Agency Curtailed: Implications for the Integration of Environmental Education in Life Sciences

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Abstract

When realised and exercised, professional agency may contribute towards the achievement of the global environmental education (EE) goals. Based on this notion, we embarked on a research project to identify this possibility regarding the integration of EE in Life Sciences in a South African context. While the South African national education policy makes provision for the integration of EE across curricula, previous research has indicated non-integration in practice. This research project was aimed at clarifying why this was the case. Three teachers and one subject advisor were interviewed using semi-structured questions. The exam-oriented approach to teaching was found to be the main factor that curtailed professional agency of both the teachers and the subject advisor towards promoting practices for the integration of EE in the subject. The article concludes by pointing to the implications of the exam-oriented approach for the socio-environmental relevance of the education system and EE in particular.

Keywords: professional agency; professional development; subject advisors; environmental education; Life Sciences; curriculum integration

Introduction

If professional agency has a place in promoting relevant practices towards the achievement of sustainable development goals (SDGs) through environmental education (EE), teachers and their professional developers are strategically located to exercise it. Teachers occupy a strategic socio-educational position in schools where they interact with children and can possibly instil early awareness about environmental issues, as well as about necessary values, attitudes and behaviours for sustainable living (Anderson and Jacobson 2018; Jose, Patrick, and Moseley 2017; Mwendwa 2017). Some professional developers, such as subject advisors, are in strategical positions of power where they can identify teachers' developmental needs or be approached for training in that regard. To achieve these ideal teaching and developmental practices, two things may be necessary. First, teachers may need to have a will to act and then identify their limitations in pursuing that will towards EE; second, professional developers may need to work beyond norms to ensure a practical integration of EE in schools. Fien and Rawling (1996, 11) contend that "[environmental education] and the professional development of environmental educators as agents of change have central roles to play in helping to create the broad social context necessary for ecologically sustainable development."

However, research shows that many teachers do not integrate EE in their lessons (Cheruiyot 2019; Dreyer and Loubser 2014; Kiarie 2016; Mwendwa 2017). The common reasons mentioned in the literature are a lack of training (Kiarie 2016), limited time (Ko and Lee 2003) and limited knowledge about EE (Mathenjwa 2014). What seems to have received limited attention in such discussions is the influence of agency on teachers and professional developers in the integration of EE in school subjects. In this article we argue that if attention is not paid to this gap, there will always be a shifting of responsibilities in this regard. This shifting of responsibilities has the potential to limit possibilities for the attainment of the global SDGs. The paper focuses on the topic of professional agency, drawing from the findings of a study that analysed how the South African education system supported Life Sciences teachers to integrate EE in their lessons. This topic emerged as one of the key findings from this study. The paper, therefore, shares this knowledge in the hope that it might inform policy and practice in South Africa and similar contexts.

The article begins by outlining the goals and role of EE in the global endeavours for sustainable development. Then agency is discussed as an analytical lens. In this section we pay special attention to professional agency and, specifically, teacher agency. The second section conceptualises professional development and locates it within the framework of agency. In the third section we define the context in which the research was conducted. This is followed by the sections on methodology, the research findings, a discussion of the findings and the conclusions and recommendations.

The Necessity and Goals of Environmental Education

Environmental Education is a big part of the United Nation's SDGs. In *Transforming our World: The 2030 Agenda for Sustainable Development*, the United Nations (UN 2015) articulated 17 goals, of which the fourth (goal) focuses on quality education. The seventh target of this fourth goal states:

> By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles. (UN 2015, 19)

