from different grades, different staff and administrators as well, a custodian. But that’s the problem, we don’t get extra people in there, we have the kids who are keen and a couple of staff members, but to try and get anybody else involved is difficult (Elementary school EE leader).

At our school kids are just so involved in so many things....they’re involved in band, and sports, and the school play, plus all their academic subjects....sometimes I think that we are spread a little bit too thin. For example, this week we tried to do the energy audit [for Ecoschool] and only one student

showed up! (Secondary school EE leader).

It's hard to get other teachers on board, even with Ecoschools, without more teacher leadership to make sure things are happening and getting the word out, and drawing in more kids from more areas I think it will be difficult to grow the Ecoclub much more because I am only in contact with the kids that I teach and the kids that I approach (Secondary school EE leader).

The frustration of competing interests and isolation from other teachers or administrators can be ameliorated with support from the formal school leadership and collaboration. Two focus group participants described the supportive relationship with formal administration, working with non-teaching staff, and dealing with isolation:

Our principal is very supportive of our environmental group and wanted the composting program because when I went and talked to the janitor in years past, he thought it was a great idea but was kind of hesitant about all the work that would be involved, so I didn't really pursue it. But we pushed for it and the principal was supportive (Secondary school EE leader).

The second respondent's response provided a similar explanation:

You aren't really allowed to be a “lone wolf” anymore when it comes to EE. You have to collaborate and be with other people, including admin, and that's a great opportunity and it's not necessarily terrible (Elementary school EE leader).

Formal school administration is critical for school-wide EE activities, yet this kind of administration can still stifle initiatives, as explained by two teachers:

Well I was very fortunate at the beginning of my career. I had an administrator who was very much on board. Since that time it was uphill because I couldn't get support from the administrators. It was a fight all the time to try and push forward the schoolyard naturalization program and environmental initiatives in this school. Parents were allowed to take on a very negative stance....the upper educational echelon were saying “environmental education” but I could not get support (Elementary school EE leader).

Likewise, the second EE leader responded with similar criticisms:

We had some funding and planted a little garden in [view of] the sun, and the principal said it had to go back because of health and safety, vandalism threat, etc. So we moved it right under this tree with little light. My point is that some administrators don't know anything about EE. She should have gone and found out more information before asking us to move the garden because right now we can't grow much from that garden short of cutting the tree down! (Elementary school EE leader).

As illustrated, competing interests with other extracurricular activities, along with inexperienced and unsupportive administration can deflect teachers' participation in school-based EE, hindering school-wide initiatives.

Since focus groups were divided into elementary and secondary panels, there was an opportunity to analyze leadership differences between the two contexts. Overall, there were surprisingly few differences in terms of how EE leadership unfolded in elementary and secondary contexts. However, one noticeable difference was the role students played in the

leadership of EE within secondary schools; this was barely mentioned by elementary EE leaders. Specifically, all secondary leaders reported upon the significant role student leaders played as an advocacy group, initiating projects at the school level or garnering support with the school administrator or community leader:

I've been really impressed by how many kids [students] have attended the eco club and it is just an informal drop-in. It's up to them if they want to come or not. I'm not taking attendance or putting any pressure on and their students from across grades 9-12, although most of the leadership comes from the older students (Secondary school EE leader).

Another secondary EE leader also elaborated on this:

I know that students are always trying to come up with great ideas about how we can promote environmental awareness. They're the ones initially who came up with the idea of doing an assembly for example, which I thought was a daunting task. But it was completely student run, student organized, and the teachers and I didn't actually take part in it [other than supervision]. We also have an activist group who work closely with our student-led eco club (Secondary school EE leader).

While elementary schools had opportunities for student-led activity, the depth of these do not compare to student-led initiatives endorsed and supervised by the secondary EE leaders.

Discussion

EE leadership analysis in schools brings to focus the importance of the professional characteristics of these leaders and the school contexts they inhabit with respect to the relationships and actions of teachers, principals, support staff, and students. From this, a distributed leadership model (Gronn, 2002; Harris, 2008; Spillane, 2006) poses a way of understanding the kind of leadership explored in this study, and its capacity to promote EE goals in elementary and secondary schools.

One of the problems identified in developing teacher leadership is the fact that prospective leaders (i.e., teachers) lack confidence, and in some cases leadership skills to carry out various roles and responsibilities (Leander & Osborne, 2008). Exemplified in our study, it was incumbent that EE leaders negotiate the inevitable tensions associated with implementing school-wide EE initiatives such as starting a composting program:

I know that the one thing that the students wanted to see was a composting program, and which we now have at our school this year, so that is something that we pushed for in years past. So that's just an example of how persistence and perseverance pays off (secondary EE leader).

