A Development Education Perspective on the Challenges and Possibilities of Climate Change in Initial Teacher Education

Benjamin Mallon

Abstract: This article is based on a series of personal reflections gathered whilst addressing climate change through development education (DE) as a tutor on an Initial Teacher Education (ITE) course. The article explores the pedagogical challenges and possibilities of supporting student teachers in developing their own educational responses to climate change through DE. The article provides a practice-driven reflection on the importance of developing a strong understanding of climate science as the foundation for a deeper analysis of global interconnections. It also considers how participatory methodologies may support learners in an exploration of collective responsibility and collective climate action.

Key words: Development education; Initial Teacher Education; student teachers; climate science; participatory methodologies.

Climate change, influenced by human action, has caused and will continue to cause devastating damage to human and natural systems across the globe (IPCC, 2014; World Bank, 2014). At the same time, there is strong evidence that a rapid collective response to climate change, built around decarbonisation and sustainable development, may mitigate against the worst consequences of climate warming (ibid). This pressing need for action has raised questions as to how education should address the scientific, political and social dimensions of climate change (Mochizuki & Bryan, 2015). Whilst the complexity of climate systems holds a number of challenges for those tasked with developing educational responses, there is also recognition that climate change may offer a number of possible opportunities for education (Kagawa & Selby, 2010). This article considers the implications of climate change for development education (DE). As a form of pedagogy which aims to foster active engagement with unequal and unjust global interconnections

and their associated responsibilities, what role might DE play in meeting the challenge of climate change? What possibilities might climate change hold for DE? Through a series of personal reflections upon my own DE practice in delivering the climate change component of a primary Initial Teacher Education (ITE) module, I seek to provide a descriptive, practice-driven discussion of some of the challenges and possibilities of addressing climate change through DE.

In the first section of the article, I consider students' existing knowledge and understanding of climate change, before exploring the challenges of providing a strong understanding of climate science. The next two sections reflect on the connections between climate change and a number of major development issues, before exploring how, in its own right, climate change brings to light many of the deeply asymmetrical interconnections between countries of the global North and those of the global South. The final section considers the challenge of developing educational responses to climate change which promote the necessary forms of action required to tackle this global issue.

Understanding climate science: The foundations for successful climate change education?

Throughout each of the four ITE sessions focused on climate change, participatory DE methodologies were the major tool employed to support students' climate learning and to develop their collective abilities. The series began with an initial small-group discussion which explored students' personal and shared experiences and understandings of climate change. This opening activity provided a basic assessment of students' prior learning, and revealed varying degrees of existing knowledge, both in relation to climate change and other development themes. Whilst some students were able to offer a basic description of the causes and consequences of climate change, sometimes drawing upon their knowledge from science education and geography education modules, many students were unsure of the basic terminology of climate science. Limited public understanding of climate change is recognised as a barrier to effective action (Gonzalez-Gaudiano &

Meira-Cartea, 2010), and it was immediately clear that addressing the fundamental aspects of climate science was essential in order to provide a grounding for any future climate learning.

In a continuation of these group discussions, students were encouraged to consider the diversity of experiences within the class and collaborate to formulate a series of questions about climate change that they would like to be addressed. Common questions centred on the historical basis of climate change (how do we know the climate is changing?), the anthropogenic nature of this change (how do we know that humans have contributed to this situation?) and the ongoing predictions of climate change (how do we know the situation will get worse?). This collection of questions was to form an important basis for subsequent learning activities, both as a means of placing the students at the centre of the learning process, and as a tool to support students' self-assessment. I also felt it important to include questions which addressed important gaps in students' existing knowledge, namely the fundamentals of climate science (for example, what is the difference between weather and climate?).

With the initial assessment in mind, I was able to call upon the range of activities I had prepared to explore some of the key aspects of climate science. These activities included an exploration of the difference between weather and climate, as well as an analysis of a series of media sources which explained the fundamentals of climate change. Although time was limited, students had such differing levels of climate science understanding that supporting students to build a solid climate science foundation appeared necessary before any exploration of the socio-political aspects of climate change. Although there is a need to focus on the political, social and economic causes of climate change, understanding the scientific foundations is essential (Gonzalez-Gaudiano & Meira-Cartea, 2010; Kavanagh et al., 2012). This reflection raised a number of questions for my own practice: whilst climate change education in ITE is limited by time, how might I be able to develop my own educational practice to support learning about climate science alongside the examination of socio-political aspects of

climate change? Certainly providing access to clear definitions of key terminology throughout the climate change education process would benefit in this regard. Other avenues may include developing resources which support the more gradual development of climate science understanding through case studies focusing on different dimensions of climate change.