EE is one of the strategies towards the attainment of this target, particularly towards addressing global environmental problems such as climate change, diversity loss, desertification and various forms of pollution. The main causes of these problems are the unstainable ways in which humans relate to the environment following their conceptualisation of development (Erhabor and Don 2016; Istiqomah and Firdaus 2020). As Giddings, Hopwood, and O'Brien (2002, 186) argue, in the process of development, "[t]he economy is often given priority in policies and the environment is viewed as apart from humans." EE plays a crucial role in providing awareness of the detrimental effects of this practice and education for sustainable development (ESD). Mwendwa (2017, 2) posits that "the essence of introducing education for sustainable development is to dissolve the artificial boundaries between the environment, economy, and society." Similarly, Le Grange (2018, 883) argues, "[w]e live at a time when […] education needs to be concerned with cultivating (post)human sensibilities." Thus, the United Nations Educational, Scientific and Cultural Organization (UNESCO 2017) calls for education systems to redefine their learning objectives and contents towards the development of new skills, values and attitudes for sustainability. This, according to UNESCO, requires the introduction of new pedagogies to empower learners through education for sustainable development. It requires a reconceptualisation of education as "both a goal in itself and a means for attaining all the other SDGs" (UNESCO 2017, 1).

Environmental Education in the Research Context

Until the late 1980s, there was no government-regulated formal EE in the South African school curriculum (Clacherty 1994; Le Grange 2002; Mosidi 1997). The processes towards formalising EE became more focused in the early 1990s through the development of the Environmental Education Policy Initiative (EEPI). Such processes happened during the transformation of the South African education system after the attainment of democracy, and they led to a call for the integration of EE across curricula. As a result, policy accommodates this integration in the formal curriculum (Loubser et al. 2014, 144), but EE is not a subject on its own in schools. Supposedly, it is taught through integration with other subjects, including Life Sciences. Many teachers, in all subjects, have not received pre-service training in EE; thus, they rely on in-service training when provided and lifelong learning.

The Life Sciences curriculum accommodates EE integration. Its content framework in the national Curriculum Assessment Policy Statement (CAPS) is organised into four knowledge strands: Life at the Molecular, Cellular and Tissue Level; Life Processes in Plants and Animals; Environmental Studies; and Diversity Change and Continuity. The Environmental Studies strand includes topics such as Biosphere to Ecosystem, Population Ecology, and Human Impact on the Environment. Therefore, CAPS does not only state the necessity to integrate EE across curriculum—subject curricula even provide for such. Yet, research from scholars such as Mathenjwa (2014) and Mwendwa (2017) still indicates limited integration in practice. This is the situation that motivated this research, with a focus on professional agency.

Conceptualising and Theorising Agency

While there are various approaches to the conceptualisation of agency, its basic notion is that, to a certain extent, people are capable of intentionally acting and possibly influencing the structures and the environment within which they operate (Biesta, Priestley, and Robinson 2015; Emirbayer and Mische 1998; Imants and Van der Wal 2020; Oolbekkink-Marchand et al. 2017). According to Oolbekkink-Marchand et al. (2017, 38), agency is "the capacity to initiate purposeful action that implies will, autonomy, freedom and, choice. [It is a] dynamic process that is personally constructed through many forms of interactions with the constraints of a given context." In other words, agency does not operate only when there are no contextual constraints—agents find a way of interacting with the constraints when or if they are driven by will and choice.

Emirbayer and Mische (1998, 963) provide a time-aligned philosophical stance in defining agency. They claim that

> human agency [is] a temporally embedded process of social engagement, informed by the past (in its habitual aspect), but also oriented toward the future (as a capacity to imagine alternative possibilities) and toward the present (as a capacity to contextualise past habits and future projects within the contingencies of the moment).

An example of this can be habitual contexts where EE has not been included in policy in the past, but where the present trajectory puts EE in a valuable spot in educational policy to enable its integration in the present curricula for present and future benefits through agential possibilities. In their conceptual analysis of teacher agency, Oolbekkink-Marchand et al. (2017, 38) identify an ecological approach that is similarly time-oriented, with the "the past or iterative dimensions, the present or practical evaluative dimension and the future or projective dimension." They argue that "[t]he practical-evaluative dimension is concerned with the present where agency can be acted out, influenced by both past and future" (Oolbekkink-Marchand et al. 2017, 38). In this case, people's agency should be motivated by the goal to change unsatisfactory practices of the past and the present. When such time-oriented or ecological agency is practised, changes do take place. Biesta, Priestley, and Robinson (2015, 624) provide an example

of the United Kingdom (UK) context where policies liberated teachers from de-professionalising tendencies in which curricula were "prescriptive" and teachers were working under "oppressive regimes of testing and inspection." In the context of South Africa, where the inclusion of EE in national curricula is relatively recent, the past of not having it should inform the present practices of the teachers and the professional developers towards imagining alternative possibilities for integrating it in subjects' lessons.