One way to deal with the inevitable challenges of school-based EE was the requirement that EE leaders be experienced practitioners. Almost 75% of our participants indicated that they had at least 6 years of professional experience in schools, with close to 40% having 15 or more years of experience. These on-the-ground experiences are essential as EE leaders inevitably require confidence that comes from experience in order to carry out tasks in the face of contested school organization and personnel.

Along with experience, EE leaders have to be personally motivated to take action in their schools. Shuman and Ham's (1997) model of teachers' commitment shows that EE teachers are

more confident and were generally efficacious in their teaching of EE, thus persisting in the face of obstacles. As well, May's (2000) framework regarding successful EE in schools points toward the importance of environmental knowledge and pedagogical skill of practitioners in implementing EE initiatives in schools. As shown in our study, these leaders persisted with initiatives in schools due to their personal commitment to EE. Thus, it can be deduced that EE leaders in this study also possessed similar environmental knowledge and skills, and were effective educators.

EE leaders considered environmentally responsible attitudes and behaviour to be the *most* important student outcome for EE school-wide initiatives; and knowledge to be the *least* important (see Table 3). This “vision” of EE is particular and important, but may not mesh with school goals or formal leadership vision as such. Thus, conflicts are inevitable as highlighted by one of our participants during the focus group regarding the establishment of school gardens:

We just did not have the administrative support....so being the kind of individual that I am I said: ‘I know this is important and I’m just going to keep going, and encouraging the people that are working with me to keep going,’ so we did and it has certainly paid off, but not without frustration (Elementary EE leader).

A social distribution of leadership encompasses the practices of several individuals in schools (i.e., teacher leaders and principals). The emerging evidence on distributed leadership indicates that it has a positive relationship on school reform initiatives and sustaining professional learning communities in schools (Harris, 2009). It has been speculated that the impact of distributed leadership on students could be significant if implemented effectively (Leithwood et al., 2009). The potential impact for EE in schools is profound.

Nevertheless, there are practical challenges associated with leadership in schools. Timperly (2005) identified management issues as barriers to distributed leadership, stating, “teacher leaders may be particularly vulnerable to being openly disrespected and disregarded because they do not carry formal authority” (p. 412). This can otherwise be explained as alignment issues with the principal's leadership styles. Furthermore, some question the possibility of distributed leadership in school climates where authority and responsibility conform to an established hierarchical nature of schooling (Harris, 2009). Our experiences with EE leaders suggest that school structures mitigate distributed leadership practices. However, many of the participants spoke to supportive principals during their careers and how they also facilitated EE activities. Indeed, it will be the responsibility of the official school leader to determine the pattern of leadership distribution in their schools, and how EE leadership fits into school structures.

In summary, developing EE teacher leadership is not an easy process. It is closely related to re-culturing schools, as it proposes a fundamental shift in the relational practices involving administrators and teachers (Hart 2003; Stevenson, 2007). In the *Recommendations* section, we provide suggestions to enhance EE leadership practices using distributed leadership principles.

Limitations

While we believe our present study offers some important insight into the characteristics and contexts of school-based EE leaders within our research jurisdiction in Canada, some aspects of our study require further attention to bolster some claims made from our study, and improve

the generalization of findings beyond the research context. First, while the focus was on examination of schools within one school district, space restrictions have limited fuller details of specific school conditions descriptions of the experiences of EE leaders. More detailed ethnographies of schools would help elucidate the deeper qualities of these leaders and their actions within schools in order to identify limitations as well as opportunities for promoting distributed leadership models in schools as it relates to EE.

Second, our initial analyses were based on self-reporting data, which may be limited in terms of the internal validity of the findings regarding what was occurring in schools. In addition, detailing of schools that were not implementing EE programs or who did not have an EE leader would have provided a rich source of comparative data and deliver more explanatory reasoning to this data. Finally, the survey was intended to collect broad characterizations of EE in schools within one school district. More fine-grained survey questions would help elucidate findings and better corroborate some findings from this study.

Recommendations

A key question for researchers and practitioners supporting school-wide EE initiatives is to delineate what factors can support the development of distributed leadership involving EE teacher-leaders in schools that traditionally have hierarchical leadership structures. For example, Harris (2009) supports the notion of collaborative practices, shared norms, and values to improve teacher leadership, but how is this to be translated into school practice? Gronn (2002) has suggested that concerted efforts are required that are either *informal working relations*, or *institutionalized practices*. In regard to EE, the former involves groups of teachers with differing capacities coalescing to complete EE tasks (e.g., making a school yard garden), and then disbanding. The latter involves the creating of committees and teams that are formalized in the leadership structures within a school. This was the most common form of organizational leadership structure within the schools, anchored around the Ecoschools program, where the EE teacher leader participated on the Ecoschools committee. In essence, this program provided legitimacy to an arrangement of institutional EE leadership practice. While deliberate planned patterns of leadership alignment has great potential for whole school EE implementation, more sustained long-term organizational activities must also be acknowledged and accompany planning efforts (Leithwood et al., 2009).

