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**Constellations of Environmentalism:
An exploration of learning and activism within
youth-created social media interest groups**

A thesis
submitted in fulfillment
of the requirements for the degree of
Doctor of Philosophy
to the College of Arts, Society, and Education at
James Cook University

by
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Abstract

Online social networks have become embedded within most young people's everyday lives (Green & Hannon, 2007) and have become the number one online activity for youth (Lenhart, 2015). Both the availability of online information and the rise of social networks have impacted how young people engage in knowledge production, communication, and creative expression (Ito et al., 2009) opening up discourse on the educative possibilities of these spaces.

This research project has explored how youth in varying geographic locations around the world use social media platforms to engage with their peers in environmental learning and environmental activism. The results of this multiple case study comprise multiple perspectives from youth from eight different countries, map characteristics of youth-focused social media networks, and explore how these affinity spaces foster learning and activism. In this regard, this project provides a typology of youth social media usage for learning about and engaging in activism on environmental sustainability issues. This typology responds to the overarching research question of the study: "How are youth using social media sites for learning about and engaging in activism on environmental sustainability issues?"

This research project is situated within an interpretivist/constructivist paradigm and is primarily focused on how youth engage in social media practices and understand their subjective experiences of social media, as well as how these experiences inform their learning and activism. The youths' accounts do not result in a definitive or generalizable theory of global youth social media usage, but these accounts elucidate the *substance, structure* and *dynamics* of informal interest-driven learning as understood by youth participants. Data collection consisted of an online questionnaire, interviews, and social media data capture. The online questionnaire provided context on how youth use technology, frequency of use, and how they position social media in relation to environmental learning and activism. The online questionnaire also provided opportunity for youth to volunteer to participate in a 6 month social media observation period. Using Nvivo 10's NCapture, youth's personal profiles along with their participation in one environmental social media interest group were captured. Interviews were conducted at the commencement of the observation period and at the end of the 6 month period.

All data were analysed qualitatively and resulted in three results chapters: Chapter 4 presents a summary of findings from the online questionnaire, individual cases of youth participants and their respective networks, and a cross-case analysis drawing upon several

aspects of the structural aspects of the environmental social media interest groups. Chapter 5 presents youth perspectives and reflections on their learning within environmental social media interest groups and Chapter 6 presents youth perspectives and reflections on activism.

The cases and chapters on learning and activism offer evidence that within informal environmental social media interest groups important learning, identity development, and antecedents of democratic civic processes can occur. There are several examples of substantive knowledge about environmental sustainability issues deepening as a result of youth participating in environmental social media interest groups. There are also examples of the importance of the relationships which are developed, fostered, or continued through online engagement in these spaces. This research project has culminated in results which provide insights and considerations into how interest-driven learning can be fostered and supported through adopting a connected learning approach within formal education systems, along with important considerations for education for sustainability and hopeful educational futures.

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Chapter 1. Introduction

In fiction books and blockbuster movies, it seems that the dominant visions of the future are dystopian. There have been several blockbuster dystopian films in the last two years: *MazeRunner: The Scotch Trials* (2015), *MadMax: Fury Road* (2015), *Tomorrowland* (2016), and *Interstellar* (2014). There does not seem to be a single utopian film during this time period. In the film, *Interstellar*, the main character, Cooper, narrates over desolate scenes, “We used to look up at the sky and wonder at our place in the stars. Now we just look down, and worry about our place in the dirt” (Nolan, 2014). Within speculative fiction, a utopian or dystopian future is the metaphor for the different directions humanity can take in its choices, ending up with a particular kind of polarized future. When considering Cooper’s words, what kind of futures in educational policy and practice are we creating and imagining?

Environmental sustainability reports often leave a reader imagining a dystopian future where hope has become an endangered thing. Unfortunately, environmental sustainability reports are not subject to the suspension of disbelief and are accounts of dystopian beginnings happening today. With the vulnerability of environmental, social, political, and economic systems increasing and the uncertainty of the implications compounding, there are few places where hopeful futures rest or are imagined.

Stepping aside from educational policy discourse and environmental sustainability reports, this research project has avoided proposing a theoretical educational model that can potentially direct young people towards more hopeful futures. Instead this project has focused on exploring how youth in geographic locations around the world are already engaging in learning and activism about the environmental sustainability issues that matter the most to them. The project has resulted in a detailed documentation of how youth engage in informal interest-driven learning and activism within environmental Facebook interest groups. The results of this multi-case study comprise multiple perspectives from youth from eight different countries, map characteristics of youth-focused social media networks, and explore how these affinity spaces foster learning and activism. In this regard, this project provides a typology of youth social media usage for learning about and engaging in activism on environmental sustainability issues.

The first part of this chapter introduces the “Research context and rationale” for this study, and the researcher’s personal background and motivation to carry out this inquiry. This is followed by a general overview of the “Conceptual framework” which situates this

exploratory study, including the research questions framing the inquiry. Next the “Significance of the study” is discussed in relation to research within environmental sustainability education and social media, followed by a brief overview of the chapters following this introductory chapter.

1.1. Research context and rationale

As reports of ecological degradation accumulate, humanity’s relationship with the systems and resources of the Earth has never been more pertinent. According to the Intergovernmental Panel on Climate Change, “human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems” (2014, p. 2). In 2010, world governments were unable to slow significant biodiversity loss, bringing the Earth’s systems closer to potential tipping points (Secretariat of the Convention on Biological Diversity, 2010). These indicators may signal the end of an era of international environmental diplomacy, which started with Agenda 21 from the Earth Summit in 1992 and emphasized education as key to a more sustainable society (United Nations, 1997; UNESCO, 2005). In this context, it may be time to (re)consider education, which has been understood as an “*agent of change*,” as a “*subject of change*” worthy of critical examination in itself (Sterling, 1996, p.18).

Within my research, I employ the term environmental sustainability education [ESE] with an understanding that educational approaches to ESE require pedagogies that embed critical thinking within all courses that promote action competence (Seatter, 2011; Sund & Lysgaard, 2013). However, this distinction is not agreed upon and within research publications the terms Education for Sustainable Development [ESD], Education for Sustainability [EfS] and Environmental Education are used without consistency (see Section 2.8 in Chapter 2).

There is a widespread social anxiety in the Western world that youth¹ have become apathetic and disaffected in relation to civic participation (Loader, 2007; Vaizey, 2005), as evidenced by low voter turnout among young people aged 18 to 25 (Oliver, 2013; Walsh & Black, 2014) and campaigns focused solely on encouraging young people to vote. Others argue that this pervasive myth of youth apathy suggests only a lack of interest in traditional politics, and that youth are participating in civic expression in non-traditional ways (Dahlgren, 2003;

¹ Within research ‘youth’ is often distinguished as 15 - 24 years of age and this range is often used for statistical consistency (UNESCO, 2016). In my research project, I have focused on youth 16 - 18 years of age (see Section 2.3).

Evans et al., 2014; Loader, 2007; Ward, 2008). With the advent of increased online interactivity and participatory platforms, such as blogs, social networking sites, and wikis, media and communication tools offer new avenues for youth participation in culture and democratic expression (Ito et al., 2009; Jenkins, Clinton, Purushotma, Robison, Weigel, 2006; Lessig, 2004). Some scholarship has researched how computer-mediated communications operating across networks have helped mobilize social movements in political and environmental protests (Juris, 2008; Pickerill, 2003; Van de Donk, Loader, Nixon, & Rucht, 2004; Van der Heijden, 2005); however, more recent additions of powerful social networking sites like Facebook and Twitter, combined with a growing youth-based user demographic, raise new questions about online environmental youth activism (Robelia, Greenhow, & Burton, 2011).

The growth of social media is especially significant within existing educational contexts, because the internet, music, film, and video are increasingly counting as out-of-school educational 'places' for youth (Jenkins et al., 2006; Stevenson, 2008; Thorne, 2011). While there is recognition within the research and literature of online informal learning, there is a widening gap between young people's online places of engagement and the emphasis of many educational systems (Buckingham, 2007). The growth of online activism and social media is also significant in environmental and outdoor education where there has been a decrease in direct experiences in natural environments (Louv, 2005; Stevenson, 2008).

Within environmental sustainability education, understanding the internet as an education and communication tool requires reimagining what constitutes environmental education and how it is practiced (Fawcett, 2009; Gough, 2009; Peters & Araya, 2009). Ardoin et al's (2013) exploration of future trends in environmental education research highlighted 'the rise of the digital age' as a research area of medium to high impact; however, few of the researcher-respondents interviewed in the study referred to the rise of the digital age as an area within which they would like to conduct research. I personally find this troubling that only a few environmental education researchers are focusing their research on this evolving and interdisciplinary field where the techno-social and ecological meet.

This research project has developed from experiences I have had working as a teacher and a sustainability coordinator within several high schools where students were learning about environmental sustainability issues outside of the formal curriculum through various web-based technologies, and some of the barriers students faced on integrating their knowledge and practices into their classrooms or schools. I became interested in how

students navigate bans on social media within their schools, but still manage to use these platforms to promote environmental activities within their school and to their school peers. During this time, I also experienced the challenges some motivated students had in finding avenues to change or even to suggest alternatives to the school's practices. Too often, the student council's focus was on organizing social events rather than on school governance. With the rise of social media platforms and increased user engagement, I began to investigate how youth use these platforms to organize and learn about the environmental sustainability issues that affect their lives and communities. As a researcher and an educator, I firmly believe that educators have an imperative to be present in youth practices, to witness practice, and to form decisions and policy based on observed practice and research.

While the growth of social media users and usage is significant and there is hopeful opportunity for collaboration and new models of knowledge production, I aim to maintain a critical and reflexive understanding of learning and technological developments as a researcher - avoiding both educational instrumentalism and technological determinism.

1.2. Conceptual framework

The project has been situated as a mapping project because of: 1) the exploratory approach which has guided the research project and 2) the under-researched and documented area of environmental learning and activism within social media sites. This project is situated within an interpretivist/constructivist paradigm and has attempted to develop a comprehensive and holistic understanding of youth-interest driven environmental learning and activism within social media sites through mapping environmental social media interest groups with social network analysis. The project has also attempted to better understand how youth in various geographic contexts use social media platforms and perceive their engagement as related to environmental learning and activism through collecting data from interviews, social media data capture, and online questionnaire responses.

This research project has not been designed to test theories from previous case studies on interest-driven learning and participatory culture (boyd, 2008; Ito et al., 2010; Jenkins et al., 2006), but to extend and explore how online participatory culture and practices are shaping youth online interest-driven learning and activism from a connective approach, which recognizes online spaces as related to other social spaces.

Through conducting online participant observation and semi-structured interviews, my research has culminated in a multiple-site case study that helps to elucidate the *substance*, *structure*, and *dynamics* of youth engagement in self-motivated and interest-driven environmental social media interest groups. This research project is framed by the following overarching research question and sub-research questions:

- How are youth using social media sites for learning about and engaging in activism on environmental sustainability issues?
 - What are some prevalent structural characteristics of youth-created environmental social media interest groups?
 - What types of learning do youth attribute to their engagement in youth-created environmental social media interest groups? How does this learning occur? What and who shapes this learning?
 - How do youth define and engage in environmental social media activism? In what ways and to what extent do youth view online environmental social media activism as contributing to social and environmental change?

1.3. Significance of study

This research project exists broadly at the intersection of environmental sustainability education [ESE], digital media education, critical pedagogy, and youth social movements.

Within ESE there are few studies which have investigated social media and environmental learning specifically. One of the few studies (Robelia et al, 2011) that has been conducted on how participating in a Facebook application changed participants' environmental knowledge and environmental behaviours collected all data within a rewards-based model, which means that the observed engagement within the study does not reflect authentic interest-driven engagement within social media. The data collected within my research study was collected with consent from participants, but without offering a reward for engagement or participation and therefore resembles a more accurate depiction of authentic interest-driven environmental learning and activism. Another study in this area has shown how environmental learning and action taking within a face-to-face, school-based program can be transferred and reinforced through social media engagement (Warner, Eames, & Irving, 2014). However, my research project has not solely focused on programs with face-to-face programming, school-based programming, or NGO programming and has included groups and networks that are informal in structure (see various group structures in

Chapter 4, Table 4.1). The inclusion of these groups has resulted in mapping learning and activism across various different levels of organizational structure and has not relied on how learning and action transfers from programming philosophy or learning outcomes to social media engagement.

Within this research project, the cases (Chapter 4) and subsequent chapters on learning (Chapter 5) and activism (Chapter 6) offer evidence that within informal environmental social media interest groups important learning, identity development, and antecedents of democratic civic processes can occur. Within the cases, there are several examples of substantive knowledge about environmental sustainability issues deepening as a result of youth participating in environmental social media interest groups. Within the learning and activism chapters, it is also evident that youth engage in debate about environmental issues and learn about civic processes on social media. There are also examples of the importance of the relationships that are developed, fostered, or continued through online engagement in these spaces.

This research has culminated in results that provide insights and considerations into how interest-driven learning can be fostered and supported through adopting a 'connected learning approach' within formal education systems, along with important considerations for education for sustainability and hopeful educational futures.

1.4. Organization of study

This PhD thesis is composed of eight chapters. Following this chapter, Chapter 2, entitled "Locating Literature Bodies in a Sea of Interdisciplinarity: Environmental Learning and Activism within Social Media" weaves together salient currents of thought and significant research findings within the intersection of four main literature bodies: participatory culture, environmental sustainability education, youth activism, and social media design affordances. Within Chapter 2, I consider generational labels of youth and review youth internet usage and social networking practices. This is followed by a synthesis of the four main literature bodies and their relationships to each other in terms of learning and activism within social networking sites.

Chapter 3 entitled "Methodology: Notes from the Online Field" presents the theoretical perspective, case study methodology and various ethnographic methods and analytical steps which have been employed in this exploratory mapping project. This research project has required considering many methodological and analytical implications for collecting data

within social media, mapping structural characteristics with social network analysis, and integrating youth qualitative data from interviews. With this in mind, this chapter outlines the integration of quantitative social network analysis with qualitative analysis of participants' experiences to provide rich and meaningful analysis of learning and engagement across online and offline spaces. This discussion is followed by a consideration of the ethical issues of research investigating youth and online new media practices. The last sections focus on issues of trustworthiness, and then methodological limitations. In this chapter, I have attempted to clearly outline the methods and analytical processes in detail to allow the reader to assess the extent to which proper researcher practices have been followed in terms of "the research design and its implementation; the operational detail of data gathering; and the reflective appraisal of the project" (Shenton, 2004, p. 72).

Chapter 4, entitled "Mapping Youth-Created Environmental Social Media Interest Groups", presents a broad overview of youth interest-driven environmental learning and activism summarized through data collected from an online questionnaire. This section is followed by a visual analytic which explains how the constructs of *affordance*, *culture*, *dynamics*, *structure*, and *substance* are employed to theoretically explore the phenomenon of engagement within environmental social media interest groups. This is followed by detailed case reports of each youth participant and their membership in an environmental social media interest group. The last section of the chapter focuses on a cross-case analysis of the structural characteristics of each youth participant's network with attention to the following aspects: *geographic reach and network size*, *leadership positions*, *adult facilitators*, *communication tools used and group meetings*, and a *network communication visualisation*. This mapping has attempted to answer the sub-research question: "What are some prevalent structural characteristics of youth-created environmental social media interest groups?" The network communication visualizations, which show the size of the interest group, engagement of participants in terms of tagging, commenting, and posting, and the relationships within the network, are evidence of how these "quasi-public" spaces afford youth spaces to connect with like-minded others, take leadership roles, express their ideas and values, and explore environmental identities.

Chapter 5 focuses on youth perspectives and reflections on their learning within environmental social media interest groups and aligns with the research questions: "What types of learning do youth attribute to their engagement in youth-created environmental social media interest groups? How does this learning occur? What and who shapes this

learning?” Drawing upon data collected from interviews, individual social media data, and group social media data, this chapter presents youth reflections on peer-to-peer learning, the types of skills required to participate in social media interest groups, a comparison of 21st century skills youth attribute to learning in high school compared to an environmental social media interest group, and lastly the role of teachers and adult facilitators within some of these groups. This chapter focuses on the constructs of *substance* and *dynamics* in terms of how substantive topic knowledge is shaped by *dynamic* processes of learning and engagement within social media group contexts.

Chapter 6 focuses on youth perspectives and reflections on activism within environmental social media interest groups and draws upon data collected from interviews, individual social media data, and aligns with the research questions: “How do youth define and engage in environmental social media activism?” and “In what ways and to what extent do youth respondents view online environmental activism as contributing to social and environmental change?” In order to attend to these questions, some contextual framing is reported on in terms of how youth define activism, how youth identify or do not identify as activists and a consideration of youth sharing practices of environmentally-related content within social media. The analysis presented in this chapter aligns with the constructs of *substance*, *dynamics*, and *culture*.

Chapter 7 offers a synthesis of results from Chapters Four, Five, and Six. The chapter begins with an overview of the study, and then a summary of why social media networks are significant sites for youth. This discussion is followed by a consideration of results from mapping network structures of environmental social media interest groups. The majority of the chapter is focused on a synthesis of results with contemporary theory and literature in relation to: 1) learning that youth attribute to environmental social media interest groups, and 2) environmental social media activism as understood and practiced by youth.

Chapter 8 provides an overview of the main findings from this research study along with a consideration of limitations of this study and recommendations for future research. The chapter and thesis conclude with a discussion on the implications of this research study’s findings in terms of connecting informal learning to formal education, and implications for environmental sustainability education [ESE] and educational futures.

Chapter 2. Locating literature bodies in a sea of interdisciplinarity: environmental learning and activism within social media

2.1. Introduction

Online social networks have become embedded within most young people's everyday lives (Green & Hannon, 2007) and 71% of American youth have profiles on Facebook (Lenhart & Page, 2015). As such, they are increasingly important information and communication tools for young people. Both the availability of online information and the rise of social networks have impacted how young people engage in knowledge production, communication, and creative expression (Ito et al., 2010). The increase in the use of social networking sites [SNS] is unparalleled by any other activity on the web (Lenhart, 2015). This increase in use among young people has resulted in a proliferation of research that considers the social, psychological, physiological, and behavioural impacts. The open and collaborative nature of social networks as communication and organizing tools, along with shifts in ways that civic and political engagement unfolds, raises questions of how young people are using these networks to learn about and take action on the issues that concern them the most.

This literature review aims to weave together contemporary emergent thought and research findings that are relevant and important for framing this research. Specifically this research draws upon literature from 21st century digital literacy education on participatory culture, environmental sustainability education, youth activism, and social media design affordances. The interdisciplinary quality of this research within a burgeoning field of study has made it difficult at times to draw clear boundaries and to pull together bodies of literature which have not previously been combined. In part, the research is distinctive for its attempt to explore dynamics in a medium that, by definition, blurs traditional boundaries of communication and learning. The following simplified diagram is provided to help relate these literature bodies to each other and locate the focus of this research.