This discussion, however, is not ignorant of Bandura's (2018, 131) argument that while individuals may be in "spheres of activity that are personally controllable," they may also be susceptible to "social conditions and institutional practices that affect their everyday lives." However, Bandura also refers to "mediated proxy agency" in which the actors are capable of "influencing others who have the resources, knowledge, and means to act on their behalf to obtain the outcomes they desire." This proxy agency may be driven by what Bandura (2018, 131) refers to as "forethought [which] enables people to transcend the dictates of their immediate environment and to shape and regulate the present to realise desired futures." In other words, agency can influence contextual conditions for a better future.

When referring specifically to teacher agency, Oolbekkink-Marchand et al. (2017, 38) speak of a "contextual space," that is, policies, rules and regulations within which teachers work. They argue that the influence, or lack of, this contextual space depends on teachers' perceptions thereof rather than its subjective nature. The teachers' perceptions of such a space create their agency because such perceptions influence the teachers' actions towards their own goals, which may be different from those of the institution in which they work. Such agency may be strengthened by necessary professional development, as discussed below.

Conceptualising Professional Development

While we explore the possible role of professional agency in the practical integration of EE in Life Sciences, we are also of the view that teachers might need some form of professional development. Darling-Hammond, Hyler, and Gardner (2017, 2) define professional development as "structured professional learning that results in changes to teacher knowledge and practices, and improvements in student learning outcome." They argue that this professional development may be "a product of both externally provided and job-embedded activities that increase teachers' knowledge and help them change their instructional practice in ways that support student learning" (Darling-Hammond, Hyler, and Gardner 2017, 2). Avalos (2011, 10) argues that "professional development is about teachers learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students' growth." Similarly, Borko (2004, 3) notes that professional development provides teachers with "opportunities that will help them enhance their knowledge and develop new instructional practices." Zepeda (2012, 6) also argues as follows:

> It is not just the professional development offered to teachers. The everyday work of teachers should focus on assisting teachers to learn from the work they do, the work students do, and the work teachers do with other teachers […] [creating] the opportunity to learn from their actual work through job-embedded learning opportunities.

Professional development, therefore, does not always have to be provided to teachers. Teachers can individually identify gaps in their knowledge and pursue learning to address these gaps, in self- or group-initiated engagements and interactions.

Referring to the United States (US), Borko (2004, 3) notes that while the value of professional development is recognised, this practice is still inadequately performed:

> Each year, schools, districts, and the federal government spend millions, if not billions, of dollars on in-service seminars and other forms of professional development that are fragmented, intellectually superficial, and do not take into account what we know about how teachers learn.

This comment implies that professional development may be better when initiated by those with first-hand information of their needs—the teachers.

In engaging on the topic of professional development, Eteläpelto et al. (2013, 61) use the concept of professional agency: "Professional agency is practiced when teachers and/or communities in schools influence, make choices, and take stances in ways that affect their work and their professional identity." This statement suggests that teachers can take "proactive rather than reactive" actions to develop their identities as teachers (Eteläpelto et al. 2013, 61). In this case, Imants and Van der Wal (2020, 1) argue that teachers have an agential role to play "as change agents in professional development, school reform and school improvement." We wish to add that even professional developers can exercise professional agency beyond the constraining conditions to interact with teachers within their jurisdiction. They can take proactive decisions to support the development of teachers and for their own development as professional developers. As Eteläpelto et al. (2013, 61) argue, "agency is about individuals or collectives who are interacting with and within specific contexts."