Exposing climate change interconnectedness

Building on the foundations of climate science, the sessions progressed to consider some of the socio-political dimensions of climate change. This focus enabled students to explore how climate change had serious implications for many of the development issues with which they had previously engaged as part of their course. The importance of such connections is clear: a future increasingly dominated by climate change would be marked by decreasing food security, poorer health, increased displacement and conflict, each further aggravated by the instability of environmental hazards, such as extreme weather events (Mochizuki & Bryan, 2015; Strachan, 2014). These discussions highlighted that climate change education may offer development educators the opportunity to explore a range of global development challenges, and importantly, to consider how many of these issues are interrelated. Some students were able to connect climate learning to their existing knowledge of development issues, occasionally forming important connections between issues which are often treated separately, for example linking extreme weather conditions such as drought to diminished food security and subsequent migration.

Bryan and Bracken (2010) have identified that some students within ITE have dismissed climate change as irrelevant to their own lives. Indeed, finding creative ways of illustrating global interconnections, namely the relationship between the policies and practices of governments and citizens in the global North and climate change, proved a considerable challenge. In reflecting upon learning activities which exposed global climate connections, an important approach in my future practice would be to 'close the loop' on some of these global connections. In short, this would involve clearly linking

the consequences of climate change experienced by people in the global South, to the causes of climate change, namely the actions of societies in the global North. Extending this chain of causality would prompt more focused discussion on the responsibility for contributing towards, but also potentially addressing, climate change (Mochizuki & Bryan, 2015). For example, extending a previous set of connections by illustrating, with greater clarity, how consumer practices and governmental policies in the global North exacerbate climate change, causing amongst other effects, extreme weather conditions such as drought, which lead to diminished food security and then to large scale migration.

From a personal perspective, reflecting upon the issue of interconnection also highlighted the need for the inclusion of climate change perspectives within my own DE practice and research. In light of the emerging literature which explores the relationship between climate change and violent conflict (for example, Barnett & Adger, 2007; Hsaing, Burke & Miguel, 2013) how can my own understanding of violent conflict be deepened by including a consideration of climate change? How might my future research exploring peace-building DE consider the impact of climate change on violent conflict? As approaches towards tackling poverty and reducing global inequality seem irrevocably bound to climate change (IPCC, 2014; World Bank, 2014), there would appear a clear need for development educators to engage with climate change, as a theme which is an increasingly important dimension of many, if not all of the major contemporary development challenges.

Critical engagement with climate interconnectedness

A major part of my reflections throughout these sessions included a consideration of how best to develop a deeper critical engagement with the range of global interconnections which had emerged in sessions with students. I had spent time considering how I might be able to support a deeper analysis of these climate connections, and whether these interconnections could serve as a basis for examining individual and collective roles and responsibilities in relation to climate change. Once

again, participatory and collaborative DE methodologies provided a platform for a deeper analysis of climate interconnections aimed at stimulating students to consider their positions within these climate interconnections.

Through a series of case studies, students considered how climate change has impacted on the lives of people in the global South. Most students appeared to grasp that the effects of climate change are felt most acutely by people in the global South who have least responsibility for its causes (Selby, 2015), and as such, climate learning offered an opportunity to explore the unequal nature of particular global interconnections. These narratives also revealed how extreme weather events have exacerbated food insecurity, and often explored how communities have responded to the impact of climate change. These forms of adaptation (how do we build resilience towards the effects of climate change?), alongside mitigation (how do we reduce carbon emissions?) are recognised as central components of the response to climate change (Mochizuki & Bryan, 2015). Whilst exploring existing adaptations provides important climate change understanding, I felt that at times a focus on existing adaptations in the global South, and possible future adaptations in the global North, deflected from the more pressing requirement for climate action to reduce carbon emissions. I questioned whether the focus should lie to a greater extent on the need for mitigation, and engaging with the more difficult task of challenging the practices which lead to climate change. Certainly in the future, one approach in this regard might be to develop an activity based around the appropriateness and urgency of particular climate action, considering both mitigation and adaptation in different contexts.

Another key reflection here focused on an underdeveloped aspect of my practice – the need to ensure that individual contributions towards historical and ongoing climate change (for example, personal carbon footprints) are situated within a broader collective responsibility. This approach was particularly important as these individual actions have such a damaging effect in light of the fact that they are part of a much broader collective use of fossil fuels (Mochizuki & Bryan, 2015). The development

of learning activities which elucidate the importance of collective impact upon climate change would further strengthen my teaching in this area. Indeed, such an approach could also lay the foundations for climate actions which go beyond the individualised.

As the increasingly weighty burden is passed on to future generations, climate change has been viewed as a matter of intergenerational justice (Gibbons, 2014; Mary Robinson Foundation, 2013). This factor is another important, yet underexplored area within my own climate change education practice. Throughout the sessions, there were a number of opportunities for exploring this approach, particularly as ITE students will themselves be working with young people and members of future generations, for whom climate change will be an increasingly important issue. Considering the people currently affected by the consequences of climate change, as well as those who will be affected in the future, adds an important dimension to any discussion of interconnection. A focus on the theme of intergenerational justice within climate change education may also provide an important opportunity for development educators – namely a genuine positioning of young people at the centre of educational approaches which address climate change.