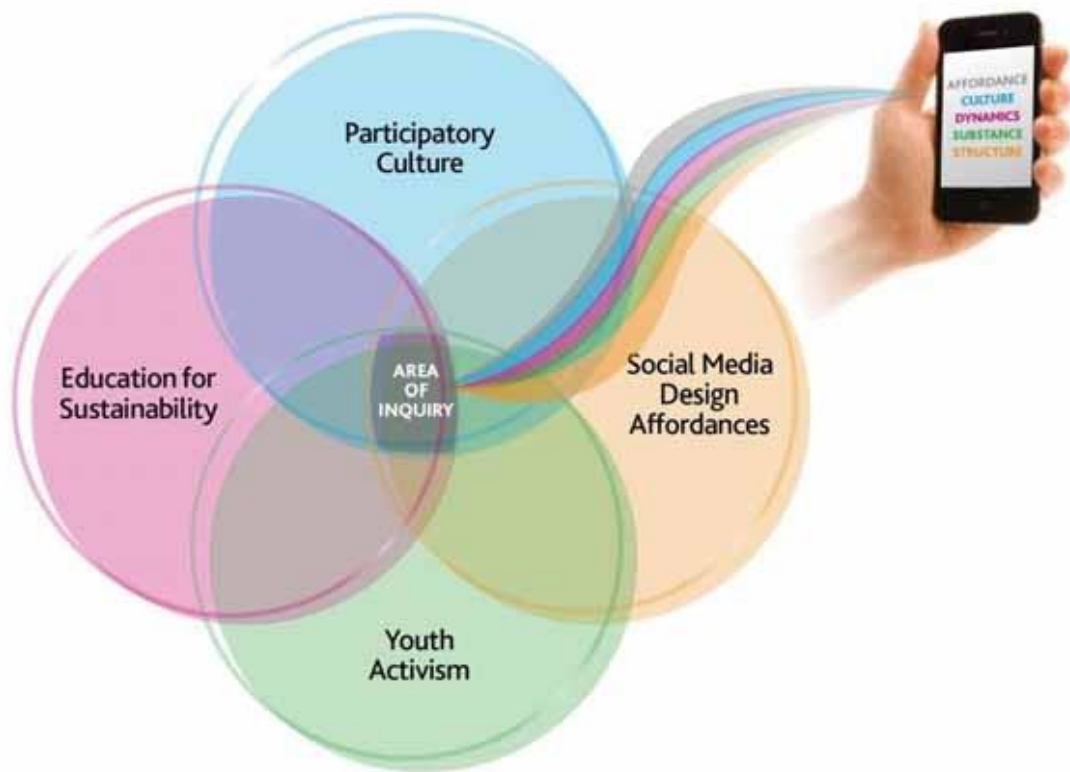


Figure 2.1: Visual analytic to explore engagement in youth-created environmental social media interest groups.

2.2. Chapter overview

This chapter begins by situating concepts of youth and associated generational labels, and is followed by a review of the literature on youth internet usage, social networking practices and social media design affordances. This is followed by a discussion of participatory culture, environmental sustainability education, youth activism and civic engagement. The last section of this chapter considers broader implications of educational and environmental sustainability policy discourses as they relate to behaviour-change instrumentalism, predetermined futures, and the future of schools.

2.3. Social construction of youth

My research is primarily focused on youth, specifically within the age range of 16 - 18 years. Within the literature, the concept of youth is a fluid category and broadly understood as a transition from childhood's dependence to adulthood's independence (UNESCO, 2016). A common age range to distinguish youth is 15 - 24 years of age and this range is often used for statistical consistency. However, defining youth as a fixed age range is problematic because

the transition from childhood to adulthood may occur outside of this range and may be dependent on specific social contexts. Some psychologists and biologists frame adolescence as a sequence of developmental stages characterized as a time of ‘storm and stress’ (Hall, 1904); a conflict between identity and ‘role confusion’ (Erikson, 1968); a period of ‘identity crisis’ (Marcia, 1980); or a stage of ‘ego-centrism’ (Piaget, 1926). The validity of such stage-based theories is contested by sociologists (Buckingham, 2008; Corsaro, 2005; Postman, 1994; Ito et al., 2010; boyd, 2008) who argue that the experience of adolescence is dependent on social context, in particular to social class, gender, and ethnicity, and that ‘youth’ is not a universal state of being. Socially-constructed categories of youth have emerged from varying social, political, and economic contexts. For instance, pre-industrial European societies did not have clear distinctions between childhood and other pre-adult phases of life (Griffin, 1993). It is also argued that youth culture is increasingly defined by the commercial market (Cohen, 1986), especially with the rise of new categories like ‘tweens’, ‘middle youth’, and ‘kidults’ (Buckingham, 2008).

Recognizing that the terms ‘youth’, ‘teenager’, and ‘adolescent’ are socio-historically dependent, I use them with an understanding of their contested meanings. For this particular research project, participants between the ages of 16 - 18 will be described as ‘youth’ or ‘young people’, even though 12 - 15 year-olds; 19 - 21 year-olds or even 21 - 24 year-olds can also be referenced by these terms.

Net Generations

The generation of young people who have grown up with the internet are labelled with a variety of different names: ‘digital natives’, ‘d[igital]-gen’, ‘n[et]-gen’, ‘Nintendo kids’, ‘Millenials’, ‘Generation Y’, and now ‘Generation Z’. Overall these generations are considered to be born after 1982 and classified as being more open, democratic, creative, and innovative than preceding generations (Buckingham, 2008). The youth in this study are considered to be on the cusp of Generation Y and Generation Z. Some commentators have suggested that Generation Z has a feeling of unsettlement and insecurity because of growing up through the 2008 recession; however, this distinction is contested (Twenge, 2012). Other research suggests that Generation Z learners share many similarities with Generation Y learners and approach learning from an intuitive, personal relevance, and visual and kinesthetic mindset (Faust, Ginno, Laherty & Manuel, 2001). These students are generally averse to lecture-oriented or text-only modes of instruction and tend not to be sequential thinkers (Black,

2010). Both cohorts have grown up with unprecedented access to the internet and this has caused a proliferation of writing on the implications of learning for these groups.

Prensky's (2001) paper, titled "Digital Natives, Digital Immigrants" and Tapscott's (1998) book, *Growing Up Digital: The Rise of the Net Generation*, are often cited in popular debate about the characteristics of these cohorts. First I will briefly summarize their respective positions and then raise some issues with these generational labels. According to Prensky, digital natives are young people who have grown up immersed in the internet, digital media, videogames, and social networks, whereas adults who have come to these things later in life are referred to as "digital immigrants". Prensky argues that digital natives think and process information in fundamentally different ways than their predecessors. He suggests that digital natives are dissatisfied with traditional education and have very different learning styles, which are characterized by valuing graphics over words, preferring interactive platforms, and operating at the "twitch speed" of video games and MTV. Prensky also draws on the work of neuroscientists and argues not only that digital natives have different learning styles but that their brain structures are different from digital immigrants even after just one decade of adaptation of online engagement.

Both of these cohorts of young people have also been characterized as the "net generation" (Tapscott, 1998) and contrasted with the baby boomers. Tapscott compares the baby boomers and the rise of television watching to the net generation and the rise of the internet. He generalizes the baby boomers' values as "hierarchal, inflexible, and centralized" and sees these values as derived from television, a passive medium, which dumbs down its users, broadcasts a singular view of the world, and isolates individuals. According to Tapscott, the net generation radically contrasts with the baby boomers: they are "hungry for expression, discovery, and their own self-development" (p.40), again in part because of inherent qualities of the internet as a medium which is characterized as active, intelligence-raising, democratic, interactive, and socially-based.

Both of these generational definitions as presented by Prensky and Tapscott are attractive in that they seem to capture a social phenomenon which many of us experience but are unable to label and apply to an entire generation. From an educational perspective, it is unlikely that a catchall term can be used to accurately demarcate the characteristics of a generation of learners in a multitude of different contexts. In fact, empirical research shows that among highly connected young people there are variations in internet skill and uses (Hargittai, 2010). Relying solely on technological determinist perspectives, access to the

internet could be equated to ability; however, research of young people's online activities has shown that the majority of their engagements and activities are not ground breaking (Luckin et al., 2009), and only a small majority of youth are considered innovators or 'digital pioneers' (Green & Hannon, 2007). Research focused on the digital divide, between those who have access to the internet and those who do not, has tended to look at basic demographic and socioeconomic predictors of access (Hargittai, 2010) rather than investigating internet skills and use (Jenkins et al., 2006).

Both Prensky and Tapscott's arguments are also flavoured with technological determinism in that the qualities of the net-generation are positioned as outcomes of the rise of the internet, rather than in light of other changes in the political economy of youth culture, social and cultural policies affecting youth, or the realities of everyday social environments for young people (Buckingham, 2008). While the terms may not be effective in describing a generation of learners, it is worth noting that usage and applications of the internet have exponentially increased since the rise of the internet, and the technological context will continue to shift communication, interaction, and knowledge production (Starkey, 2011).

2.4. Youth internet usage

Globally there are 3.36 billion people with access to the internet. By world region there are approximately 1.6 billion users in Asia, 605 million users in Europe, 313 million users in North America, 345 million users in Latin America, 330 million users in Africa, 123 million users in the Middle East, and 27 million users in Oceania/ Australia (Internet World Stats, 2016). It is difficult to know what percentage of the 3.36 billion world users are youth; however, American trends of youth connectivity show that 95% of American youth have access to the internet at home (Madden, Lenhart, Duggan, Cortesi & Gasser, 2013). Since the major growth areas of internet users over the last few years has been in the developing world, then it is very likely that youth access to the internet has also grown in other world regions. However, data are not publicly available for many developing countries.

2.5. Youth and social networking

The emergence of information and communication technologies has given rise to a new kind of socially networked economy and culture (Castells, 2010). According to Castells, these information networks constitute "the new morphology of societies", which he named "the rise of the network society" (2010, p.500). The online communication landscape has significantly changed from 2001 to the present with the advent of several very powerful social

networking services, such as: Yahoo and Google groups in 2001; Friendster in 2002; MySpace and LinkedIn in 2003; Orkut and Facebook in 2004; YouTube in 2005; Twitter in 2006; and Google+ in 2011, among many other less well-known social networking service providers. Within the literature social networking sites are defined as, “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content” (Kaplan and Haenlein, 2010, p.60).

Anatomy of social networking sites

While some SNS vary in services offered, the majority have many similar features. They comprise a personal profile, which offers a description of each member, his or her social links, and a variety of additional services to facilitate information sharing and communication. The network is created by members inviting other members to join, accepting friend associations, or accepting other members’ invitations to connect. In addition to text, photos, videos, and links uploaded by an individual, members can leave comments on other people’s walls as well as send private messages. The activity stream shows the actions and comments of the members’ interactions. SNS are considered instrumental in the shift to Web 2.0 design because these sites have within the platform design: participatory information sharing, user-generated content, user-centred design, and online collaboration. While social networking applications can be used for purposes like information retrieval, their defining features of online engagement are to “perform and realize social interactions, self-presentation, public performance, social capital management, social monitoring, and the production, maintenance, and furthering of social ties” (Tufekçi, 2008, p. 548).

Youth love social networking

The popularity of social networking is unparalleled by other web applications (as of December, 2015, Facebook had 1.6 billion monthly active users) (Statista, 2016). Visiting a social networking site has been identified as the number one activity American youth do online: 73% of youth internet users between the ages of 12 - 17 in the US use an online social networking site, whereas only 8% visit virtual worlds, such as Second Life (Lenhart, 2009). In Australia, social networking and other online communication activities comprise 64% of young people’s total internet time - an average of 49 minutes per day (Australian Communications and Media Authority, 2008), and the majority of this time (76%) is spent while they are at home. However, not all youth participate in social networking; boyd’s (2008)

research suggested three main categories of teen nonparticipants: disenfranchised teens, who lack access either by structural limitations or social restraint; conscientious objectors who choose not to participate; and former users, teens who once participated but have stopped due to a wide range of circumstances.

From the range of available SNS, Facebook, Instagram, Snapchat, and Twitter are the most popular platforms among American youth (Lenhart & Page, 2015).

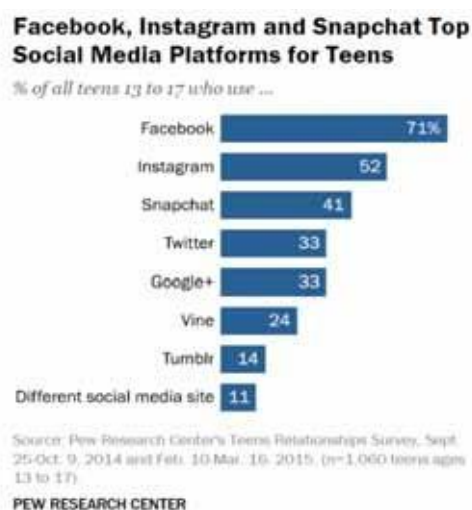


Figure 2.2: SNS platforms used by American youth. Reprinted from *Teens, Social Media & Technology Overview 2015* by Lenhart, A. & Page, D., 2015, Washington, DC: Pew Research Centre. Reprinted with permission.

The scale of these networks is also worthy to note, with the average American having 634 ties in his or her overall online social network (Lenhart, 2009).

“Hanging Out”, “Messing Around” and “Geeking Out”

In the largest ethnographic study on youth internet use to date, researchers interviewed 800 youth from across the US and conducted over 5000 hours of online observation (Ito et al., 2010). This study is important not only because of its scale but because it shows the diversity of youth engagement, raises questions about inequalities of access, and explores informal peer-to-peer online learning.

Ito et al (2010) found that the majority of youth use online social networks to extend their range of friendships from familiar contexts of school, religious organizations, sports, and other activities. From this observation, they classified youth engagement on SNS as “hanging out,” where they supplement already existing friendships by being in constant contact with friends through private messages or through posting public messages. The study also found that young people engage in informal peer-to-peer online learning, which is either interest-

driven or friend-driven. Some youth “mess around” which means that they explore their interests or hobbies and may experiment with digital media and produce web content in which they acquire technical and media skills. A minority of youth “geek out” and explore a specific topic or talent with individuals or organizations that have specialized knowledge on the topic outside of their peer group network or peers’ interests.

2.6. SNS and youth identity development

The personalized content that individuals share within SNS is a narrativization of identity (Sfard & Prusak, 2005). Personal social network profiles are discursive constructs and in this way, are stories where identity is constructed by the user who posts content but also by individuals within the network who respond. In SNS there are no physical corporeal bodies so users rely on the identity information that an individual has selectively chosen as representative. The selection, curation, and presentation of personal identity information requires that users explicitly “write themselves into being” (boyd, 2008) through creating a profile, adding photos, biographical information and status updates.

There is concern about young people understanding the significance of the content they post as representative of themselves in a quasi-public sphere. However research conducted by Lenhart and Madden (2007) has shown that most youth actively manage their personal information and consider privacy settings on photos, video, and text that they share. While there are many ethical questions about adolescents and informed Facebook identity construction, Clarke (2009) argues that SNS platforms give young adolescents a sense of agency and encourages them to take responsibility for shaping their identity development.

Research has shown that in online spaces where identity is accountable, such as within SNS, users may use their profiles to express or explore “hoped-for possible selves” (Yurchisin, Watchravesringkan & McCabe., 2005). Similarly, Sfard and Prusak (2005) suggest that stories about a person can be split into two subsets: *actual identity*, which consists of stories about the actual state of affairs, and *designated identity*, composed of narratives presenting a state of affairs which for one reason or another is expected. For example, “designated identities are stories believed to have the potential to become a part of one’s actual identity. They can be recognized by their use of the future tense or of words that express commitment, obligation or necessity, such as should, ought, have to, must, want, can/cannot, etc” (Sfard & Prusak, 2005, p. 45).

Online SNS create an opportunity to explore “hoped-for-self” personas through character manipulation, group affiliation, preference exploration, and image selection (Zhao, Grasmuck & Martin, 2008). However, these are not static presentations of self as users can update profile information and status updates as well as receive feedback from others, creating a complex online identity exploration and exchange space: “Facebook is an ideal condition for examining identity construction in online environments where the relationships are anchored in offline communities” (Zhao et al., 2008, p. 1820).

Beyond pro-social identity development through social media, research documents incidents of cyberbullying (Patchin & Hinduja, 2006), privacy issues (Palfrey, Gasser, boyd, 2010), internet addiction, and sleep deprivation (Christakis & Moreno, 2009) among youth and SNS. Moreover, while ICT-use is not antithetical to sustainability practice, internet addiction and nomophobia (Yildirim & Correia, 2015), an anxiety disorder related to the fear of being without a mobile phone, along with shifting concepts of place and community may create a counter sustainability impact.

Environmental and activist identity construction

Identity development is complex; however, at its core it refers to describing the self or making aspects of the self known to others (Altheide, 2000). The construction of an identity includes descriptions that are generated internally as well as those that are confirmed or imposed by others (Devine-Wright & Clayton, 2010; Stone, 1981). During adolescence defining one’s identity becomes a paramount task (Crocetti, Rubini, Luyckx & Meeus, 2008; Erikson, 1968) and since Erikson’s seminal work there have been extensive studies that have addressed this developmental time. Identity and how identity construction relates to behaviours is a complex process which many different disciplines explore. For the purpose of this research, I will focus on activist identity construction and environmental identity construction.

Within social movement studies and social psychology, a scale of activism orientation has been developed to measure how activist identities may influence attitudes and behaviours of an individual (Corning & Myers, 2003). There has been a proliferation of research focused on new forms of citizenship and politics within SNS sites (discussed in more detail in Section 2.9 Youth Activism & Civic Engagement).

Within environmental education, environmental identity construction has been primarily conceptualized and studied through considering how identity is formed and informed by an individual’s relationship to the natural environment (Blatt, 2013; Clayton,

2003; Dresner, Handelman, Braun, & Rollwagen-Bollens, 2014); however, some scholars have instead focused on the ways which social association inform and shape environmental identity (Clayton & Opatow, 2003). A social environmental identity is an environmental identity that is formed around social interaction and group dynamics rather than an affiliation with the natural world (Kempton & Holland, 2003). Specifically, Kempton and Holland (2003) explain that a social environmental identity is self-defined and used by people to position themselves in relation to others regarding their environmental views and lifestyle choices.

Drawing upon Kempton & Holland's (2003) work on social environmental identity and their three proposed stages of environmental identity development among environmentalists, Stapleton (2015) expands their work to create a list of several aspects of social environmental identity:

1. Is malleable over time
2. Is tightly connected to practice
3. Is continually informed by and recreated through social interaction
4. Simultaneously exists on multiple levels; global/local and micro/macro scales; and
5. Can be largely impacted by education and schooling (p.97)

These aspects offer a relevant framework for considering socio-environmental identity development in social media and are applied to participants' social media data in Chapter 7, Section 7.6.

2.7. Participatory culture and education in the 21st century

According to a study conducted by Lenhart and Madden (2005), more than one-half of all youth had created media content, and roughly one third of teens who use the internet had shared content they had produced. Jenkins et al (2006) explain that in many cases these teens are participating in what they describe as "participatory culture". According to Jenkins et al (2006),

A participatory culture is a culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices. A participatory culture is also one in which members believe their contributions matter, and feel some degree of social connection with one another (at the least they care what other people think about what they have created). (p.3)

The ability for a young person to participate in online culture(s) with relatively low barriers to express their ideas, and with an underlying philosophy of sharing creations along with a culture of informal mentorship challenges the dominant educational model of the 20th

century, which is generally characterised by teacher-centered lessons, discrete subjects, students working independently, and a focus on lower order thinking (such as knowledge and comprehension). If today's students are immersed in an information-rich, technologically-abundant world, with relatively low barriers to participatory cultures, what types of literacies, skills and actions might better support learning? Buckingham (2008), Jenkins et al (2006), and Green and Hannon (2007) focus on the importance of building criticality for both cognitive skills and online practices. For other educational researchers, technical skill sets are promoted as core competencies (Lenhart, 2005). The Framework for 21st Century Learning (Partnership for 21st Century Learning, 2007) has developed an extensive list of interdisciplinary themes, learning and innovation skills, and literacies to help guide educational policy and address the gap between 20th century education approaches and the knowledge and skills students need for the 21st century. Overall, these literacies, learning areas, and skills can be summarized as: communication, collaboration, creativity, leadership, and technological proficiency (Luckin et al., 2009). For more detail on the Framework for 21st Century Learning, see Chapter 5, Section 5.4.6.