In the context of EE, Robottom and Kyburz-Graber (2000) identified professional development of environmental educators as a priority of international agencies such as UNESCO and the Organisation for Economic Co-operation and Development (OECD). Yet, knowledge on how the professional developers understand and experience their role in this regard is not much documented. Research on the topic of EE and pedagogy mainly relates to teachers and/or the training of pre-service environmental educators (Fien and Rawling 1996; Howlett, Ferreira, and Blomfield 2016). Much has also been written about participatory action research where professional development activities are in practice (Ballard and Belsky 2010; Robottom and Sauvé 2003). Findings from such activities are rarely about the professional developers, but rather about teachers and learners.

Methodology

The research project followed a qualitative case study design in which one subject advisor and three teachers were interviewed in seeking to understand their experiences regarding the integration of EE in Life Sciences. The subject advisor and the three teachers were purposively selected. The sampled subject advisor was the only one responsible for Life Sciences in the district and each of the three teachers was the only Life Sciences teacher for Grades 10–12 in each of the sampled schools in that district.

Data were collected through two methods: document analysis and semi-structured interviews. This paper, however, reports only on the interview data where the theme of agency was identified. Data were analysed thematically following the steps suggested by Maguire and Delahunt (2017). To ensure trustworthiness, the findings were presented and critiqued at a conference. This was done after having given the transcripts of interview recordings to the participants for authentication, following all the ethical considerations. To develop this article, we interpreted the data in an attempt to understand how professional agency emerged from the participants' responses.

Findings

We first present the teachers' and then the subject advisor's understandings of their professional agency as interpreted from the data.

Teachers' Understandings of Their Professional Agency

Three themes were drawn from this category of participants: (1) Engagement with relevant documents, (2) Familiarity with EE topics, and (3) Dependence on the subject advisor.

Engagement with Relevant Documents

When EE is not a subject on its own, but rather taught through other subjects, teachers can use their agency to find information to guide them in that regard. As indicated earlier, the project was conducted in a context where policy prescribes the integration of EE, but is not explicit about how it should be taught. Thus, we asked teachers how EE is presented in the documents they use. Their responses suggested agential stances regarding the identification of EE-related topics in the Life Sciences curriculum. For example, John[1] stated:

> [EE] is there in Life Sciences curriculum policy because there are certain concepts that deal with environment. For example, human impact on the environment is there.

Although this statement did not necessarily imply that John integrates EE in his lessons, it indicated some level of responsibility regarding the identification of EE-related topics in the subject. The opposite was found with Michael, who gave an unpromising response

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[1] All names are pseudonyms.

to the question: "Unfortunately, I do not have the documents with me wherein I can read and interpret for you." This response was worrisome because we assumed that a teacher that integrated EE in lessons would know about this without having to look at the documents during the interview.

There were even clearer responses that indicated limited agency concerning finding information in documents. Ronald, for example, stated that he did not often visit the policy document because "[y]ou find out that sometimes visiting the CAPS document takes time and you find out that you do not even have enough time, but I know that EE is there." In this case, Ronald knew that there was EE to be integrated, but he blamed non-integration on a lack of time. The pertinent question here is: What does the teacher use to prepare if he or she does not have time to read the necessary documents?

Familiarity with Environmental Education Topics in the Curriculum

In trying to draw reflection from the teachers, we asked which EE topics were covered in Life Sciences. We found that some of the teachers were not sure how to go about answering this question. They would mention one or two themes with limited confidence. For example, John replied:

> I think it is included because we learn about human impacts on the environment. If it's human impact on the environment, this means that EE must be applied also.

We identified uncertainty from this response through the use of words "I think" and "must be." Our interpretation of the use of these words was that John did not take charge in attempting to know more about EE, even though the policy says it should be integrated in the subject he teaches. When he was further asked if "human impact" was the only EE topic in Life Sciences, his response was:

> I think so … because the only EE topic that I am familiar with in Life Sciences is "Human impact on the environment." That's the only topic that I know that deals with the environment.

This response confirmed that the participant was ignorant of the other topics through which his lessons could integrate EE.

Michael was even more explicit in identifying only one topic that accommodates the integration of EE in Life Sciences:

> I know that the only EE topic in Life Sciences is "Human impact on the environment" and it covers a lot of environmental aspects and helps people to know how to take care of the environment.

These responses indicated limited understanding of EE in the subject and no agency towards acquiring more understanding.