Some aspects of distributed leadership were evident in our case study schools. Yet all participants spoke to existing practices in their school as being insufficient, especially as it pertains to the event that they were unable to continue as EE leaders. Below are some recommendations based on other distributed leadership initiatives focused on student learning (Dinham 2009; Leithwood et al., 2009). These principles can support development and sustaining of distributed EE leadership in school settings:

- Provide time for professional development (PD) for EE leaders to increase their confidence and capabilities in dealing with leadership tasks associated with school-wide EE initiatives.
- Provide opportunities for team building, collaborative activities and professional dialogue amongst leaders, formal school administrators, teachers, and community partners. This can include staff meetings and PD days, and other opportunities for teacher release.
- Support formal school leadership (i.e., principal) that recognizes the importance of EE in schools, and acknowledges the role of teacher leaders.

- Provide incentives and rewards for teacher leaders initiating school-wide EE activities.
- Select EE leaders that have experience, demonstrated knowledge of EE, strong interpersonal skills, and can deal with ambiguity in their EE leadership.

This study extends our previous EE research (Fazio & Karrow, 2013, Karrow & Fazio, 2010) in elementary and secondary schools. Overall, our analyses are similar to Ernst's (2009) other surveys of school-based EE practices, yet differ from the EE literature with respect to the characteristics and contexts of EE leaders in schools. Our research begins to highlight the importance of EE leaders, particularly teacher leaders, and their capacity to take action in schools. Indeed, more research questions are prompted from our research: Are teacher leaders confident and capable in managing and leading EE initiatives? Do their personal EE views correspond with their school's vision and formal leadership? Do they share and collaborate with other practitioners regarding EE knowledge and resources? What personal qualities of teachers produce effective informal EE leaders? How can schools better leverage distributed leadership principles to impact EE programs in schools?

These important questions require further research to deeply examine school organizational conditions, teacher motivation, and professional development opportunities for these leaders. More ethnographic investigation of school conditions and EE leader enactment is required to extend the findings from our study to support environmental literacy in schools through championing the development of teachers as EE leaders.

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Appendix: Sample Survey Questions

What type of school do you work in?

- | | |
|---|---|
| <input type="checkbox"/> Elementary (K-5) | <input type="checkbox"/> Elementary (K-8) |
| <input type="checkbox"/> Elementary (K-6) | <input type="checkbox"/> Secondary (9-12) |
| <input type="checkbox"/> Elementary (6-8) | |

Which best describes the setting of your school? (please check one)

- Urban Suburban Rural

Please indicate your gender:

- Female Male

Please check below your terminal schooling degree. (You may choose more than one).

- | | |
|--|---|
| <input type="checkbox"/> Early Childhood Education Diploma | <input type="checkbox"/> Masters of Education |
| <input type="checkbox"/> Bachelor of Education | <input type="checkbox"/> Masters of Arts |
| <input type="checkbox"/> Bachelor of Arts | <input type="checkbox"/> Masters of Science |
| <input type="checkbox"/> Bachelor of Science | |

Please specify your role in your school (You may choose more than one).

- | | |
|--|--|
| <input type="checkbox"/> Principal | <input type="checkbox"/> Head of Department |
| <input type="checkbox"/> Vice principal | <input type="checkbox"/> Classroom teacher/Subject teacher |
| <input type="checkbox"/> Curriculum Leader | <input type="checkbox"/> Other (please specify) |
| <input type="checkbox"/> Divisional Leader | |

Indicate your total teaching experience:

- | | |
|-------------------------------------|--------------------------------------|
| <input type="checkbox"/> < 2 years | <input type="checkbox"/> 11-15 years |
| <input type="checkbox"/> 2-5 years | <input type="checkbox"/> >15 years |
| <input type="checkbox"/> 6-10 years | |

What does environmental education mean to you?

Please rank the following student outcomes, based on how important you perceive it is for the school to provide opportunities through school-based environmental education. (1=Most Important; 5=Least Important)

Please indicate below any other resources and guidelines that you use in planning and teaching your environmental education program. Please be specific.

What, if anything, has hindered forming collaborations with outside organizations to support the school environmental education program?