Concomitant with developing 21st century skills, there is a growing recognition of the importance of informal learning in out-of-school learning environments (Ito et al., 2009; Jenkins et al., 2006; Owen et al., 2006; Stevenson, 2008). The divide between most current classrooms, which are designed around information scarcity, and the students' daily use of and access to the internet is often contradictory. The term digital dissonance is used to describe this disconnect between how youth use media at school versus out of school (Clark et al., 2009).

The current dominant model of education that emerged in the industrial revolution is arguably out of step with the way that information and knowledge are exchanged, disseminated, and created due to information availability, automation of data, and interconnectivity, all spin-off implications of the internet (Davidson & Goldberg, 2010). If Henry Ford was alive today, he would be amazed about how much the world has changed in terms of technology, corporate organizations, production, and work; however, if he was to visit a school, it would be a very familiar institution that functions in almost the same fashion as when he was a boy (Whitney, 2010). Overall, tertiary education systems have been significantly quicker to adapt than the K-12 system. From 2011 onward we have seen the rise of massive open online courses [MOOCs], learning analytics, personal learning environments, personal learning networks, and research into new emerging theories.

The Horizon Report is an annual report that aims to identify and describe emerging technologies likely to have a large impact on teaching, learning, research, or creative expression within education around the globe. The number one trend stated in the New Media Consortium's (2012) Horizon Report, which specifically focuses on K-12 learning, is:

The abundance of resources and relationships made easily accessible via the Internet is increasingly challenging us to revisit our roles as educators. This multi-year trend was again ranked very highly, indicating its continued influence. Institutions must consider the unique value that each resource adds to a world in which information is everywhere. In such a world, sense-making and the ability to assess the credibility of information are paramount. Mentoring and preparing students for the world in which they will live is again at the forefront. (p. 4)

The priority given to the notions of "sensemaking" and an "ability to assess the credibility of information" signify a shift from a time of information scarcity to a time of information abundance. If we are swimming in data then is it not the role of schools to prepare students to credibly make sense of the world they will encounter when they leave school?

The importance of online informal learning is also marked by the MacArthur Foundation's decision to shift its funding mandate, after 26 years of providing funds to support traditional school reform in the USA, to a focus on informal online learning, specifically, how young people are learning outside of school as they participate with digital media (MacArthur Foundation, 2011). Since 2006, the Foundation has awarded grants of more than \$85 million to organizations and individuals to support digital media and learning. The MacArthur Foundation summarizes the shift in learning environments in the 21st century in three ways:

- 1) a shift from education (bound by an institution) to learning (which can happen anywhere);
- 2) a shift from consumption of information to participation and production of content;
- 3) a shift from educational institutions to educational networks (2011a).

Throughout the 1990s, school systems focused energy and funding into providing the hardware and software for students to have access to computers and the internet (Burbules & Callister, 2000). However, providing hardware does not automatically transfer into positive educational experiences or students gaining computer skills and competencies. Fostering a rich experience requires educational initiatives to help youth learn how to use programs and tools competently. Jenkins et al (2006) refers to the difference between youth who have access and those who do not, and the corresponding range of computing competencies, as the

Participation Gap. It is argued that historically, youth who had access to books at home, or whose parents took them to musical performances and museums, developed skills that transferred to their performance in school (Jenkins et al., 2006). Castells argues that as:

computer use is ever less a lifestyle option, ever more an everyday necessity, inability to use computers or find information on the web is a matter of stigma, of social exclusion revealing not only social norms but also the growing centrality of computers to work, education, and politics". (as cited in Jenkins et al., 2006, p.14)

The rise of the internet and social networks are seen as drivers for the shift to 21st century education. Social networks are deemed to offer new democratic and collaborative models of educational practice (Reich, Subrahmanyam & Espinoza, 20012). It is argued that SNS have many features which can facilitate positive educational learning potentials: peer-to-peer learning, diversification of cultural expression, skill development for the modern workplace, a more empowered sense of citizenship (Jenkins et al., 2006), synchronous and asynchronous feedback, and the ability to augment social contexts, such as school, university, or local community (Mason & Rennie, 2007). Social networking sites can also support interactions and exchanges between learners facing similar challenges in their studies (Shapiro & Margolin, 2014); connect learners with others who have shared interests and affinities not catered to in their immediate educational environments (Maloney, 2007); and engage learners in social interactions and dialogue through which much learning occurs. Young people are participating in these activities not only as individuals but often collaboratively and cooperatively as interest- or purpose-driven communities of practice (Merchant, 2012)

Within the literature, learning which occurs within social networking sites has been referred to as endogenous learning (Rosenfeld Halverson, 2011) because the learning goals are intrinsic and specific to the individual learner's interests. This is opposed to more conventional exogenous learning, associated with formal education environments where the learning goals are extrinsically set by departments of education, universities, etc. The endogenous appeal within social networking sites to learn about intrinsic interests allows for learning to occur individually or individuals to form groups around specific topics of interest.

However some research shows that a small number of youth use the online world to explore their interests or find information that goes beyond what they can access at school or in their local community (Ito et al., 2009). At the same time the type of activities that young people engage in online are often not groundbreaking, but mundane (Luckin et al., 2009; Buckingham, 2008). Dissent over the influence of SNS on education has also been voiced in terms of SNS being seen as contributing to student disengagement, distraction, and

disconnection of learners (Bugeja, 2006; Cassidy, 2006; Shirky, 2014), the loss of critical thought (Brabazon, 2007), and reifying a 'culture of disrespect' between students and educators (Ziegler, 2007).

According to Facer and Selwyn (2010), the social networking debate has mostly focused on regulation and permissiveness within the formal education setting. They argue that there is a need for research to focus on considering the lived experiences and practices of learners, critical reflection on "what constitutes effective attainment of competence in social networking practices" (p. 41), and challenging the assumption that educational institutions have the right to utilize these spaces which youth use for formal education purposes. Focus groups with 11 - 16 year-olds from 27 different schools in the UK reported that many students felt that participating in an online social space was an important respite from school and that if SNS were introduced into class work the students thought it would only be useful for socialization rather than learning (Luckin et al., 2009).

Learning Theories

While many new online tools and their application to education are being explored and researched, there is current debate about whether existing learning theories can account for social- and education-related phenomena that have developed with the rise of the internet and social networks. In the context of this research, a background understanding of learning theories helps to situate youth responses about the types of learning they attribute to informal peer-to-peer learning about environmental issues.

Constructivism

Constructivism is a foundational learning theory, which has had considerable influence on other learning theories and numerous teaching methodologies, as well as greatly impacting Information Communication Technologies [ICT] learning platform design and pedagogy. It is a theory of knowledge which is based upon the premise that humans generate knowledge and meaning from an interaction between their experiences and ideas. Piaget (1926), the father of constructivism, explained that learners internalize knowledge through a process of accommodation and assimilation and in turn construct new knowledge from their experiences through four successive stages of child development.

Social constructivism, as articulated by Vygotsky, extends the theory of constructivism and claims that individuals learn the most through social and group activities. Social learning theory is based upon the premise that meaning and knowledge are constructed through

interaction with peers and reflection (Higgs, 2005), and that the context in which learning occurs becomes central to the learning process. In this sense, knowledge is socially constructed and the interpretation of knowledge is then dependent on the social and cultural contexts through which the learning occurred (Hung, 2001). Also important to Vygotsky's theory is the Zone of Proximal Development, in which he claims that students can achieve only a certain level of learning by themselves, but are able to learn and accomplish more by working with or observing more capable others, including peers (Vygotsky, 1978). The social and collaborative aspect of learning suggested by Vygotsky has influenced teaching methods in the classroom and in online instruction. There are many advantages that arise from student discussion in relation to learning: increased student ability to test and synthesize ideas (Corden, 2001; Weber, Powell, Maher & Lee, 2008), and an increase in student motivation, collaborative skills, and the ability to problem-solve (Dyson, 2004; Matsumara, Slater & Crosson, 2008). Computer-supported collaborative learning [CSCL] is a teaching approach in which learning takes place with other students via computer-mediated communication, and the learning is characterized by the sharing and construction of knowledge among participants using computer or broadband communication technologies.

Connectivism

Siemens (2004) proposed that the three broad learning theories, behaviourism, cognitivism, and constructivism, were all developed before learning was impacted by technology. He argues that learning needs and theories should be reflective of the underlying social environments that have greatly shifted with the rapid increase of technology and social networks. The aim of connectivism (Siemens, 2004) as a theoretical framework is to understand learning in our current digital age. Learning occurs when a learner connects to and feeds information into a learning community (Kop, 2008). As Siemens (2004) has succinctly stated, "the learning is the network". Downes (2011), another connectivism advocate, explains that knowledge is distributed across a network, and that "learning consists of the ability to construct and transverse those networks" (para 7). Knowledge is considered the set of connections formed by action and experience and it is not something that is acquired; rather, it is the growth or development of connections both in the mind and in society (Downes, 2011). Because of this principle, Downes (2007) argues that connectivism differs from other learning theories in that it challenges the concept that knowledge is propositional or grounded in language and logic.

Whether connectivism is a learning theory or not has been contested in academic articles, conferences, and many blog posts. Verhagen (2006) claims that it is not a new theory because it has no new principles that are not already present in other learning theories; instead he categorizes it as a pedagogy. Kerr (2007) like Verhagen (2006) warns against connectivism not losing the “lessons of constructivism and the need for each learner to construct his or her own mental models in an individualistic way” (as cited by Forster, 2007, para 1). However, Downes (2011) affirms that the core difference between connectivism and constructivism is that knowledge is acquired not as though it were a thing, but rather that it occurs as a process.

The debate continues in terms of learning and knowledge transfer. Kerr (2007) argues that the connectivist model does not sufficiently explain higher-order thinking. Instead, he sees it as generalizing learning terms and confusing knowledge with learning and education. He requests that connectivist theorists explain the internal processes that lead to deep thinking and creating understanding if “learning is the network”. Siemens (2006) claims that when learners are involved and in control of developing their own networks, then understanding emerges by applying meta-cognition to their evaluative choices about which parts of the networks are useful for their purposes and which parts need to be eliminated. Furthermore, Downes claims that in connectivism “deep thinking” or “creating understanding” are the same as the process of forming connections because “there are no mental modes *per se* (for example, no systematically constructed rule-based representational systems), and what there is (i.e. connectionist networks) is not built, like a model, but is instead grown, like a plant” (2012, p.87). In a thorough review of the debate, Kop and Hill (2008) conclude that although there is a paradigm shift occurring in educational theory and a new epistemology may be emerging, connectivism has not contributed enough to this new paradigm to warrant being recognized as a separate learning theory.

Since my research is focused on environmental learning and activism occurring within youth-created social media interest groups, I will not draw upon Piaget’s constructivism learning theory, for it focuses on the ability of the individual student working alone rather than recognizing an individual’s ability as being related to his or her social context. I will draw upon Vygotsky’s social learning theory and the Zone of Proximal Development to inform my research study, with its focus on knowledge being socially-constructed and the interpretation of knowledge being dependent on the social and cultural contexts that social media affords. One of the limitations of Vygotsky’s social learning theory is that the

development of learning is grounded in language. I recognize the theoretical contributions of connectivism in elucidating learning and knowledge-construction in the digital age - especially in terms of learning not being solely grounded in language but seen as process. However, like Kop and Hill (2008), I do not think that connectivism has demarcated itself enough to warrant consideration as a separate paradigm from constructivism. Therefore, youths' responses are understood within a constructivist understanding of learning theory.

2.8. Environmental sustainability education [ESE]

Within ESE, a key question is whether contemporary theory and practice have taken into consideration the affordances of online participatory cultures and its impact on student knowledge production, collaboration, and learning. This section reviews dominant approaches to environmental education including Education for Sustainable Development [ESD]; Education for Sustainability [EfS], and Environmental Sustainability Education [ESE]² and focuses specifically on conceptions of student agency and its importance in relation to critical thinking, and democratic practice within ESE.

The history of educational approaches to environmental education often starts with dominant policy, research, and educational approaches documented in the 1970's with conference proceedings from UNESCO's International Environmental Education Program.³ The Belgrade Charter (UNESCO, 1972) resulted in a global framework for environmental education, which linked issues of environmental preservation with socially just development, and the Tbilisi Declaration (UNESCO, 1977) articulated the goals of environmental education as:

- 1) to foster clear awareness of, and concern about economic, social, political, and ecological interdependence in urban and rural areas;

² Within my research, I employ the term environmental sustainability education [ESE] with an understanding that educational approaches to ESE require pedagogies that embed critical thinking within all courses that promote action competence (Seatter, 2011; Sund & Lysgaard, 2013). In previous research, I have adopted the terminology Education for Sustainability [EfS] because of Sterling's (2001) argument that EfS embodies a "radical cultural shift of worldview... which integrates ecological sustainability with social justice and sees sustainability as a promising metaphor for historic and necessary structural and personal transformation" (p. 19). In this regard EfS is differentiated from a more technocratic and economic view of sustainability found within Education for Sustainable Development. However, this distinction of terminology is not agreed upon within the field and all three terms are used in various publications without consistency.

³ The dominant history of environmental education often overlooks environmental education in first nations and indigenous populations around the world - a topic too large for the scope of this paper.

- 2) to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment;
- 3) to create new patterns of behavior of individuals, groups, and society as a whole towards the environment (p.15).

A transmissive or passive model of learning (Kelsey, 2010) has dominated most environmental education and interpretation programs for many years (Stevenson, 1987, 2007; Tilbury, 1995). A teaching handbook for environmental educators at the secondary level clearly advocates against the transmissive model of teaching:

No amount of preaching to the citizenry about the perils of a polluted environment, the dangers of irresponsible disposal of wastes or deforestation and the benefits to mankind of greening the environment will make people act to seek to forestall environmental degradation unless they are imbued with a deep concern for the common good, a sense of responsibility for maintaining a balanced and healthy ecosystem and a strong drive to achieve harmony with nature. (UNESCO, 1990, p. 191)

Historically, environmental education is also marked by an emphasis on knowledge and attitudes as predictors of behaviour. Hungerford and Volk (1990) refute the idea that responsible action taken by students results from environmental educators imparting knowledge and Chawla and Cushing (2007) argues that the antecedents of action are far more complex. Research has shown that environmental attitudes are seen as precursors to pro-environmental behaviour, but they do not directly lead to behaviour change unless paired with a deeper ecological understanding (Duerden & Witt, 2010). Research has also shown the importance of emotions and beliefs (Pooley & O'Connor, 2000) or the importance of the affective domain or perception-based components (Kollmuss & Ageyman, 2002) for individuals adopting environmental behaviours. Schultz and Zelenzy (2013) confirmed that providing more knowledge in order to promote behaviour change only resulted in changes to individuals who already cared about the topic.

In the mid-1990s, fostering values became increasingly important in environmental education pedagogy and instruction, since values are foundational to the development of our attitudes, decision-making, and action-taking processes (Blanchet-Cohen, 2008; Crompton, 2008; Zelezny, 1999). According to Stern's (2000) theory of value-belief-norm, individuals will take action if people value:

the protection of the environment for its own sake or because they understand its benefits for human society. They also need to know enough about environmental issues to understand consequences for themselves and the people and places that matter to them (taking ownership of issues). Finally they need to believe that they can have an effect on these issues and that social norms prescribe that they should act (empowerment) (as paraphrased by Chawla, 2007, p. 2 -3).

More recent scholarship suggests the need to understand knowledge as occurring contextually, attitudes as influenced and formed by a number of social and personal factors, and behaviour as more nuanced, with both individual and societal considerations (Heimlich and Ardoin, 2008; Robelia et al., 2011). However, within scholarship there is a further shift away from behaviour change to one of developing criticality. The aim of environmental education is seen as providing opportunities for learners to thoughtfully and critically examine environmental issues, to make informed decisions, and to develop an environmental ethic, from which they commit to act in ways which sustain or even enhance the environment (Stevenson with Stirling, 2010).

Sterling (2003) adopted Bateson's learning levels to consider different orders of sustainability learning. In a first-order learning response (Sterling, 2010) "there is change within particular boundaries and without examining or changing the assumptions or values that inform what you are doing or thinking" (p. 22). Sterling (2010) argues that instrumental views of ESE tend to align with educational approaches which focus on this first-order learning response (i.e. basic learning). The second-order learning response that Sterling (2003) adopts is more critically reflexive (i.e. learning about learning), where the learner may change his or her beliefs, values, and assumptions. According to Sterling (2010), a second-order learning response arises from questioning the limits of instrumental education and is consistent with an intrinsic view of ESE. Sterling suggests a third-order learning response and draws upon Bateson's third level of paradigmatic learning along with Hawkins' (1991) and Bawden and Packhem's (1993) view of epistemic learning. This third-order shift is referred to by Sterling (2003) as an 'ecological transformative educational paradigm', which he articulates in great detail in his thesis, but is understood succinctly as a shift in epistemology or way of knowing and thinking that constructs how people perceive and interact with the world. This form of thinking requires a level of reflexivity allowing us to "see our worldview rather than *seeing with our worldview*" (2010, p. 23).

Jensen and Schnack (1997) have advocated for an integration of critical thinking and action taking through developing 'action competence.' That is, encouraging learners to engage with the world by: "asking critical questions such as how, why, where and who, and engage in 'authentic' as opposed to as if situations in which they make decisions about what they want to change and what actions are necessary to bring about change" (1997, n.p.). In this sense, action competence involves conscious, committed, and competent action rather than simply

taking action on an issue. Jensen and Schnack's (1997) notion of "action-competence" is described as the capacity to analyze society and life critically in order to understand the root causes of environmental problems, and to work for solutions to problems from both an individual and societal level. Wals and Jickling (2002) focus on the importance of critical thinking to cut through embedded connotations of popular words like 'sustainability' in order to uncover assumptions of world view and embedded values when individuals discuss environmental sustainability issues, writing that "critical thought depends on transcendent elements in ordinary language, the words and ideas that reveal assumptions and worldviews, and the tools to mediate differences between contesting value systems" (p. 223). Morgensen (1997) advocated that action competence also requires a holistic perspective "in order to translate intention to act into actual action" (p. 435). Therefore, the responsible activist is a holistic critical thinker with an awareness of his or her emotions. Morgensen (1997) argues that individuals who do not acknowledge their emotions risk becoming "insipid, purely registering external stimuli, bored and incapable of distinguishing between the significant and the insignificant" (p. 435).

This overall focus of critical thinking and reflexivity within ESE signals a shift from behavior-based educational strategies to learner-centred and critically active learning strategies, which recognize the learner as an agent or actor in a transformative process.

Agency

Learner agency has multiple meanings that are informed by the discipline that an individual is working within. For example, within philosophical traditions of Hegel and Marx, agency is a collective, historical dynamic rather than a specific capability or behaviour of an individual, whereas within sociology, agency is generally considered one's independent ability to make choices. However, there is much debate between the individual agent and the ordering social structures that the individual is embedded within.