Dependence on the Subject Advisor

Although the teachers' responses hinted that they were aware of some resources to help with the integration of EE in the Life Sciences curriculum, they were not making efforts to integrate EE in their lessons. One of the reasons they mentioned was limited support from the subject advisor. Ronald indicated that the subject advisor rarely visited the school and, when he did, he did not focus on EE, but on the whole subject. The advisor was also blamed for not providing necessary resources, only the textbooks. When asked about what other resources he would expect from the subject advisor, Michael replied:

> Teaching Life Sciences requires materials such as posters, models, TV and textbooks. So, I expected those materials, but I got only a textbook.

John also identified the lack of resources:

> There is usually a shortage of resources when it comes to doing practicals in Life Sciences.

It is interesting that these participants indicated no responsibility towards developing the resources for the purposes of EE. Their concern was not about a lack of training on the development of resources, but on the lack of provision of these resources. We interpreted this as limited agency on their part, especially when one stated, "I do not have expertise in developing teaching resources for EE" (Ronald).

We then looked at the subject advisor's responses regarding his role in ensuring the practical integration of EE in Life Sciences in the schools.

The Subject Advisor's Agency

Our assumption was that Mr Marcus, the subject advisor, would be concerned about the limited or lack of integration of EE in the subject and that he would support the teachers in this regard. We drew two themes related to professional agency from his responses: (1) Structural competition constrains agency, and (2) Reactive and selective support against agency.

Structural Competition Constrains Agency

The education system in South Africa is structured to essentialise competition for matric results across provinces. This, according to Mr Marcus, curtails possibilities for exercising agency. He commented that the Department of Education in the country is "results-oriented":

> We do not look at the longer impact that we make [through education]. It is just a matter of all nine provinces competing for the first position during final examinations. The impact of the subject in real life [is not a focus]. So, I can say we are not doing enough to support teachers to integrate EE.

This response suggests that Mr Marcus's work is conditioned by the competition in the education system. Although he understands that education should be applicable to real-life situations, the system limits his agency in practice. In other words, he shifts the blame for his inability to support teachers to this structural competition. He further indicated that, due to this structural competition, his main concern was the performance of learners in the subject rather than the pedagogical practices in particular sections of its curriculum:

> As I am, I cannot go out and say I am going to support a teacher on EE. […] The performance of learners in a section does not mean that they understand it because we teach them being exam-oriented.

This response suggests that even if teachers were to integrate EE, there would still be no corresponding change in their contexts to suggest that learners understood what they had been taught. Still, the subject advisor did not seem worried about this lack of socio-environmental relevance of the education system even though it seemed that he could use his strategic position to influence change in this regard. The response was also interesting since it indicated that exam-orientated teaching may produce no more than ignorance in certain sections of the subject content and process of teaching and learning.

Reactive and Selective Support against Agency

Mr Marcus was working reactively rather than proactively with regard to the subject. When asked about how often he visited schools to support Life Sciences teachers in EE in particular, he responded as follows:

> We work outside for monitoring and support. So, it means that I will go there, and if I identify a problem, I will provide support on the problem I found [….]. So, we go out there [to provide] support [on] Life Sciences as a subject, not EE as a section.

This response shows that if a teacher did not integrate EE in the subject, the advisor would not see that as a problem, and then there would be no such integration. The support from the subject advisor was not specific to EE. He further said, "a visit is given in schools but not for this topic of EE. But if we find problems in this section of EE, for example in human impact, then we do address that." Therefore, for a visit to be paid, he would first have to see if there was a problem or not—and that problem would be about learner performance rather than anything specific to EE. The problem with this response is that teachers do not integrate EE because it is not examined. They focus on examined sections in response to the exam-oriented structure of the system. Therefore, if the school performance in Life Sciences is satisfactory, Mr Marcus might not know whether EE is integrated or not in the subject.