Dobson (2006) has argued that engaging with the causal relationships behind climate change can provide students with the opportunity to explore deeper connections and, thus, encourage action. Considering the responsibilities that are attached to the interconnections linking global issues such as climate change needs to be matched with an ability and means to bring about change. Exploring the causes and consequences of climate change offers DE an opportunity to expose deep global interconnections and interdependence. Yet even with a clearly articulated causal relationship, the question remains, how might DE respond to the climate science and consequences of climate change and support learners to take meaningful climate action?

Meeting the responsibility for climate change through pedagogies of collective action?

In response to the need for climate change education to move beyond the promotion of individualised actions (Kavanagh et al., 2012) the sessions which sought to address the ideas of transformative action incorporated collaborative methodologies. My hope was that utilising these approaches would promote consideration of both collective responsibility and collective action, whilst avoiding the possibility of climate change being viewed as overwhelming, disempowering and thus stifling action (Hiller, 2010).

Adopting active learning methodologies is recognised as a challenge for many inexperienced development educators (Bryan & Bracken, 2010). Across each of the climate sessions, I made a concerted effort to foster discussion around the ways in which such methodologies could be undertaken within DE scenarios. Whilst discussion around the role of development educators during the process of collaborative methodologies seemed fruitful, there appeared to be a need to provide students with a deeper theoretical basis for these approaches, and if possible, a connection to other areas of the curriculum where group work methodologies had been explored.

Despite the increasing political commitment towards addressing climate change, it is clear that an overemphasis on incentivised financial policies or 'technological fixes' will not produce the deeper transformation required to address climate change (Kagawa & Selby, 2010; Mochizuki and Bryan, 2015). This raised the question of whether, as a development educator practicing within a formal education system, I am able to stimulate climate change action which extends beyond the technological and financially incentivised. Despite taking small individual steps towards overcoming the 'soft' DE approaches that limit the possibilities of transformative actions (Andreotti, 2006; Bryan & Bracken, 2011) a key challenge to exploring action which goes beyond the technological fix was the limitations of time. The overcrowded ITE curriculum has already been recognised as leaving little time for critical DE (Bryan & Bracken, 2012), and with such constraints, I felt that creating opportunities for the action-

related learning remained an ongoing challenge throughout my CCE practice. Making space for aspects of climate change education which addresses the need for collective action is essential. Whether climate action can be further prioritised within climate change sessions for ITE, or indeed infused throughout all aspects of my future DE practice is a question that I will need to return to.

Conclusion

Utilising reflective practice as a DE learning tool (Bryan & Bracken, 2010), this article has offered a series of personal reflections on some of the pedagogical challenges and possibilities of supporting ITE students in developing their knowledge and understanding of climate change. It is recognised that ITE needs to provide learning opportunities for student teachers to consider their own roles and responsibilities within broader global issues (Waldron, 2014) and, from a personal perspective, exploring climate change through DE may offer a great deal in this regard.

DE offers an important critical space for the consideration of the socio-political dimensions of climate change, through a social and global justice approach (Kavanagh et al., 2012). However, there are a number of challenges which present themselves, particular within the context of ITE. Supporting a solid understanding of the scientific basis for climate change may pose a challenge to DE in certain contexts, but is an essential foundation for a deeper exploration of the socio-political dimensions of climate change. Building upon students' existing knowledge with concise climate science appears essential in supporting an informed dialogue around climate change. In the initial stages of climate change education, exploring the personal and shared experiences and understandings of climate change through active and participatory DE methodologies may later support exploration of the historical causes of climate change as a collective factor, but might also foreground the types of collective response to climate change which are so badly required.

Climate change is a clear example of a global system marked by historical and ongoing unequal relationships between the global North and the global South, and is deeply entwined with major development issues, such as conflict, famine and forced migration. These connections raise uncomfortable questions around the backward facing responsibility for the causes of climate change, and the forward facing responsibility to act against climate change. Climate learning illuminates issues of interdependence and interconnectedness which have prompted deep reflections on other aspects of my professional practice.

There is a pressing need for educational responses to global issues, such as climate change, to finds ways of moving beyond simply supporting individualised action and technological fixes. Incorporating collaborative DE methodologies within my climate change education practice may provide an opportunity for students to move towards collective action on climate change, but there is also a need to support these students in developing the confidence to employ these methodologies in their own DE practice. DE seeks to support learners in considering and taking action in light of their roles and responsibilities in an increasingly globalised world. Climate change is recognised as one of the most pressing issues of our time, and challenges development educators to support collective action against climate change through decarbonisation and sustainable development. At the same time, climate change also offers an opportunity for development educators as an issue which demands an ongoing commitment to social justice, so pivotal to transformative DE (Bryan & Bracken, 2011).

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Benjamin Mallon is a PhD Researcher, Irish Research Council Scholar and initial teacher education tutor within the Department of Education at St. Patrick's College, Drumcondra, Dublin. His research focuses on education and conflict, in particular educational projects endeavouring to build peace. Ben's current research, supported by the Irish Research Council, examines peace-building education programmes on the island of Ireland.