Many environmental initiatives in schools focus on private actions such as turning off the lights, water conservation, or waste reduction (Chawla, 2007). However, an analysis of the most challenging environmental issues suggests that private actions are limited unless these actions are orchestrated in conjunction with collective policy change (Chawla and Cushing, 2007; Fien and Trainer, 1993). In this sense, the concept of agency has shifted from one of individual responsibility to include a focus on mutual responsibility in and for action (Stevenson with Stirling, 2010).

In *Engaging Environmental Education: Learning, Culture and Agency*, Stevenson with Stirling suggest that instead of defining agency as an individual versus collective dichotomy, the concept can be further expanded upon in terms of reflexive, relational, and transformative agency (2010).

Reflexive agency is characterized by Bordieu as “the capacities of socially and culturally situated agents to reflect upon their social conditions, criticize them, and articulate new interpretations of them” (cited by Stevenson with Stirling, 2010). Within critical pedagogy, reflexivity arises from a process called critical consciousness in which the student perceives the social, political, and economic contradictions and takes action against the oppressive elements of reality (Freire, 1970). Dialoguing, a conversation method used to encourage students to discuss their experiences and reflect on the politics of culture and critical democracy, is often used (Freire, 1970) and is considered inextricably linked to developing critical consciousness. When dialoguing and critical reflection among diverse cultures occurs, then opportunities for cultural pluralism are more likely to arise, as well as alternative interpretations and possible avenues for change (Stevenson with Stirling, 2010).

Relational agency is described by Edwards as “a capacity to align one’s thoughts and actions with those of others in order to interpret problems of practice and to respond to those interpretations” (cited by Stevenson with Stirling, 2010, p. 231). Within this concept of relational agency is the understanding that another person may be helpful in overcoming an issue, but that there is a negotiation in deciding how to address working together towards a joint action. Relational agency represents a shift from an individual’s sense of agency to a collective sense of agency.

Finally, transformative agency, which is based on coalition building and is a catalyst for institutional change, is described as recognizing collective responsibility for social practices and the reproduction or future implications of these practices. Traditionally, schools have focused on individual agency or private environmental actions, such as turning off the lights (Chawla & Cushing, 2007), and have focused far less on developing relational or transformative agency, such as the role of social movements and the politics and development of collaborative skills and coalition building (Stevenson with Stirling, 2010).

The importance of agency, critical thinking, and democratic practice can be traced through much scholarship on environmental education. Jensen and Schnack (1997) argue that environmental education programs often promote action-oriented learning; however, these programs often focus on disconnected activities regarding behaviour-modification rather than

activities which promote action informed by critical analysis. Chawla and Cushing (2007) advocate for a political model of environmental education in order to give children and youth the opportunity to have direct experience in managing their school, to engage them in community projects where they can see how mechanisms of government work, and to help them feel that they are making meaningful contributions. Orr has also argued that environmental education is “unavoidably political” and that educators and leaders need to consider collective agency in their approaches: Do we “equip students morally and intellectually to be a part of the existing pattern of corporate-dominated resource flows, or to take part in reshaping these patterns towards greater sustainability” (Orr, 1992, pp. 145-6)? Huckle (1991) also advocates for transformative and critical approaches, which position learners as “active citizens”:

...a shared speculation with pupils on those forms of technology and social organisation which can enable people to live in harmony with one another and with the natural world. It should be a form of social education cast in what Giroux (1983) describes as the emancipatory mould. This seeks to empower pupils so to reflect on their experience in light of critical theory and to act on the insights gained. It is a form of praxis (Grundy, 1987) which by allowing pupils and teachers to reflectively deconstruct and reconstruct their social world, develops the critical and active citizens who are capable of bringing about the transition to sustainable development. (p. 54)

Relation to place

Within environmental education, exploring the role of sensory immersion and relation to place is required in order to consider some of the implications for learning about the environment and sustainability through technologically-mediated forms. Early antecedents of environmental education can be traced first to nature study and outdoor study in the early 1890s, and second to the conservation movement and outdoor education in the late 1920s (Stevenson, 1997). From these antecedents, some forms of environmental education posit sensory awareness or sensory immersion as key to fostering a student’s emotional attachment to the Earth and its life (Van Matre, 1990). There is also significant concern echoed in environmental philosophy about the psychological effects of living in societies which are visually-dominated and sensory-deprived (Livingston, 2007).

Along with an emphasis on sensory awareness, environmental education programs are often based on learning about a specific ecological region or place (Gruenewald, 2005). According to some scholars, sensory awareness and connection to place are required for developing values and actions for stewardship and responsibility (Gruenewald, 2005; Orr, 2004; Sobel, 2004). Abram (1996) suggests that sensory awareness and immersion in the natural world are needed to allow an individual to:

slip beneath human constructs and catch sight of this other, older logic at work in the world. Only as we come close to our senses and begin to trust, once again, the nuanced intelligence of our sensing bodies, do we begin to notice and respond to the subtle logos of the land...The senses...are the primary way that the earth has of informing our thoughts and guiding our actions. (p. 268)

Weston (1994) also articulates the need to literally “come back to our senses”; he suggests quiet zones be created where there are no powered appliances and people can visit or live within these zones and hear birds, wind, and silence. Both Abram and Weston argue for a shift in worldview, one in which the more-than-human is re-centred and regarded as necessary for sensory development, so that through this immersion, human subjectivity will be contextualized within a more-than-human world. If sensory awareness and relation to place are requisites for developing values and actions of stewardship and responsibility, then what are the educative implications if students do not have these formative experiences?

Louv (2005) adopted the phrase “Nature Deficit Disorder” to signify the decrease in children’s exposure to the “natural” world due to their increasing use of technologies as well as parental concerns over their security. Bowers (2000) discredits any learning through mediated experiences and argues that within cyberspace the relation of self to other is reduced to decontextualized forms of text that depend on individual interpretation. His concern is that the distanced subjective experience mediated by cyberspace differs from orally-based interactions in which memory and the five senses are invoked and involve both physical and mental faculties. Due to the increase of mediated technologies in education and the decrease of time children and youth spend outdoors, it is important to question these implications on how children and young people will appreciate and value the natural world, when young people learn about the natural world from within virtual, human-built environments.

Stevenson (2008) explores the notion of “place-based” pedagogy in the 21st century by broadening the connotation of education sites to include out-of-school community-based, arts-based, and sports-based programs for youth. He also recognizes that media communication is playing an important role in youth participating in cultural production and facilitating their explorations of the relationship of self to community. In this sense, the notion of the “local” may be redefined in terms of bio-geographical and socio-cultural boundaries. Instead of discrediting all online learning (Bowers, 2000), or isolating and separating online and offline contexts as unique worlds (Jones, 1999; Leander, 2008), adopting a connected perspective may be more helpful for grappling with the internet and its implications to

learning. A connected perspective recognizes that the internet is a cultural artefact, within a broader cultural context within which people live, and that the internet also engenders practices that are unique to the online context and should be studied as technologically-mediated. The focus when considering online practices is that “people routinely build connections to internet-related practices and sites and myriad offline practices and sites” (Leander, 2008, p. 36) and that these ‘practices’ are located in time and space, but also travel through time and space and across online and offline spaces. Practices from offline experiences inform online practice, and experience and online experiences inform offline practices and experiences (Slevin, 2000).

Online experiences and ESE

From a connected perspective, it is possible to consider online learning experiences that can (re)connect people with local issues through meaningful and relevant education about local socio-ecological challenges (Aguayo, 2014). According to Aguayo (2014), these online learning systems can actively address public misconceptions on local socio-ecological challenges through interactive feedback, and in this way act as a corollary for responsive place-based community education. Within the intersection of environmental sustainability and social-media learning, there are limited studies exploring types and processes of learning and engagement within these networked spaces. In an article mapping future trends for environmental education research, environmental academics were surveyed and they reported that “the rise of social media” is a medium to high impact trend within the field; however, few of the researcher-respondents referred to media, communication, or information technologies as areas within which they would like or plan to conduct research (Ardoin et al., 2013).

One of the few studies that have been conducted focused on how youth participating in a Facebook application deepened participants’ environmental knowledge and resulted in shifts in environmental behaviours (Robelia et al., 2011). However, all of the data collected for this study is within a rewards-based model that offered a trip to the Arctic and a laptop as rewards. Therefore, the observed engagement and outcomes within the study do not reflect authentic interest-driven engagement within social media. Another research study highlights how environmental learning and action-taking that was experienced within a face-to-face and school-based program can be transferred and reinforced through social-media engagement (Warner et al., 2014). Warner et al’s study focuses on the transfer of environmental learning through social media engagement after a face-to-face and school based program whereas this

research project has not solely focused on school-based programs but considered various informal group structures (see Chapter 4, Table 7.1), which has resulted in mapping learning and activism across various levels of organizational structure. A very recent study (Andersson & Öhman, 2016) has just been added to this burgeoning area and it presents research which supports that young people discuss and learn about environmental sustainability issues, especially political and moral dimensions of issues, through social media. Andersson & Öhman (2016) suggest that understanding how young people construct knowledge about environmental and sustainability issues from their social media experiences could help teachers to engage in pluralistic and participatory approaches to classroom discussion. However, the knowledge contribution of the results is generic and qualitatively constructed from an online conversation with youth about their social media practices rather than observed over a period of time, as this research dissertation has provided.

2.9. Youth activism & civic engagement

As discussed in Environmental Sustainability Education, Section 2.8, if environmental education, ESD, EfS, and ESE practices require a political and critical infusion in order for students to make meaningful contributions to transform environmental problems, and dominant education systems do not generally offer students these types of opportunities (Sterling, 1996), then are youth using their online social networks to engage in informal peer-to-peer learning or social organizing to create the kind of political and environmental change they hope to see in the world? This section outlines youth civic engagement and activism as it relates to online environmental activism through social-media networks.

Research literature has begun to map how youth participate in civic expression in non-traditional ways (Loader, 2007; Ward, 2008). Terms like “new politics”, “life politics”, “life-style politics”, or “sub-politics” (Dahlgren, 2003) have emerged to describe civic engagement outside of conventional civic forums. “Life-style politics” connotes a shift from politics of traditional ideology to politics guided by personal values. Life-style politics become not only an instrumental activity for achieving specific goals, but can become a performative activity expressing individual identity construction (Dahlgren, 2003). This shift in social identity formation has increased individual responsibility for managing personal identity as individuals have become distanced from modern institutions that traditionally provided social membership and status (Giddens, 1991).

The Civic Learning Online Project identifies this shift as two paradigms of citizenship that are distinctively meaningful to different age groups in many democracies around the world: the *dutiful citizen* and the *actualizing citizen*. Their distinctions, while simplified and not representative of all types of citizens, are helpful for considering the marked generational differences in civic practices and styles of affiliation between young people today and older generations (Lopez, 2006). Dutiful citizens are characterized as:

- having a strong sense of duty to participate in government
- voting as a core democratic act
- having higher trust in leaders and media
- participating in social organizations, interest groups, political parties, while

actualizing citizens are characterized as:

- having a weak sense of duty to participate in government
- focusing on lifestyle politics: political consumerism, volunteering, social activism
- having a mistrust of media and politicians - less likely to follow politics in the news
- joining loose networks for social action - communicating through digital media (Bennet, Wells, & Rank, 2009)

Age-based or generational categorizations are problematic for oversimplifying and essentializing a generation into one group, especially since there are young people today who hold a conception of citizenry that aligns with the dutiful citizen category. Likewise, senior citizens who participated in liberation politics of the 1960s and '70s may have more fluid political understandings, and align more closely with the attributes of actualizing citizens. However, survey research shows that the majority of young people understand traditional politics as inauthentic and disconnected from their political affiliations or experiences (Coleman, 2008; Earl, 2008). In fact, the British government's policy document on e-Democracy states:

One important target group for this policy is young people. All democratic institutions have a responsibility to ensure that young people are able to play their part. Evidence suggests that young people are among those least likely to see the democratic process as relevant to them. Young people are also among those most likely to be competent in ICT. (as cited by Coleman, 2008, p.191)

If younger generations are becoming increasingly involved in political expression of personal values and young people are also increasingly immersed in digital media and social media, then are they asserting their political identities through their social networking profiles? Do social networks offer an avenue for youth to participate in culture and democratic expression (Lessig, 2004; Jenkins et al., 2006)?

Within collective behaviour literature there has been considerable debate around defining activism. For example, questions around whether behaviour must be extra-institutional to be considered activist, whether activism is centered around a degree of coordination, or whether overt actions or merely supportive attitudes of a movement are considered activism (McAdam, McCarthy, & Zald, 1988; Snow & Oliver, 1995) are all asked to demarcate activist acts. Within this literature, activist orientation is defined as an individual's developed, relatively stable, yet malleable orientation to engage in various collective, social-political, problem-solving behaviours (Corning & Myers, 2002). According to previous research studies, there is a propensity that once an individual has developed activist attitudes toward political action-taking that these attitudes can last for decades (Fendrich & Lovoy, 1988; McAdam, 1988). However, these studies also suggest that orientation towards activism is also affected by life experiences and ongoing socialization processes. New social contexts may also influence activist orientation, for example, university groups, or social media interest groups, where individuals meet others who may model different forms of activism. Overall, experiences with activism often increase the chances that an individual will engage in protest in the future (Lofland, 1977; McAdam, 1986). However failure to achieve goals or physical repression can lead individuals to abandon political action.

The literature cited in the preceding paragraph references studies that considered activism before the advent of social media and Web 2.0 affordances. Some scholars argue that social media platforms such as Facebook or Twitter lend themselves to political communication more readily than traditional media spaces given unique design affordances (Neumayer & Raffl, 2008). Shirky (2008) declares that the rise of social networking platforms has created opportunities to engage in public speech and undertake collective action in historically unprecedented ways. However, Papacharissi (2010) argues that "a new public space is not synonymous with a new public sphere" suggesting that it is the quality of social interaction that makes a space "public" and not solely the underlying architecture (Commercialization section, para 3). In fact, many quasi-public networks, such as Facebook and Twitter, are paradoxically public spaces as they are managed by corporations and increasingly monetized for commercial ends, problematizing the notion that these spaces are "public" (Barnes, 2006; Lange, 2007; Arora, 2014).

Social media users are increasingly engaging in political activities in SNS (Smith, 2014). Engagement is measured by the Pew Internet Centre as: liking or promoting political content; encouraging others to vote; posting own comments on politics; reporting others'

political content; encouraging others to take action; posting links to political articles; joining a political group; or following candidates or elected officials (Smith, 2014). However, defining what constitutes online civic or political engagement and how to measure these acts is an ongoing debate within the literature (Theocharis & Quintelier, 2014).

More social media users are engaging in political activities there

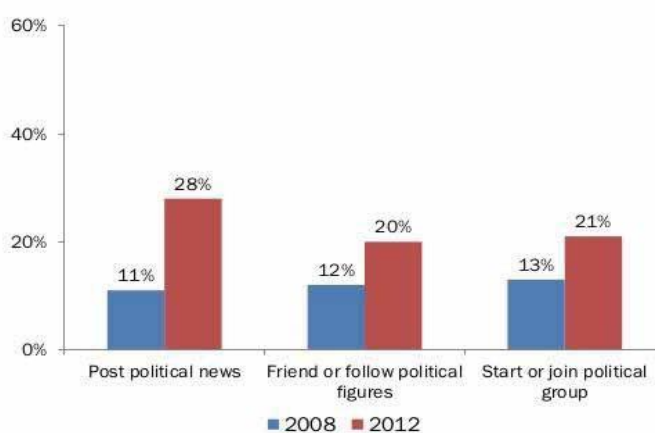


Figure 2.3: Social media users engaging in political activities on SNS. Reprinted from *Politics and Advocacy in the Social Media Era* (Slide 26), by Smith, A., 2014, Washington, DC: Pew Research Centre. Reprinted with permission.

Gladwell (2010) took a very strong stance on social media activism and argued that “no real change” has occurred from individuals engaging in activism in SNS. He contrasted the “real” activism of the 1960s civil rights movement with the “weak” activism coordinated through social media today and claimed that social media activism is ineffective because it is based on weak ties to a cause. Responding to Gladwell’s (2010) article in the *New Yorker*, Mirani, a writer for the *Guardian*, argued that Gladwell’s premise may be accurate if activism is defined only as sit-ins, taking direct action, or protests; however if social media activism is understood as a tool that facilitates dialogue and the sharing of information, then it is possible and probable that individuals will be influenced or learn from the information that they engage with on a SNS platform. Tufekçi (2015) argues that more recent social movements have scaled quickly due to the amplification affordances of social media, but with the fast rate of scaling up, the benefits of slower social movement organizing of the 1960s is lost. Tufekçi poignantly asks: “As digital technology makes things easier for movements, why haven’t successful outcomes become more likely as well?” (Tedx transcript, para 6). This discussion as

it relates to youths' perspectives on whether social media activism contributes to social or environmental change is continued in Chapter 7, Section 7.6.4.

2.10. Theoretical Framework

This project has been situated as a mapping project because of 1) the exploratory and inquiry-based approach which has guided the research process, and 2) the under-researched and-documented area of environmental learning and activism within social media sites. With the focus of better understanding of how youth in various geographic contexts use social media platforms for informal environmental learning and activism, the project has explored many facets of youth identity, peer-to-peer engagement, learning, and activism within an increasingly connected and wired world. The project is grounded in the lived reality and perceptions that youth have about social media, environmental issues, and activism, and while the project is informed by academic theory and pedagogies, the empirical research reflects how youth understand these technologies and phenomena.

The mapping has drawn upon several analytical methods such as thematic analysis, questionnaire analysis, and social network analysis (as discussed in Chapter 3). Unlike mapping a landscape, which is static for a period that is long enough to document typology, the cases within this chapter are situational and dynamic. The constructs of *affordance*, *culture*, *dynamics*, *structure*, and *substance* are employed to theoretically explore the phenomenon of engagement in environmental social media interest groups. References to these constructs are used throughout the following chapters to help situate the reader and findings from this research study.