Discussion of Findings

Our findings are consistent with those in the existing literature, namely that various factors constrain the integration of EE in school subjects (Kiarie 2016; Ko and Lee 2003;

Mathenjwa 2014). However, this literature misses another important point—that of the role of agency in this void, with regard to teachers and professional developers alike. We found no indication of a will from either categories of participants to "initiate purposeful action" (Oolbekkink-Marchand et al. 2017) towards ensuring a practical integration of EE in Life Sciences. In particular, the subject advisor is strategically located in a position where he could intentionally influence or change the exam-oriented structures within which he operates (Biesta, Priestley, and Robinson 2015; Emirbayer and Mische 1998; Imants and Van der Wal 2020; Oolbekkink-Marchand et al. 2017).

Similarly, the teachers indicated no intention to know more or to develop themselves professionally regarding the integration of EE in Life Sciences. Therefore, there is limited indication of changes to their "knowledge and practices, and improvements in student learning outcomes" (Darling-Hammond, Hyler, and Gardner 2017, 2), as would probably be the case if EE were practically integrated. While there is supposed to be external professional development from the subject advisor, who is expected to have resources, teachers could also develop themselves through "job-embedded activities that increase [their] knowledge and help them change their instructional practice in ways that support student learning" (Darling-Hammond, Hyler, and Gardner 2017, 2; see also Avalos 2011; Borko 2004; Zepeda 2012). This was not the case in the research context.

Eteläpelto et al. (2013, 61) state that "agency is about individuals or collectives who are interacting with and within specific contexts"; we found no evidence among any of the participants of this type of agency. Teachers were not interacting among themselves in terms of EE integration, nor was there interaction with the advisor. This contradicts UNESCO's and the OECD's emphasis on the need to develop environmental educators professionally.

We are cognisant of the conditioning structural constraints that promote teaching for examination rather than teaching for learning in the research context. This promotes competition at the expense of learning for a possible application of knowledge and, most importantly, limits agency. However, our findings suggest that neither the teachers nor the subject advisor have made any efforts to address these constraints in attempting to find a solution. Our view is that the teachers and the subject advisor could use Bandura's "mediated proxy agency." If they had the will to teach EE through Life Sciences, teachers could influence the subject advisor who has "resources, knowledge, and means to act on their behalf" (Bandura 2018, 131) to create an enabling environment for this cause. In doing so, both categories could try to "transcend the dictates of their immediate environment and to shape and regulate the present to realize desired futures" (Bandura 2018, 131) in which EE could be taken more seriously.

Conclusions and Implications

Three conclusions can be drawn from the findings and discussion above. First, there is a structurally produced demarcation between a Life Sciences teacher and an EE teacher. This structure is produced through limited emphasis on EE in this subject to the extent

that it is not among the examined topics. The participating teachers were, therefore, Life Sciences teachers and not EE teachers. There are two implications to this: (1) if the integration of EE, as articulated in the CAPS, is a serious stand for the education system, then EE should be an explicit aspect of Life Sciences examination; (2) the exam-oriented approach to teaching can be revised to accommodate a focus on all aspects of the Life Sciences curriculum.

The second conclusion we draw from the findings and discussion is that EE teachers need continuous professional development, which, in this study, was found to be limited. This professional development is necessary to assist the teachers in interpreting and understanding the areas that need to be covered in individual subject curricula as well as in areas that require developing personal professional agency. Professional agency is curtailed by contradictions between the systemic exam-oriented approach and the policy stipulation for the integration of EE across curricula. This is a contradiction because the exam-oriented teaching approach excludes EE in the exam process. Unfortunately, this exam-oriented approach does not only limit teachers and subject advisors' agency in this context, but also learning for understanding. We found this to be one of the crucial issues that may prohibit the achievement of the global EE goals.

Third, we concluded that the non-integration of EE in the context is also caused by limited agency from both the teachers and the subject advisor. There needs to be a paradigm shift regarding the purpose of education and assessment if the goals of EE are to be achieved in this context.

Research can explore and develop knowledge on the possible approaches to the teaching of EE in Life Sciences to promote practical learning rather than the unnecessary essentialisation of competition for performance in examinations. Professional agency in this regard, on the part of policymakers and EE practitioners, including teachers and subject advisors, could most likely contribute better knowledge towards quality education for sustainable development.

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