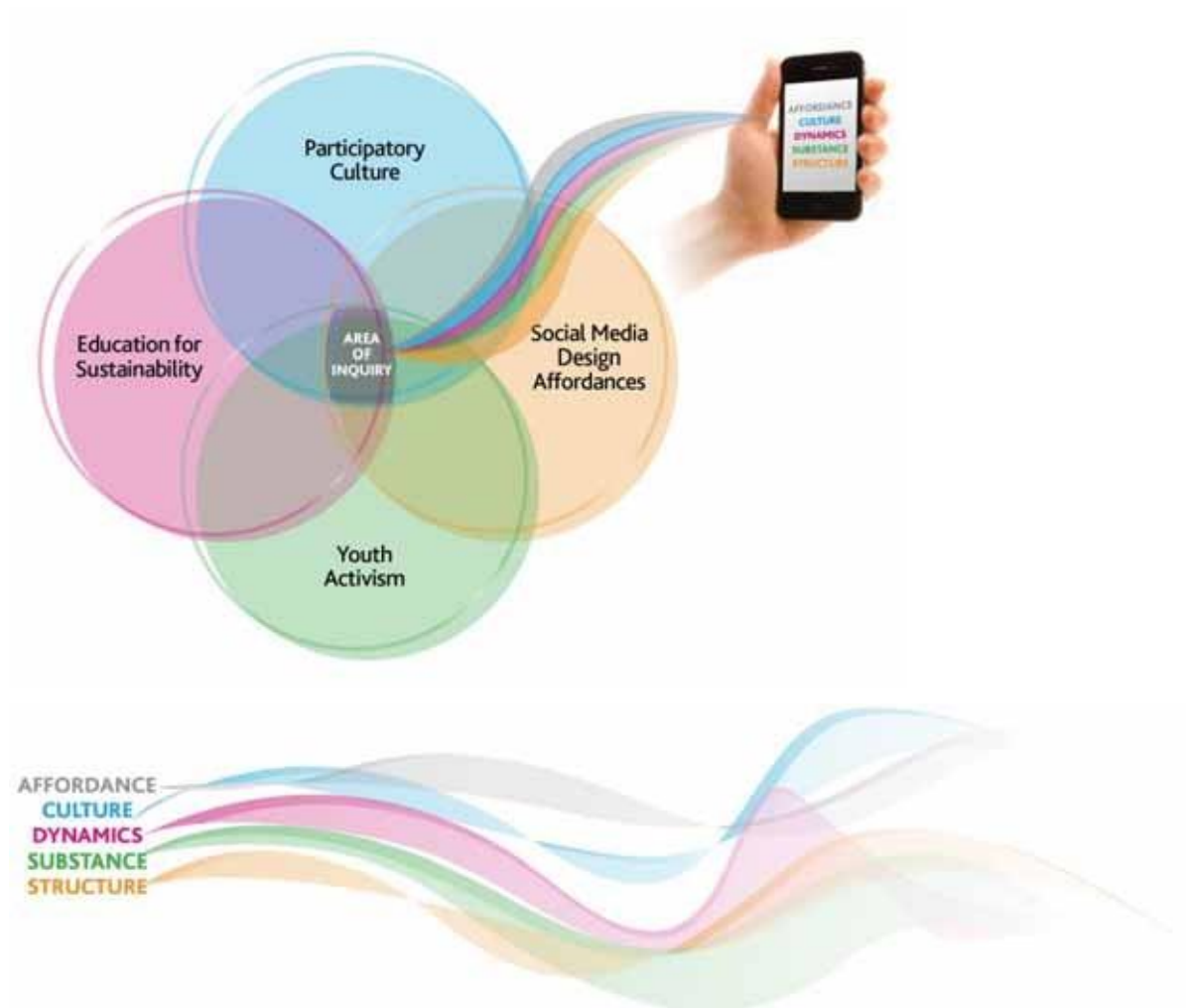


Figure 2.4: Visual analytic and constructs for mapping learning and activism within environmental social media interest groups

The constructs are depicted as waves to represent the situational and dynamic occurrences of interest-driven environmental learning and activism.

Affordance

The construct of *affordance* represents the complex interaction between the user and the design interface of the social media site (Gibson, 1979). For example, the “share” button allows an individual user to share content that a friend posted to a specific group or to their personal profile page. Specific design features within Facebook afford and shape specific types of engagement, communication, and collaboration. For youth, Facebook affords a type of third space, which is not home or school, where they can “hang out” with “friends”. The majority of youth use social networking sites to extend their range of friendships from familiar contexts

of school, religious organizations, sports, and other activities (Ito et al., 2010). This digital “hanging out” and ability to be in constant contact is afforded through sending private messages or through posting public messages through Facebook or other social networks (Ito et al., 2010).

Culture

Culture represents the local, regional, and national identities of members of the group, as well as existing cultural codes of a specific social media interest-driven group. With an understanding that online interaction and offline interaction are not isolated but increasingly interconnected, the construct of *culture*, situates the offline identities of an individual (local, regional, national, and other identities) along with the online identity of an individual and the specific role s/he may have within a group. Accessibility to the internet is one of the defining aspects of modern life and the emergence of information and communication technologies broadly has given rise to a new kind of socially networked economy and culture (Castells, 2000). As of 2016, the World Internet Statistics report that 3.36 billion of the world’s population have access to the internet and the majority of online interaction and engagement occurs through social media sites, with an estimated 2.34 billion social media users worldwide (Statista, 2016). Of these 2.34 billion social media users, Facebook reports 1.71 billion active monthly users, which is roughly 38.6% of the global online population (Statista, 2016). Social networking sites form a new online layer through which people organize their lives. These quasi-public online spaces influence human interaction on an individual and community level, as well as on a larger societal level. Therefore, I have adopted a connected perspective which recognizes that the internet is a cultural artefact, within a broader cultural context within which people live (see Chapter 2, Section entitled Relation to place and Chapter 3, A networked perspective). The *culture* of an online group is shaped by the *substance* or content that is shared in online discussions within the group.

Dynamics

The construct, *dynamics*, represents the interactive processes of engagement which shape learning and activism within a specific social media interest group. The *dynamics* construct draws on aspects of group dynamics, such as environmental factors, personal factors, and leadership factors, that can affect a group’s cohesion. Within a social media interest group, these factors along with the online affordances of Facebook also contribute to the *dynamics* of individual and group engagement.

In terms of learning *dynamics*, an individual's interest in a specific topic, the leadership and group structure of the group, and the type of content that is shared may all influence an individual's learning from participating in a social media interest group. According to literature, social networking sites can also support interactions and exchanges between learners facing similar challenges in their studies (Shapiro & Margolin, 2014); connect learners with others who have shared interests and affinities not catered to in their immediate educational environments (Maloney, 2007); and engage learners in social interactions and dialogue through which much learning occurs. Young people are participating in these activities not only as individuals but often collaboratively and cooperatively as interest- or purpose-driven communities of practice (Merchant, 2012). Learning which occurs within social networking sites has been referred to as endogenous learning (Rosenfeld Halverson, 2011) because the learning goals are intrinsic and specific to the individual learner's interests. This is opposed to more conventional exogenous learning, associated with formal education environments where the learning goals are extrinsically set by departments of education, universities, etc. The endogenous appeal within social networking sites to learn about intrinsic interests allows for learning to occur individually or individuals to form groups around specific topics of interest creating a potentially dynamic learning environment. Sub-research questions focused on learning dynamics which align with this construct are: "how did this learning occur?" and "what and who shaped this learning?" Within Chapter 5, these sub-research questions are addressed through considering:

- content that influenced other group members
- how responding to positive and negative comments influenced individual youths' learning and confidence

In terms of activism, the same dynamics of engagement are considered influential as they are with learning. As explained in Section 2.9, the literature on activism orientation considered activism before the advent of social media and Web 2.0 affordances. Some scholars argue that social media platforms such as Facebook or Twitter lend themselves to political communication more readily than traditional media spaces given unique design affordances (Neumayer & Raffl, 2008). Shirky (2008) declares that the rise of social networking platforms has created opportunities to engage in public speech and undertake collective action in historically unprecedented ways. Research from the Pew Internet Centre shows that social media users are increasingly engaging in political activities in SNS (Smith, 2014). Researching

youth's conceptualisation(s) and practices of activism will help better understand this emerging area.

To consider activism dynamics, the following aspects were analyzed:

- reported environmentally-related content shared by youth in social media
- examples of online environmental activism practices
- youth distinctions between online and offline environmental activism
- youth reflections on environmental social media activism as contributing to environmental and social change processes

Structure

Through researching the *structure* of different youth social media interest groups, and with emerging tools for mapping social networks, this project has integrated network analysis to help interpret environmental social media interest groups. *Structure* represents the network structure of a specific social media group, for example, geographic reach and size of network, leadership positions, adult facilitators, communication tools and meetings, and a network communication visualization. The network communication visualizations create strong visuals, showing the rough size, composition of the population, engagement, and relationships within the networked public (see cases within Chapter 4).

Substance

The construct of *substance* represents substantive topic knowledge that is posted, shared, or commented upon within the social media interest-driven group. Engestrom (2005) used the term object-centred sociality to explain that in many online social networks, it is not just the social relationships but the artefacts or objects which get shared that are also important for understanding dynamics of engagement. In this way, the construct of *substance* captures the information shared within objects and artefacts shared within a social media interest group. The *substance* of the online discussion may not easily be isolated from the engagement *dynamics* occurring in the group.

2.11 Educational futures

The following sections provide context for thinking about educational futures, raises some issues within behaviour-change instrumentalism, and the role of formal education institutions in future 21st century contexts. These sections provide background context for some of the issues and tensions young people may experience or encounter.

Within policy discourse, both sustainability and education have been framed as instrumental vessels to guide humanity towards a future that is somehow predictable (Facer, 2011; Foster, 2011). Take, for example, how the now completed United Nations Decade for Education for Sustainable Development was defined by UNESCO, with an inherent instrumentalism towards behaviour changes in citizens that will result in, albeit, a hopeful environmental future:

The overall goal is to integrate the principles, values, and practices of sustainable development into all aspects of education and learning. This educational effort will encourage changes in behavior that will create environmental integrity, economic viability, and a just society for present and future generations (2005)⁴.

A similar instrumentalism between young people's education and the future, even national survival of the American economy, is articulated in Barack Obama's 2012 State of the Union where he discusses formal education:

At this defining moment in our history, America faces few more urgent challenges than preparing our children to compete in the global economy. The decisions our leaders make about education in the coming years will shape our future for generations to come. It will help determine not only whether our children have the chance to fulfill their God-given potential or whether our workers have a chance to build a better life for their families, but whether we as a nation will remain in the 21st century the kind of global economic leader that we were in the 20th century (Gaddi, 2012, p.149).

Both of these examples show how education policy discourse can be defined and oriented towards meeting predetermined futures. This in and of itself is not problematic, that is if the future is predictable, which I will address in the following sections; however, the opportunities, avenues or mechanisms, for children and youth to challenge, consider, or shape their educational or environmental futures that education is preparing them for, are invisible or non-existent in some contemporary policy discourse (Facer, 2011). More importantly, there is rarely consideration, voice, or agency given to children and young people, who will

⁴ Within UNESCO's print materials there are also some quotes which reflect an emancipatory perspective towards education.

have full rights in the future, to give input and to shape what they see as necessary for their futures (Facer, 2011; Hart, 2008).

Education for sustainability instrumentalism

The underlying assumption in the UNESCO definition of Education for Sustainability (above) is that principles, values, and practices will shift behaviour change towards environmental and social justice ethics. Within environmental education research, it has become clear that the relationship between knowledge and attitudes leading to change in behaviour is much more complicated and unclear than previously conceptualized in the research literature (see Section 2.8 on ESE). Considering what environmental education research has developed in terms of the importance of the affective domain in creating shifts in behaviour and the importance of developing criticality and reflexivity, how does UNESCO envisage behaviour change occurring with such a broad framework that does not make explicit how principles, values, or practices will be shaped? Will these invisible educators have some professional development in how to work with children and youths' affective domains?

Beyond the concerns of vagueness described above, within the educational community and specifically within environmental education discourse there has been significant concern over the phrase "Education for Sustainable Development." The problematic terminology and vagueness of the definition has fueled a heated debate for the last thirty years concerning issues of the etymology, pedagogy, and concept of sustainable development.

Through unpacking the UNESCO definition, the notion of creating behavior change by using education as a vehicle to do so has been contested within the literature. For example, the preposition "for," within the term Education for Sustainable Development, can connote a prescription that education has a predetermined outcome. This instrumental view of education disregards contemporary pedagogy on reflexivity, critical thinking, local knowledge, democracy, and self-determination (Wals & Jickling, 2002; Sauv , Berryman, and Brunelle, 2007). From a socially critical perspective, education as an instrument for sustainable development, limits the growth of environmental thinking by prescribing an end result and in so doing omits conceptual challenges to the constructions of "environment," "education," "sustainability," and "development" and limits emergent change within the learning process.

If environmental thinking is to continue evolving, and if students are to be participants in an environmental discourse unimagined today, then we must resist temptations to

exclude a wide suite of emerging ideas in favor of a sustainability or sustainable development agenda (Wals & Jickling, 2002, pg. 122)

There is another assumption within the UNESCO text that behaviour changes will result in positive decisions or outcomes that will create environmental integrity, economic viability, and a just society (Stevenson, 2006; Stables & Scott, 2002). What if decision-makers chose to prioritize economy over equity or equity or environmental integrity? In the theory of sustainability all three pillars of economy, environment, and society are balanced and prioritized equally; however when it comes to policy or decision-making practice rarely are social costs and environmental costs considered or understood (Stevenson, 2006). This has led some scholars to argue that the term is logically inconsistent or an oxymoron since it is inconceivable to sustain “development”; that is, the term often refers to “economic development”, which is based on a modernistic belief in progress related to the advancement of scientific and technological information (Sauvé, 1998, p.45).

Within the literature, there are other positions and arguments contesting the usage of “education for sustainability” and some scholars argue that it is the multiple meanings and contested understandings, which are ‘healthy sign[s]’ (Fawcett, Russell, Bell, 2002) because the term, in its resistance to a single meaning, encourages debate. Moreover, Stevenson (2006) argued that the term is deliberately broad to be inclusive of multiple positions. Huckle suggests that one of the key functions of EfS is “to help people reflect and act on these [contested] meanings and so realize alternative futures in more informed and democratic ways” (2001, p. 3). However, while there has been a response within the education system, it is insufficient and constrained, if it is to “fulfill its potential as an *agent of change* towards a more sustainable society” (Sterling, 2001, p.18). All of these scholars focus on the reflexivity and contested meanings as part of the learning process to inform us of sustainability. These positions, which represent different interpretations of ESD are in direct contrast to an instrumental view of education for sustainability to guide society to a desired sustainable balance.

Predetermined sustainability futures

It is argued that one of the inherent flaws within education for sustainable development discourse is a focus on actions towards a scientifically-predictable environmental future (Foster, 2011). Foster argues that there is too much emphasis and trust given to strategies “which envisage specific percentage cuts in CO₂ emissions by specific dates

50 (or 20) years ahead” as this approach overlooks “all the ecological synergies and feedbacks involved are infinitely too complex to guess at beyond the very short-term, never mind predict and try to plan for” (p. 386).

Climate change, today’s leading environmental issue, has been described as a wicked problem, which is not only difficult to define but new forms and spinoffs of the problem emerge while solutions to the original problem are being developed: “It is uncertain in its form and extent, rather than drawn in clear lines. It is insidious rather than directly confrontational. It is long term, rather than immediate in both its impact and its remedies” (Garnaut, 2008, p. xviii). It is not solely an environmental issue, it is a social (Holmes, 2015); health (UNICEF, 2014) and economic issue (Moss et al., 2010). The implications of climate change, the difficulty to predict its impact, require an approach which is much broader than instrumental approaches to education but which acknowledge the uncertainty, unpredictability, and allow for responsiveness and emerging processes: “the ‘journey model’ of our progress into the future (‘getting to there from here’) fundamentally misrepresents our creative engagements in emergent change” (Foster, 2011, p. 384). If education systems are limited to a predefined environmental future and the systems and processes that created that prediction are incorrect, then how will citizens of the future respond to evolving issues if they have been taught to respond but do not have the capacities for emergent learning and understanding?

Moreover, children and youth are more vulnerable to the negative effects of climate change - in fact children bear 90% of the disease burden from climate change (Farrant, Armstrong & Albert, 2012). Although particular outcomes cannot be predicted with certainty, there is mounting evidence that unless record levels of CO₂ are curbed, then by 2050 there will be major climatic changes that will make life on the planet much more challenging (UNICEF, 2014). It will be children and youth who are most at risk of high temperatures, malnutrition and climate-induced migration: “The greatest challenge for our children and their children will be feeding the 9 billion people projected for the middle of the twenty-first century in a world ravaged by hotter temperatures, more extreme weather and sea level rise” (UNICEF, 2014, p.5). This raises the question, for children born today who will most likely bear the impacts of climate change before they can vote or enter the work force, what advocacy spaces in policy-making and learning spaces within the formal education system are given for them to have input into their futures?

In part investigating how youth engage in environmental learning and activism is an attempt at considering whether social media provides a space for these types of actions and discussions to unfold.

Education and the fallacy of economic futures

Another fallacy of a predictable future is the underlying premise that if one takes a traditional trajectory through schooling, that s/he will move towards a stable economic career. However, this fallacy is recognized by the majority of young people in most countries around the world. Current rates of unemployment for youth aged 15-24 years old in developed countries have become a concern. Countries like Greece and Spain have experienced unprecedented rates of youth unemployment, 58.4% and 57.3% respectively (World Bank, 2013). However, countries such as Australia (12.2%), Canada (13.8%) and the United States (15.8%) (World Bank, 2013) have all reported higher youth unemployment rates. This trend is of concern given that it is now taking youth longer periods of time to transition to full time work (more than 5 years) and youth are increasingly employed in casual work positions (Skujins & Lim, 2015).

Some educational reform has focused on a dominant economic narrative that is focused on job growth in the knowledge era and away from manufacturing and labour positions. The new Technology subject in the Australian National Curriculum aims to prepare young Australians to compete in the service knowledge economy (ACARA, 2015). Knowledge economy reforms often focus on Richard Florida's description of creative work, such as research development, design, marketing and sales, and global supply chain management (Ito et al., 2013) and flourishing creative industries which require creativity, creative thinking skills and innovation, within post-industrial cities in western countries. In order for young people to transition into knowledge economy service jobs, young people are required to invest greater time and resources into formal education (Facer, 2011) and to upskilling to be competitive for knowledge economy jobs. Upon reflection of this kind of emerging marketplace, in a global context, what does the creative class mean within an international division of labor? Are developed countries filled with creatives and developing countries employed for manufacturing, laboring, and routine work (Ito et al., 2013)? How do we envisage this economic future will look like taking into consideration social and political justice for all?

Education and the future of schools

This exploration on some of the problematic aspects of instrumentalism within education for sustainability and education towards predictable or known futures leads to how schools can be imagined and positioned as sites that develop capacities for children and youth to respond to uncertain futures (Facer, 2011). Forecasting what the educational needs of students will be in future society and future contexts is complicated and always subject to change; however, some suggestions for participatory processes to create educational institutions which are adaptive and responsive to community challenges are discussed in Chapter 8, Section 8.4 entitled “Implications for environmental sustainability education and educational futures.

2.12 Chapter summary

This chapter began by situating concepts of youth and associated generational labels, and was followed by a review of the literature on youth internet usage, social networking practices and social media design affordances. The majority of the chapter focused on reviewing the main literature bodies: participatory culture, environmental sustainability education, youth activism and civic engagement and salient currents of thought within each literature body. The last section of this chapter introduced literature that relates to the broader implications of interest-driven learning and activism within social media sites in terms of environmental sustainability policy discourse, and educational futures.

Chapter 3 Methodology - notes from the online field

3.1 Chapter overview

This chapter presents the methodology and methods adopted to investigate how youth in varying geographic locations around the world are using social media platforms to engage with their peers in environmental learning and activism.

The first part of this chapter presents the research questions that guide this inquiry, followed by a discussion of the theoretical perspective, case study methodology, various ethnographic methods, and analytical steps employed to investigate youth environmental sustainability learning and activism within social media interest groups. This discussion is followed by a consideration of the ethical issues of research investigating youth and online new media practices. The last sections focus on issues of trustworthiness.

3.2 Research questions

As outlined in the introduction of this thesis, the focus of this inquiry is to investigate the following overarching research question and subsequent sub-research questions:

- How are youth using social media sites for learning about and engaging in activism on environmental sustainability issues?
 - What are some prevalent structural characteristics of youth-created environmental social media interest groups?
 - What types of learning do youth attribute to their engagement in youth-created environmental social media interest groups? How does this learning occur? What and who shapes this learning?
 - How do youth define and engage in environmental social media activism? In what ways and to what extent do youth view online environmental social media activism as contributing to social and environmental change?

3.3 Methodology

In what follows, I will discuss the implications of the adoption of an interpretivist /constructivist theoretical perspective on case study research.

Theoretical perspective

An interpretivist/constructivist approach focuses on “the world of human experience”

(Cohen & Manion, 1994, p. 36) and posits that inquiry into social phenomenon necessitates an understanding of the social worlds that people experience. This approach also recognizes that an individual's understanding of reality is socially constructed, fluid, and negotiated within cultures, social settings, and relationships with other people (Blaikie, 2004). This research project is situated within an interpretivist/constructivist paradigm and is primarily focused on how youth, engaging in social media practices in different locations and cultures around the world, understand their subjective experiences of social media, as well as how these experiences inform their learning and action. From an interpretivist/constructivist approach, this research is concerned with the youth's constructed realities (Schwandt, 2000; Patton, 2002) of how social media practices influence, inform, and reconfigure their environmental learning and action.

In addition, I position the youth's responses as part of their discursive practice, without assuming any causal or evidential relationship (Richardson, 1999, p. 67) and recognize that within a survey or interview, "the link between lived experience and its expression is always problematic, and, thus, what we are able to access about lived experience are but various performances - spoken, told, and retold accounts" (Schwandt & Burgon, 2006, p. 102). With this attention on youth participants' accounts of their usage and experiences of social media and environmental learning and action, I have tried to allow youth participants' words and voices to speak for themselves (Lincoln, Lynham & Guba, 2011) and to allow dominant concepts to emerge from the text (Mertens, 2014). The youths' accounts do not result in a definitive or generalizable theory of global youth social media, but these accounts elucidate dynamics of informal interest-driven learning as understood by youth participants and shed light on teaching strategies for environmental education and informal online learning.

Interpretive case study

Given the current gap in research on youth interest-driven learning within social media sites, adopting interpretive case study as a methodology aligns in several ways. An interpretive case study inquiry process focuses on elucidating characteristics, patterns, significant factors, and interaction of a particular phenomenon. Within the literature, there are some differences between conceptions of what constitutes a case study methodology. For example, Yin (1994) defines case study in terms of research process, whereas Stake (1995) focuses on defining the unit of study, and Merriam (1988) focuses on the end product of the case study as an "intensive, holistic description and analysis of a single instance, phenomenon,

or social unit” (p. 21). All of these different positions contribute to defining case study methodology and can be condensed to suggest that case study research is focused on “delimiting the object of study, the case” (Merriam, 1998, p. 27).

According to Yin (1994), case study research focuses on “contemporary phenomenon (e.g., a ‘case’), set within its real-world context-especially, when the boundaries between phenomenon and context are not clearly evident” (p. 13). Yin’s definition recognizes how the contextual conditions are interrelated or important to the phenomenon under investigation, which is important for this study focused on social practices in social media spaces, because of the difficulty of separating affordances (design attributes) of the social media site and social practices or behaviours (Van Osch and Mendelson, 2011). Within a context where structure and process are interrelated, the case study then requires a twofold purpose, as Becker relates: “to arrive at a comprehensive understanding of the groups under study” and “to develop general theoretical statements about regularities in social structure and process”(as cited in Merriam, 1998, p. 29).

Interpretive case research can provide in-depth understanding of phenomena due to its rich and descriptive characteristics which draws upon Geertz’s notion of “thick description” (Berg, 2007). According to Stake (2006), many interpretive case researchers are influenced by the ethnographic desire to seek emic meanings held by research participants within the case:

the case researcher needs to generate a picture of the case and then produce a portrayal of the case for others to see. In certain ways, the case is dynamic. It operates in real time. It acts purposively, encounters obstacles, and often has a strong sense of self. It interacts with other cases, playing different roles, vying and complying. It has stages of life - only one of which may be observed, but the sense of history and future are part of the picture (p. 3).

Within case study research, the emic meanings held by research participants are referred to as “sensemaking” (Weick, 1995). The sensemaking processes of case study research are described as:

the manner by which people, groups, and organizations make sense of stimuli with which they are confronted, how they frame what they see and hear, and how they perceive and interpret this information, and how they interpret their own actions and go about solving problems and interacting with others (Berg, 2007, p.285).

Critiques of case study research

Case study research is commonly used within education research for research studies which are investigating context-specific educational situations. The case reports which are

written for a wider audience generally do not include research procedures and analytic process (Corcoran, Walker, & Wals, 2004). Stake (2006) suggests that case study is both a process of inquiry about the case and the resulting culminating product of the inquiry. If the final report was called a “case record” (Stenhouse, 1978) then perhaps it would help clarify the confusion. For this confusion, case study methodology risks being reduced to the descriptive report which describes the context-specific phenomenon. The confusion and general oversimplification of case study methodology is taken up in Flyvbjerg’s (2006) paper “Five Misunderstandings About Case Study Research”, where each misunderstanding is systematically addressed. Flyvbjerg argues that case study, when practiced rigorously, may strengthen social science practices as the outcomes are systematic production of exemplars. I’ve intended to apply rigour and include detailed methods so as to conduct sound case study research that adheres to quality criteria and process.

In the initial stages of conceptualizing this research study, positioning youths’ perceptions of online informal learning and action has been an important approach for two main reasons: i) youth’s perceptions are informed by their formative years of internet access, (i.e. they have grown up their entire lives with the internet), and ii) the importance of conducting this research with young people who identify as using social media for environmental activism.

Within the literature on youth informal online learning, as discussed in the literature review, there are few published studies which have explored this phenomenon. This case study is informed by several preceding case studies discussed in the literature review:

- Ito et al’s (2009) ethnographic study, *Hanging Out, Messing Around, and Geeking Out*, which explores informal online youth engagement
- Jenkins et al’s (2006) white paper for the MacArthur Foundation entitled “Confronting the Challenges of Participatory Culture,” which shows some potential benefits of participatory online culture
- boyd’s (2008) dissertation *Taken Out of Context: American Teen Sociality in Networked Publics*, a 2.5 year study of American teens engagement with social networking sites.

This case study has not been developed to test these theories, but rather to extend and explore how online participatory culture and practices are shaping youth online learning and activism in the context of interest-driven environmental learning.

Connective inquiry and online practices

This case study research project is also informed by connective inquiry and the previous work of many qualitative researchers working within internet-related studies. In early studies related to internet research, scholars had a tendency to isolate and separate online and offline contexts (Jones, 1999; Leander, 2008). Bruckman and Resnick (1995) positioned the internet as a “third place” with unique cultural practices while Wellman and Haythornwaite (2002) argued that the internet had become embedded within everyday life rendering it difficult to isolate from offline life. Hine (2000) significantly influenced the debate when she explained that the internet can be understood as both a culture and cultural artefact. In this way, as a culture, the internet engenders practices that are unique to the online context and should be studied as technologically-mediated; however, as a cultural artefact, the internet exists within a broader cultural context within which people live.

Researchers interested in online social practices began to account for online and offline contexts by investigating social phenomena, through technologically-mediated and technologically-unmediated interactions, and cultural practices across different online and offline field sites. For example, in boyd’s (2008) dissertation research, she interviewed American teenagers in malls about their online practices. Other ethnographic researchers considered how technological usage is influenced by cultural practices, geographic location, and geographically-specific cultural practices. Wakeford’s (2003) study of London internet cafes showed how local cultural practices become configured within global communications, and in many ways, proposes the interrelatedness of technologies between online and offline contexts. Burell (2009) explores the benefits and consequences of constructing the field site as a network that incorporates physical, virtual, and imagined spaces. The boundaries begin to become fuzzy and indistinct. Another way to articulate the interrelatedness and interplay between technology and society is that technologies are socially constructed through usage (Bijker, 2010) and the sociotechnical practices that arise inform cultural practices in both online and offline worlds (Slevin, 2000). This understanding of technologies as socially-constructed entities frames this research project. My ontological perspective is discussed in more detail in Section 3.4 Researcher Positionality.

Within research on internet-related social practices, the debate has not only focused on theoretical distinctions of offline and online practices, but on discussions of research methods concerning the appropriate range and uses of traditional research methods and techniques within online spaces (Leander, 2008). Many researchers have focused on

'connective' approaches (Hine, 2000) due to the assumption that "people routinely build connections to internet-related practices and sites and myriad offline practices and sites" (Leander, 2008, p. 36). Leander (2008) argues that 'practices' are located in time and space, but also travel through time and space and across online and offline spaces. For example, the content a user posts on a Facebook profile is located in time (a specific moment) and space (Facebook profile) but the content can travel across aspects of the users' life in both physical (speak to friend face-to-face over lunch about post) and virtual spaces (can be seen and searched by others). The argument follows that since 'practice' travels so should social science research interested in online social practices:

Connective social research of internet-related practices regards (social) relations and connections as normative social practices and sees online social spaces as completely related to other social spaces (Lankshear & Knobel, 2011, p. 148).

While I agree with Lankshear et al (2011) that the distinction between online and offline, virtual world and real world, or cyberspace and virtual space are imperfect and fuzzy distinctions, the context of a specific mediated online environment needs to be taken seriously in terms of how it shapes cultural practice. For example, the design affordances and social use of Facebook may shape cultural practice in different ways than the design affordances and social use of Twitter. Moreover, online practice is not only technologically determined, there are many dimensions of culture which shape online practice. One such example is geographic context. For example, differences in geographic context can result in differences of content and practice, (i.e. content and practice of youth in Malaysia may be very different than content and practice of youth in the Middle East or North America). Internet-related social research projects cannot focus too closely on specific field sites that are bound to spatial structures, for example, physical or digital - or a specific social media platform, because of how conversations, experiences, and practices move through media, space, and time. In this way, internet-related social research requires a commitment to research focused on obtaining a rich understanding of "the networks of people, objects, and practices" under investigation (boyd, 2011, p. 66).

A networked perspective

In addition to connective inquiry, this research is also informed by a networked perspective. In the *Information Age: Economy, Society, and Culture*, Castells (2010) puts forward the construct of a *network* as the defining feature to explain the interrelationships of economy, society and culture within our current epoch: "Networks constitute the new

morphology of our societies, and the diffusion of networking logic substantially modifies the operation and outcomes in processes of production, experience, power, and culture” (p. 500). Terms like “networking”, “six degrees of separation”, “social capital” have traversed academic discourse and network science publications, and are commonly-used in many different sectors. In addition, the rise of social networking platforms over the last 15 years has been one of the most dynamic spaces related to digital media. The adoption of social network terminology has created both acceptance of and confusion between these terms within academic and non-academic circles (Pescosolido, 2008). However, network science and social network analysis have been clearly defined over the last 50 years and longer by early network studies.

Network science is an interdisciplinary field which studies complex networks and draws upon diverse theories and methods including graph theory (mathematics), statistical mechanics (physics), data mining and information visualization (computer science), and social structure (sociology). In the last decade, there has been significant increase in network research within many disciplines (Borgatti, Mehra, Brass & Labianca, 2009; Freeman, 2004). Network theory has been applied to many diverse areas and researchers have found that there are similar network structures, independent of age, function, and scope from the cell to the internet (Barabasi, 2009). Network theory goes far beyond the proliferation of research. The US military considers network theory central to the training of military intelligence officers and it was a layered social network analysis which lead to locating and capturing Saddam Hussein in 2004 (Hougham, 2005).

The theory of networks has developed an approach to study ‘social relations’ rather than ‘individual attributes’ (Burt, 1987), alongside a similar move beyond the false dichotomy of individual versus social distinctions within psychological and sociological fields. Specifically, within network theory, focusing on social relations has provided explanations for social phenomenon in a wide variety of disciplines from psychology to economics. Within the literature, the term *Social Network Analysis* is used at times to represent studies which are working with social network theory. To avoid the inherent confusion with the term Social Network Analysis, I will adopt the term “social network perspective” (Carolan, 2013) to capture social network theories, models, and applications. In this research project, the methods are informed by a social network perspective, but do not follow a specific social network methodology or analysis.

History of social network research

Social network research has its antecedents in the work of Auguste Comte who attempted to found a new field of “social physics” in the 1830s and in the work of French sociologist Emil Durkheim in the 1920s who argued that societal structures could be investigated not in the intentions of individuals, but in the structure of the social environments in which they are embedded. In 1934, Moreno and Jennings mapped the social network of a high school for girls in upstate New York, using “sociometry”, a technique used to represent individuals’ subjective feelings towards one another, in order to better understand why young girls were running away from the school in unprecedented ways. Within anthropology, early network studies (Barnes, 1954; Bott, 1971; Mitchell, 1969) were conducted through the researcher combining observational data, interviews, narrative, and visual data to map social relations and social processes. Social network research is, therefore, rooted in both qualitative and quantitative methodologies and has developed from formal mathematical research in sociometry and graph theory (Moreno & Jennings, 1938), as well as from early ethnographic studies of the structures of kinship and interpersonal relations by anthropologists.

While social network research has developed and been influenced by both quantitative and qualitative fields, it has become increasingly popularized since the 1970s due to a growth in mathematical mapping and visualization computer programs, for example, UCINET (<https://sites.google.com/site/ucinetsoftware/home>) and Pajek (<http://vlado.fmf.uni-lj.si/pub/networks/pajek/>). Qualitative network analysis studies discuss the importance of culture, narrative, content, and context as a way to complement quantitative maps and measures of network structures (Edwards, 2010). The mapping and measuring of social relations reduces relations to binary categories and thereby omits information concerning the quality or strength of the ties, as this context cannot be adequately captured through additional numerical data (Peay, 1980), which results in network diagrams that produce a static image of ties frozen in a moment in time. A qualitative approach then complements quantitative social network analysis as social researchers “can explore issues relating to the construction, reproduction, variability, and dynamics of network ties, and crucially in most cases, the meaning that ties have for those involved” (Edwards, 2010, p. 6).

Social network research key concepts

At the core of social network research are several key concepts. *Actors* are the social units such as individuals, groups or organizations. The term *actor* is used interchangeably

with the term *node*. The connections between the social units are referred to as *ties* or *edges*.

Typically, within education, examples of actors are students in a classroom, principals in a school district, or parents in a community. Examples of *ties* within education are: behaviour interaction between students (e.g., talking to each other or sending messages), physical proximity of students (e.g., seating plan), social affiliation or association (e.g., enrolled in same class or belonging to same peer group), and evaluation of others (considering someone a friend or enemy) (Carolan, 2013, p. 5).

Adopting a networked perspective, this case study research is informed by social network theory and draws upon basic social network analysis procedures to help investigate the practices of youth (actors) who are using social media to share environmental information, coordinate events, and take political action.

3.4 Researcher positionality

As a teacher, I have experienced the myriad ways that young people use social media. The antecedents of this research project started in 2005, when I was working as a high-school teacher and was asked to supervise a group of six students through the Young Master's Program, an online sustainability program for high school students. From this experience, I saw how my students transferred some concepts from the online forums into how they were organizing their grass-roots recycling program at the school. Then in 2009, I was working for a NGO and my position required I work as an external support worker to two schools who were implementing whole school approaches to sustainability. I attended all environment-related meetings at the schools and began to notice how within the Environmental Club meetings, students would organize which students would relay updates and campaign information from their home computers to the whole school through their Environmental Club Facebook groups. I became interested in how the students navigated the ban on most social media at their schools, but still used these platforms to promote school-based activities to the rest of the school population.

With the increase in social media usage in my lived experiences, I became increasingly focused on how these platforms are used in school settings by youth in positive ways. While social media can be used by young people in very damaging and abusive ways - especially in terms of famous cases of rape photos or cyber-bullying - the media and discussion often only focuses on these negative uses. Many schoolboards have then taken an across-the-board banning approach, creating a digital dissonance, or disconnect between how youth use media

at school versus out of school (Clark et al., 2009). A much more detailed discussion of these issues is available in the Discussion Chapter; however, as a researcher and as an educator, I firmly believe that we have an imperative to attend to youth practices, to witness practice, and to form decisions and policy based on observed practices and informed by research.

In many ways, my philosophy of education and practice has been greatly influenced by critical pedagogy, after experiencing 'contradictory' or disconnected moments in which the curriculum and school structure I experienced as a student and later as a teacher confronted my own philosophical and political beliefs about education.

Critical pedagogy, as a philosophy of education, challenges the implicit assumptions and practices of dominant culture and, thereby, conventional education systems, and is intended to help students to develop critical consciousness and take action against experienced inequities (Giroux, 2010; Kincheloe, 2005; Freire, 1970). However, within critical pedagogy discourse, there are concerns that the influences of postmodernism on critical theory, which have been used to decentre systems of oppression, may in turn create more divisions and hinder transformative possibilities resulting in 'balkanized positions' (Kanpol, 1994). Like Kanpol, I believe that the process of deconstruction and critique needs to be grounded in moral possibility: "the struggle of the academic educational Left...is bereft of the language of the ethical or moral - the human language of hope which must frame any obscure discourse of change, possibility, and justice" (xi). Freire (1996) positioned hope as imperative to the critical consciousness process and conversely, hopelessness as a product of economic, historical, and social forces of oppression. In this sense, hope is an 'ontological' need within a student's journey to critical consciousness (Hendricks, 1994). From this position, I see critical reflexivity as an integral aspect of transformative educational approaches.

I apply reflexivity to my view of social media and technology in general. In this view, technologies can be understood as tools, which have certain intended uses and purposes, but that also acquire new and unexpected uses and have new and unexpected effects (Burbules & Callister, 2000). In this sense, technologies are not deterministic (i.e., people may modify and alter the hardware, software, rules of engagement, or intended uses). Technologies are also "non-neutral tools" that have a mix of costs and benefits and, often unintended, consequences, located within the rationality and morality of the individual user (Burbules & Callister, 2000) and larger cultural and economic milieus (Franklin, 1999; Bowers, 2000). A technology's

value is not an outcome of the technology alone or its potential; it is located in the technology's practice (boyd, 2008; Bijker, 2010).

This perspective also adopts an understanding that technology reshapes how users perceive themselves as agents and their relations to others and their perceptions, including their ability to measure the costs and benefits of a technology once they have entered the mindset of technology. This suggests that we never simply use technologies without technologies also "using" us:

Technology is not the sum of the artifacts, of the wheels and gears, of the rails and electronic transmitters. Technology is a system. It entails far more than its individual material components. Technology involves organization, procedures, symbols, new words, equations, and most of all a mindset. (Franklin, 1999, p.12)

The internet as both a technology and a communication tool is understood within a broader set of social structures and cultural patterns (Ito et al., 2009). The internet is reshaping concepts of interaction, knowledge, dissemination, community, and a multitude of other social norms (Stahl, 1999; Franklin, 1999; Burbules & Callister, 2000); however, people are also shaping the internet and its culture (Slevin, 2000).

Through adopting a relational and reflexive view of technology as a critical lens, my consideration of environmental interest-driven online learning and action has been radically, but cautiously, transformed. Within education circles, the internet and technologies are frequently positioned as potential cures for various socio-political, economic, and educational problems. I am careful in not unthinkingly adopting the "technological fix" belief where all efforts and resources are invested in technology to fix societal issues instead of committing effort and resources to addressing systemic social inequities.

While I maintain a critical and relational view of technology, social media sites offer spaces for youth to communicate with a large peer group, set-up informal learning groups, and take political action on issues. Choosing to investigate these youth-driven online practices is not only to explore how youth understand their own online learning and actions and perceptions of the agency of social media sites, but also to reflect on what the formal education system can learn from the uses and mechanisms of peer-engagement by teens.

3.5 Research design

The investigation, research design, and subsequent choice of methods for this study are informed by an interpretivist/constructivist theoretical perspective, situated within case

study methodology and methods. The research design also takes into consideration connective inquiry and a networked perspective.

Case study methods

Case study methodology and its subsequent methods have been chosen to guide this inquiry for reasons stated in the section on *Interpretive case study*, but also because this research project aligns with the three conditions explained by Yin (2014) for ascertaining case study methods: i) the form of research question, ii) extent of control a researcher has over actual behavioural events and iii) the degree of focus on contemporary events. In this study, the research questions are focused on “how” and “why” questions; the researcher does not need to control behavioural events within the online space; and the research focuses on contemporary events, which all of these responses indicate that this research is best suited to a case study inquiry. A selected literature review of data collection methods preceded data collection and this literature review informs this study; however it is not referred to as data collected.

Multiple case design

At the onset of the research process, the intention was to synthesize a detailed, and insightful view into the structure, dynamics, and depth of youth interest-driven informal environmental learning. This research project is positioned as a multiple case study focusing on various youth who identify as users of social media for engaging with peers in environmental learning and action. Through data collection, I have interviewed and collected data (predominantly social media) on specific individuals and a group in which the individual participates.

Figure 3.1 illustrates how each case is bounded by an individual youth’s reflection on their usage of social media for interest-driven environmental learning and action. Within each case, an online environmental group, within which the youth participates, is positioned as an embedded unit of analysis within the case. The dashed lines represent the difficulty of isolating the phenomenon from the context, that is, the difficulty in distinguishing online social practices from social media design affordances.

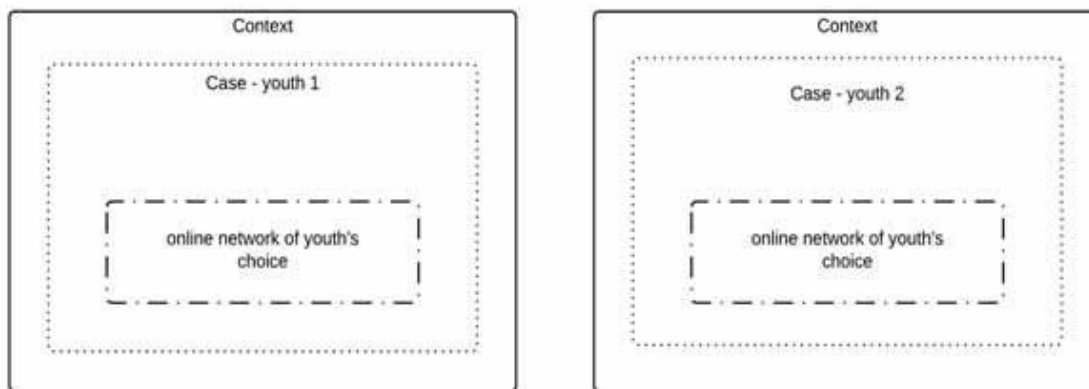


Figure 3.1: Illustration of cases within multiple case study

The individual youth are positioned as individual cases because each youth lives in a different geographic region within a diverse culture, that is, each case is studied in depth for its “situational uniqueness” (Stake, 2006, p.12). While the youth are all interacting within Facebook groups, none of the youth are participating in the same Facebook group. Furthermore to consider Facebook as a single case or unit of analysis would flatten the cultural identities of these youth and their respective groups.

At the onset of this research project, I was unsure that I would find individual youth and youth-created groups participating in online learning and action around environmental issues to the extent I did. The diversity and range of the groups have not allowed this study to compare the multiple cases for generalizable findings of what engagement and participation in all youth-developed environmentally-focused social media groups looks like (Yin, 2013, p. 57). This research study is not focused on generalizations, but is focused on gaining a better understanding of how youth use social media for interest-driven environmental learning and action and thereby yield insights into the social processes related to this theoretical interest (Yin, 2013, p. 52). The better understanding of youth use of social media for interest-driven environmental learning and action is the quintain of this research project. Unlike a generalization of a case study, the quintain is the target collection, arena, or umbrella for the cases in the study (Stake, 2006). In order to understand the quintain, various single cases are studied and the similarities and differences of the cases are then analysed through a cross-case analysis. The focus, therefore, is on understanding the quintain, which provides a better understanding of how youth use social media for interest-driven environmental learning and action. Through studying various cases of youth usage of interest-driven environmental learning and action allows the specific details of each case’s situational and experiential

knowledge to construct the basic understanding of the quintain. The findings of the cross-case analysis (quintain) will not draw focus on generalizations or causal claims; however, it will result in a “multiply sequenced, multiply contextual, and functionally coincidentally, rather than causally determined” result (Stake, 2006, p. 13).

3.6. Recruitment and Sample of Participants

Youth 16 - 18 years of age tend to be a difficult population to access when requesting voluntary participation because of the transient and informal nature of environmental youth groups. The invitation to participate in this research was not coordinated through a formal school program as the research is focused on interest-driven and informal learning. As a means to recruit voluntary youth respondents, invitations (Appendix A) to participate in the research were sent through various international and national environmental and youth-focused organizations. The staff at Taking IT Global, a global online social network and hub for environmental and civic youth participation, placed the online questionnaire invitation in their *Dispatch* newsletter (Appendix B), which is circulated to a global youth membership of 4000. In addition the staff gave feedback on the online questionnaire design.

Other environmental organizations that promoted the online questionnaire to their youth members are: The Young Masters Program, an international sustainability program in Sweden; TUNZA, the youth chapter for the United Nations Youth Environmental Program; specific regional UN environmental youth groups; the Integrated Programs network in Ontario; and the Environmental Educators of Ontario Network. Besides these organizations, the invitation was also circulated to my professional and academic contacts within the environmental education field. I included many practicing teachers and adult facilitators of youth groups in my outreach.

The invitation to participate was also hosted on my website so that a landing page could be created and the online questionnaire was anchored to the invitation. The text of the invitation to participate in the research study requested that the invitation be passed along to individuals or networks of youth that would be interested in participating. Because the URL link could be shared to networks without me knowing, calculating the response rate was not possible. However, it was noted that the posting of the invitation in Taking It Global's *Dispatch* newsletter resulted in 32 online questionnaire responses, of which 20 respondents were within the 16 - 18 age range. Working with large environmental organizations that service youth populations was helpful in recruiting participants in diverse regions for this study.

The sampling approach taken in this project is snowball sampling, which is a nonprobability sampling (Fricker, 2008). The invitation to participate relied on environmental youth organizations and individuals to pass along the invitation to others in their network who fit the criteria and would be interested. The responses by youth are understood as a convenience sample and are not representative of a wider youth population more generally.

Online questionnaire

As discussed above, an online questionnaire was employed in this research study to help find individual youth who fit several criteria for the case study. The initial draft of the online questionnaire was developed in consultation with Taking IT Global staff and was broadly based on Jenkins et al., summary of the potential benefits of participatory culture (peer-to-peer learning, a changed attitude toward intellectual property, the diversification of cultural expression, the development of skills valued in the modern workplace, and a more empowered conception of citizenship) (2006). The online questionnaire once drafted was reviewed by staff at Taking IT Global and my supervisory team and subsequent revisions were completed. The online questionnaire was piloted with two youth 16 years of age and their questions and feedback was included in the final version of the online questionnaire.

The online questionnaire was anonymous and respondents could voluntarily leave their contact information if they were interested and available to participate in the 6-month observation period. An online questionnaire was beneficial as it allowed the respondents to complete the questionnaire at the time, place, and pace of their choosing, while affording them an increased sense of privacy (Vehovar & Manfreda, 2008).

The questionnaire was hosted on Survey Monkey and collected responses from March 28, 2012 until June 26, 2013. The online questionnaire collected a total of 171 responses and the majority of responses were collected during November, 2012 (41 responses) and January, 2013 (75 responses).

Once respondent data was filtered and respondents 16-18 years of age were isolated, there were 63 total respondents from 29 different countries (Figure 3.3). To review the specific questions asked in the online questionnaire, see Appendix C.

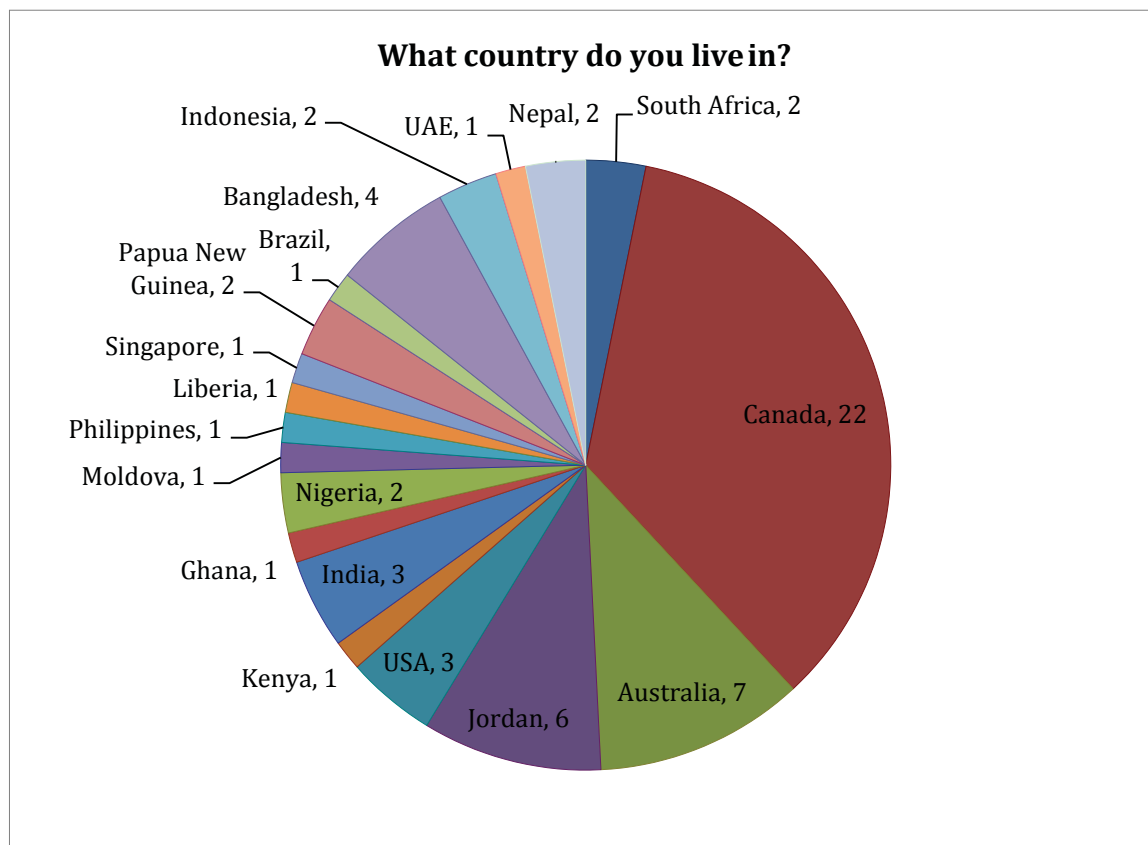


Figure 3.2: Total youth respondents by country. This figure illustrates the total number of youth respondents from each country who responded (63) to the online questionnaire.

Selection of youth participants

Within the questionnaire, youth were invited to participate in a longer observation study of their online environmental practices. Of the 63 potential youth respondents, 39 respondents provided their contact information. These 39 respondents met the following criteria:

- between the ages of 16 - 18
- identify as actively engaged in sharing environmentally-focused media content

Respondents who left their contact information were contacted via email to confirm their interest in participating in a longer observation study. If respondents confirmed their interest in participating in the longer study, they were required to complete the informed consent forms (Appendix D), which were provided via email. Respondents who were volunteering to participate in the online observation period were also instructed to “friend” my JCU researcher profile on Facebook if they wanted to continue with the observation on

Facebook. From this process, 15 youth agreed to participate in the observation research comprised of interviews, social media data collection, completing an empowerment scale, and review of preliminary data analysis. Of these 15 youth, 10 completed all components of the observation research, two completed one interview, two withdrew, and one respondent did not respond to interview requests. All respondents agreed to have their names and environmental projects referenced in publications. Below is a brief introduction to the participants of this study - all descriptive information below reflects the youth and their organizations at the time of interview between March, 2013 and December 17, 2014.

Aman Agrawal

Aman is a grade 10 student, who lives in Northern India. He started a NGO called Saviours of the Environment that is focused on “increasing awareness on environmental issues among youth, the most important part of our society and promoting sustainable and low-carbon lifestyle[s]” (Saviors of the Environment, About section, Facebook). Aman is also on the board of Plant for the Planet, a German youth-run NGO, which focuses on children and youth decision-making and action.

Anup Chalise

Anup is a grade 12 student in Pokhara, Nepal. In 2009, at the age of 14, Anup created Peepal Promotion for Climate Action, a project that plants Peepal trees in rural and predominantly indigenous Nepalese communities.

Hussam Yaseen

Hussam is a grade 10 student at King’s Academy in Madaba, Jordan. Hussam is involved in his school’s Green Club, an environmental club at his school. He is also involved with an informal closed youth-group called The Young Jordanians, which focuses on social and environmental issues facing Jordan and encourages youth to share ideas for action campaigns.

Kayla Kermit

Kayla is 16 years old and a grade 10 student at a high school in Guelph, Ontario, Canada. Kayla participates in several groups including her school’s Green Team, Social Justice Group and in the community with CPAWS. After Kayla participated in a semester long integrated program, called TERRA, focused on the environment and social justice at her high school, the class decided to create a private Facebook group to allow for them to stay in touch.

Laura Rigg

Laura is a grade 12 student at Dartmouth High School in Nova Scotia, Canada. During Laura's time at the high school, Laura and a friend, in their grade 9 year conducted an extensive waste audit which resulted in the team reporting on the school's environmental impacts at a Canada-wide science fair competition. The two young women decided to return to the school and implement some waste minimization strategies, which they would then follow-up with subsequent waste audits. These actions were the impetus to start up a comprehensive environmental club, which is led by Laura and her friend.

Leago Monareng

Leago is 18 years old and finished high school in 2013 in Pretoria, South Africa. Leago is a regional president for a council within the youth-created and youth-focused NGO, Generation Earth. Generation Earth was created to address the gap between the environmental sector and the passion and drive of young people. Generation Earth supports the establishment of green councils in schools and universities to help facilitate the development and implementation of environmental projects and programs. As a volunteer president, Leago organizes and facilitates weekly meetings in Pretoria. He also participated in COP17, (the 17th Conference of the Parties to the United Nations Framework Convention on Climate Change) held in Durban, South Africa in 2011.

Mary Konobo Jr.

Mary is 18 years old and completed grade 12 in 2013 in Port Moresby, Papua New Guinea. Mary grew up in rural Papua New Guinea before moving to Port Moresby as a teenager. In Port Moresby, Mary was surprised at the amount of litter in the streets and some practices she saw on a daily basis. For example, people throwing garbage from moving vehicles, spitting betel nut, or using kerosene to burn rubbish. She was concerned that young people growing up in Port Moresby did not realise or did not know the consequences of these actions, especially if they saw them being practiced in the city streets every day. So in grade 10, Mary decided to create a Facebook page called "Make A Change! Be Environmentally Friendly" in order "to raise environmental awareness and to educate each other on how our actions are affecting the natural environment." Mary is the founder and leader of the group and has invited friends, family, and community members to join and contribute to the group.

Michael Dillon

Michael is 16 years old and finishing grade 11 in Cairns, Australia. Michael joined the Cairns Facebook group for the Australia Youth Climate Coalition to gain background information and to get to know people that share similar ideas. At Michael's high school, there is no Environmental Club or other student-interest clubs apart from sports and so Michael thought that joining an online Facebook group may help him find like-minded others and to have a more informed sense of whether he should pursue university degrees or a career in renewable energy research and development.

Rebecca Feddema

Rebecca is 17 years old and has completed grade 11 in Ontario, Canada. Rebecca has been an animal rights activist for five years and understands animal rights issues as interconnected to many human and environmental issues. She has been involved in many local, regional, and international animal rights groups and volunteers to take care of animals and to coordinate volunteer events, often working over 20 hours a week outside of high school sometimes spending five hours in the evening focusing on online activism.

Sagar Aryal

Sagar is 17 years old, has completed grade 12, and lives in Nepal. He has also spent a year living in Sweden during high school. In grade five, Sagar created a group called Sano sansar which later became a volunteer-run non-governmental organization, which offers programs and campaigns focused on social justice and environmental issues predominantly in Nepal. Sano sansar's first campaign was starting a library for children who were deprived of going to school in Kathmandu. The students then started to focus on environmental conservation and sustainable development and developed an extensive website and online network. In 2013, Sano sansar launched different programs in several different countries, including: Sri Lanka, Maldives, Germany, Nigeria, and Sweden.

3.7. Data collection methods

Figure 3.2 illustrates the various methods of data collection and analysis that have been employed in this study to develop a comprehensive and holistic understanding of youth interest-driven environmental learning and action. The diagram shows data collection and analysis stages as discrete and sequential; however, the collection and analysis stages in this research project were at many instances recursive and interactive (Merriam, 1998, p. 27). For

example, a particular post observed on a youth's profile page along with data collected from the "About Us" section of a Facebook group was discussed in an interview. For organizational purposes, a description of each stage of data collection (Online questionnaire, participant selection, Interview 1, Social Media Group Capture, Social Media Personal Profile Capture, Interview 2, Empowerment Scale) is depicted in Figure 3.2.

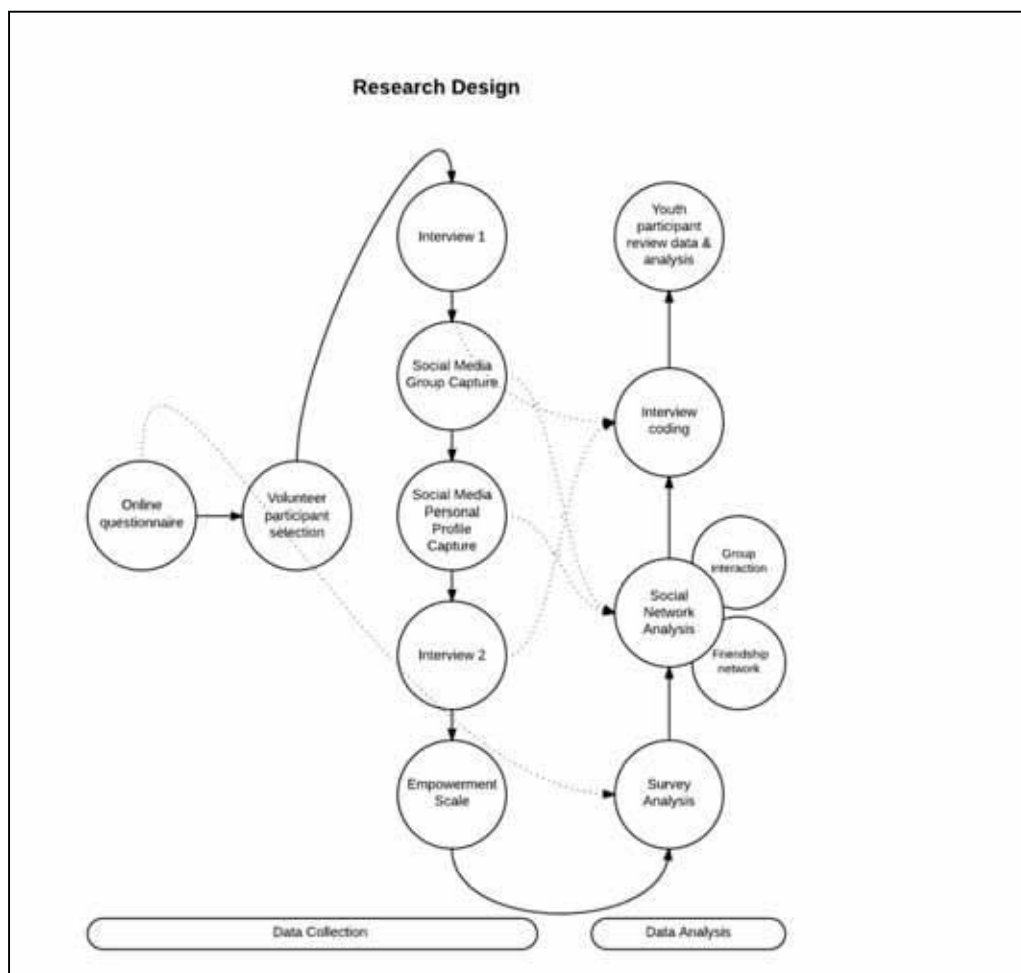


Figure 3.3: Research design: Data collection and analysis flow

Interviews

The semi-structured interview protocol questions were developed in relation to the research questions and sub research questions of this study and were reviewed by my supervisory committee. The final draft of the interview questions was piloted with Anup Chalise, a participant in this research study. After this successful pilot, the interview questions were not modified. Once youth respondents agreed to participate in this research study, interview times were coordinated. Interviews followed the semi-structured interview protocol, which allowed me to focus on specific responses within the online questionnaire and

ask clarifying or qualifying follow-up questions. The interview lengths were approximately 1 hour in length (see Data Collection Summary and interview schedule Appendix G for specific times). Each observation period for each participant commenced with an interview and ended with an interview. Interviews were conducted between March, 2013 and December 17, 2014. In the initial interview, informed consent was explained and given if it had not already been submitted. The first interview followed a protocol (Appendix E) with questions that relate to environmental activism, group structure, peer-to-peer environmental learning within groups, and the role of teachers and adult mentors. The second interview protocol (Appendix F) focused on discussing with youth their understanding of group process in an online network, and their conceptions of 21st century skill development and empowerment. The length of each interview, interview data, and other information on data collection is summarized in the Data Collection Summary (Appendix G).

Setting-up interviews

Coordinating interview times was facilitated through sending a Facebook message or email to a participant. Youth participants generally responded very quickly (from immediately to a day later) to Facebook messages. At times, the interview would be scheduled in the following 48 hours as when the interview was scheduled too far in advance, youth respondents were less likely to be able to conduct the interview due to scheduling or forgetting about the interview. In instances where the youth had forgotten about the interview, I would send a Skype and Facebook message and frequently youth would respond immediately and request to reschedule. For some of the respondents, we needed to reschedule up to three times to find a time in which we could conduct the interview. In addition, there was a noticeable difference between youth responses when messages were sent via email - longer return times and a less likely return.

Interview mode-flexibility

All interviews were scheduled to be conducted through Skype; however only audio was recorded due to requests of the ethics committee. Due to varying levels of internet-access for participants, three interviews were conducted through text-chatting within Skype and Facebook. For two of the interviews, with Annisa and Aman, this option was offered after attempting to connect via videoconferencing and the videoconference connection being too weak to allow for a clear and audible interview. With synchronous text-chatting, I could type clarifying questions and probe participant responses. In the text-chat, the respondents typed

very quickly and the quick exchanges felt like a focused conversation that followed the interview protocol. In addition to synchronous text-chat interviews, Mary's first was conducted using Facebook chat asynchronously due to time zone differences and a poor internet connection. With Mary, I would post 3 - 5 questions in a message at a time and she would respond. With this format, it was difficult to develop a rapport with Mary in Facebook as we were always online at different times. While I could ask clarifying questions to responses she had made in previous messages, the loss of the synchronous responses made the interview more formal and rigid. The posting of questions and her responding took six weeks in total.

Reflection on these different interview modes showed that a video conference was helpful for building rapport, conversation and trust (Merriam, 1998, p.23). Using digital communication technologies allowed me to interview youth in numerous countries and more easily connect with globally disparate youth, who can be transient and difficult to access (Pascoe, 2012). Within literature on online interviewing, there is some evidence that participants engage in higher levels of personal disclosure in online interviews (Joinson, 2005), which may prove more beneficial than a face-to-face interview, where the interviewer can rely on interpersonal interaction to help build rapport (Pascoe, 2012). Without having the visual image of the respondent or for the interviewee that of the interviewer, it was often difficult to have a "fluid" conversation or build rapport. However, in terms of time and efficiency, a chat-interview conducted either synchronously or asynchronously can save time as there is no need for transcription of the audio or video file.

Programs used for interviewing

In this research study, email and Facebook messenger were utilized to coordinate interviews. Skype (www.skype.com) was predominately used and Google Hangouts (<http://www.google.com/+learnmore/hangouts/>) was occasionally used for videoconferencing with youth. Due to limited internet access or youth not having an account with either platform, the interview would then be conducted over the phone. Interviews were recorded with Quicktime (<https://www.apple.com/au/quicktime/what-is/>) for transcription at a later date.

Social network observation

In the initial plan for this research study, the collection plan for social media data was to visit a participant's Facebook page or group at regular time intervals (twice a week) and

copy any environmentally-related posts that the individual respondent made to a spreadsheet that I would later analyse. However, in June 2012, Nvivo10 was released, which included NCapture (http://www.qsrinternational.com/products_nvivo_add-ons.aspx), a browser extension developed to import website or social media data into pdfs or datasets into Nvivo10. The release of NCapture changed my observation plan methods as I became able to collect participants' Facebook data in one action or download.

NCapture copies data that is publicly posted or that is viewable by the specific profile. For example, in the data that I collected, the post was either publicly posted or it was shared with my JCU researcher profile allowing for me to capture the post, photo, comment, or tag with NCapture. During this study, there were some issues which arose with NCapture. For example, when attempting to capture pages with significant posting and commenting, the program would crash or fail to complete the data pull. This issue has been acknowledged by QSR International within forums but has not been resolved as of yet. Additionally, the user cannot set time parameters on the data capture, which makes it very difficult to set parameters on the social media content collected. NodeXL, another social media data extractor program, does allow for this kind of customization; however, it does not integrate with Nvivo10.

Once social media content for all respondents had been collected by NCapture, the files were imported into Nvivo10 and then exported into csv files so that the files could be edited to reflect the six month data collection period. In addition, all identifying names were erased, except participants who consented for their social media data to be collected. This additional processing was required because i) once a dataset from NCapture has been imported into Nvivo10, the file cannot be edited and ii) to align with informed consent parameters of this research study (Appendix G - Data Collection overview).

3.8 Data analysis & synthesis

In the following section, relevant details on data analysis and synthesis are detailed and explained in relation to methodological considerations.

Analysis

Within this research project, data collection and analysis did not occur in two discrete step-by-step phases but in many instances occurred concurrently. According to Merriam (1998), qualitative analysis begins with the first interview, observation, or document read. In this research project, data analysis and synthesis were intertwined, as insights or hunches

emerged, other data collection followed. It is this interactive and iterative process that can allow a researcher to develop believable and trustworthy findings (Merriam, 1998, p.152).

Within this interactive process of collection and analysis, broadly, my analysis is framed by an interpretivist/constructivist approach and has been characterized by thematic analysis which has drawn upon inductive analytical approaches. Specifically, thematic analysis was employed in open-ended questions within the online questionnaire, interviews, and across text within the social media data capture files to move from specific observations to patterns and connections. This recursive process can be summarized in six different phases of analysis (Braun & Clarke, 2006): 1) familiarizing myself with the data 2) generating initial codes 3) searching for themes 4) reviewing themes 5) defining and naming themes, and 6) writing up report. Other analytic processes were also employed in order to analyse the online questionnaire and process the social network analysis. The online questionnaire analysis and social network analysis are explained in more detail in following sections; however, the results of these analytic processes have been considered as rich descriptive data. For example, the online questionnaire resulted in descriptive statistics and the social network analysis produced communication visualizations that were considered as visual narratives of social media interest group communication. The aim has been to provide a rich description of the entire data set and to explore the under-researched area of youth engagement in environmental social media interest groups.

Online questionnaire analysis

Online questionnaire results were transferred from Survey Monkey to Nvivo10. The 63 responses of youth aged 16 - 18 years old originated from 29 different countries. Close-ended questions were analysed for descriptive statistics and open-ended questions were analysed thematically. The thematic analysis was inductive and data-driven. In many instances, like the interview analysis, the thematic titles are verbatim transcriptions of youth responses. In this way, the close-ended questions provide a snapshot overview of youth perspectives in relation to the questions within the questionnaire. These findings were analysed with an understanding that the sample of participants was collected through snowball sampling and is a convenience sample. The results, therefore, cannot be generalized to represent youth globally; however, results do provide contextual information for the development of the more central and in-depth qualitative phase of this study. The online questionnaire provided context on how youth use technology, frequency of use, and how they position social media in relation to environmental learning and action. Participants'

questionnaire responses were integrated into both the first and second interview.

Interview Analysis

All interviews were transcribed and then imported into Nvivo 10. Working within a constructivist framework, I analysed interviews thematically. Since interviews followed a similar interview structure, specific themes began to develop as youth responses were more closely related to specific groups of questions; however, some themes did emerge in different sections of the interview structure. I tried to maintain some flexibility around what qualified as a theme as some had many references, where other themes had few references, but still represented an important consideration in relation to the research question. In order to represent prevalence of a particular theme, I developed a system to identify how many youth responses aligned with a specific theme, for example, the adjective “some” signified that three to four youths’ responses aligned, whereas the adjective “most” signified that eight to ten youths’ responses aligned (Braun & Clarke, 2006). Themes emerged inductively, that is, the themes are strongly linked to the data (Patton, 1990) and in most instances are a verbatim transcription of youth responses. While I tried to allow for the analysis to be data-driven, I cannot claim that my coding and organization of themes was not influenced by my understanding of the literature or my own epistemological underpinnings.

Social network analysis

Once data from Facebook groups were cleaned and anonymized (except for the voluntary youth participants), the files were imported into a database. I hired an IT consultant to write the queries to develop the edges or ties (show relationship) and node (actors) csv files. The queries were written to show the relationship between the individual who posted content, “poster”, an individual who was named by the poster, “tagged”, and any individuals who commented on the content, “commenter”. Through analysing these relationships, a visualization of the communication interactions within the Facebook group could be shown.

To develop the node and edge files that would depict the relationships between “poster”, “tagged”, and “commenter”, the IT consultant and I worked to develop two networks that were then combined. Data was divided into Network 1 and Network 2. Network 1 represents the relationship between “poster” and “tagged” (Figure 3.4).

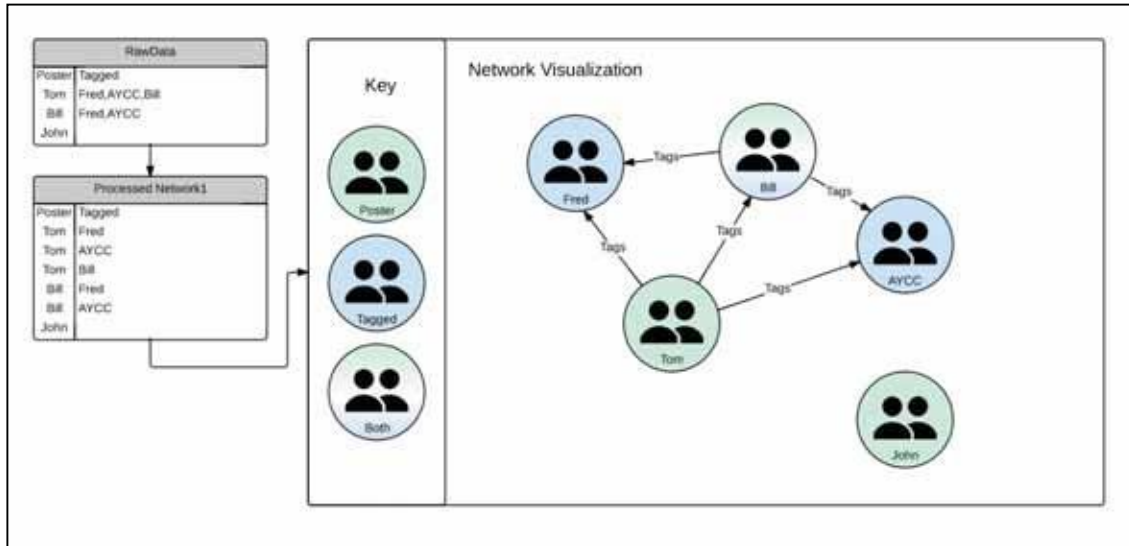


Figure 3.4: An illustrative example of how Network 1 comprises “poster” and “tagged” actors

In Figure 3.4, Tom made a post on the AYCC Facebook page and tagged Fred, Bill, and the AYCC. Bill also made a post on the AYCC Facebook page and tagged Fred and the AYCC. John made a post, but did not tag anyone. John was also not tagged in Tom or Bill’s post, so there are no edges connecting John to the others.

When the queries are sent to the database, the database connects the nodes and edges (corresponding to “poster” and “tagged”) and outputs a csv file as Processed Network 1.

Network 2 then associates the data according to the relationship between “poster” and “commenter” (Figure 3.5).

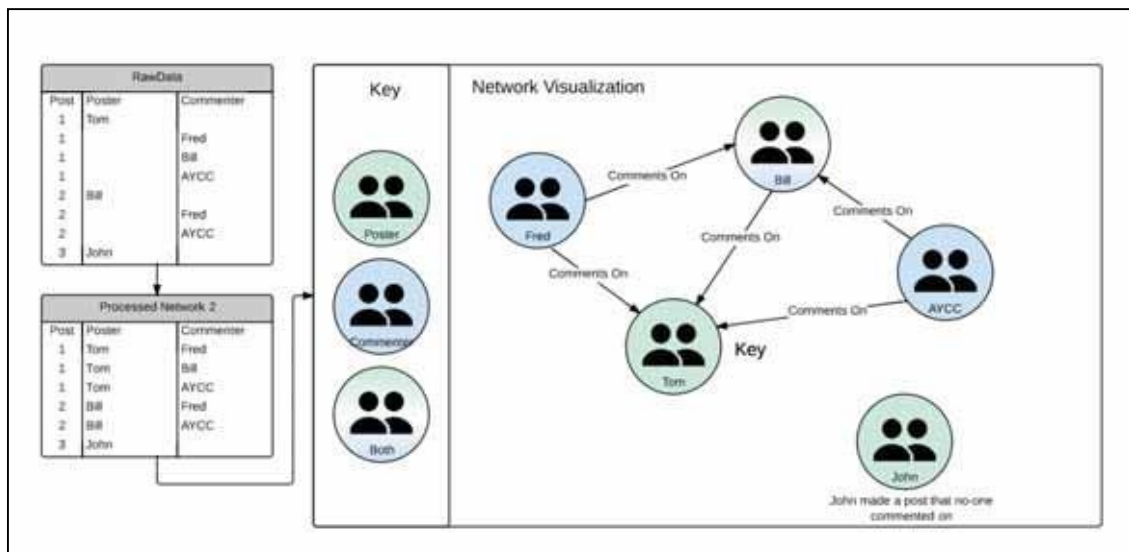


Figure 3.5: An illustrative example of how Network 2 comprises “poster” and “commenter” actors

In Figure 3.5, Tom made a post in the AYCC Facebook page and then Fred, Bill, and the AYCC administrator commented on the post. Bill also made a post and Fred and the AYCC administrator commented on the post. John also made a post; however no one commented on it.

Queries were made of the database to organize the nodes and edges (corresponding to “poster” and “commenter”), which resulted in an output csv file for Processed Network 2. Both network 1 and network 2 were combined to create a csv file that represents the relationship between “poster”, “tagged”, and “commenter” actors within a network.

Network visualization

The combined network file was then imported in Gephi (<http://gephi.github.io/>), an interactive network visualization and analysis program. Within Gephi, all network visualization manipulations were run with the same parameters and preferences following the Gephi Visualization guide (Appendix H). In addition, keeping the network parameters and preferences the same created visual consistency between the network visualizations. In all the network visualizations, both the colour and size of the nodes show the centrality of the node to the network. Centrality is used to understand which nodes within a network are the most influential to the network (Carolan, 2013) - within graph theory, centrality is used to identify the most important vertices within a graph. In the network visualizations in this study, centrality measures are based on number of posts, tags and comments made.

The static visualization of the network is very powerful and an observer can begin to assume many things about interaction in these groups. However, these visualizations are positioned as visual narratives and require contextual information from interviews to better situate communication flows, dynamics, and relationships.

Youth review & feedback

After the data was initially analysed, the youth participants were sent a copy of the data that had been collected along with preliminary analysis. This step has been included to allow for youth participants to review and offer feedback on my interpretation of their meanings and experiences. This step is important within a constructivist approach, so that youth also play a role in the interpretation of the research, even though the researcher most often has more power in determining meanings (Hollingsworth & Dybdahl, 2007).

Cross-case analysis & synthesis

Once all data sources had undergone thematic, questionnaire, or social network analysis and youth review, a case report was compiled for each individual youth participant and their environmental social media interest group of choice. Following Stake's (2006) cross-case analysis procedures, I then rated each case high, medium, or low utility according to the prevalent themes that emerged through thematic analysis according to the three main areas of research inquiry: 1) prevalent structural characteristics of social media interest groups, 2) learning, and 3) activism (see Appendix I). Given the amount of data within each case, I decided to present the cross-case analysis on the prevalent structural characteristics of social media interest groups at the end of Chapter 4, and allocated an entire chapter to present results on learning within social media interest groups within Chapter 5, and then another entire chapter, Chapter 6, to present results on activism.

In terms of quality procedures, I have triangulated an individual youths' perspective across multiple data sources (online questionnaire, two interviews, and social media data capture) over a six-month period. This process allowed me to observe consistency of youth reported actions, reflections on their participation, and observed actions across the various data sources (See Section 3.10 Issues of trustworthiness for more information). The coding structure and codes that emerged from thematic analysis, was reviewed frequently with my advisory committee throughout the data collection and analysis phases. In addition, another researcher reviewed youth responses, codes, and coding structure within Nvivo to ensure inter-coder reliability.

3.9 Ethical considerations

Researching social processes specific to youth is not an easy task for a variety of reasons, such as accessing youth populations, ethical adult-youth dynamics, and shifting contemporary definitions of youth (Pascoe, 2012). Beyond these challenges, researching youth social processes in online spaces brings other layers of complexities including a lack of IRB understanding of internet-related studies, adult preconceptions about new technologies, and a lack of clear ethical guidelines related to internet research (Pascoe, 2012). This research complies with the Australian Government's National Statement on Ethical Conduct in Human Research (2007) and was granted approval by the Human Research Ethics Committee at James Cook University as of January 1, 2012 (Appendix J). The following section outlines some of the ethical considerations that have guided decisions within this research project.

Youth as research participants

The overall interpretivist/constructivist approach of this project, which takes youth participants' understandings and conceptions of learning and action as the central focus, is also informed by participatory approaches to research and critical pedagogy. Within this project, the youth participants are understood as "young people who are mature enough to understand and consent, and are not vulnerable through immaturity in ways that warrant additional consent from a parent or guardian" (National Health & Medical Research Council, 2007). In addition, I have positioned youth in this study as having a capacity to reflect on their own learning and social agency as "co-participants in research - not as mere objects to be observed and categorized" (Kincheloe, 2005, p. xii). Positioning the youth as "co-participants" means that the youth are seen as active agents capable of contributing to their own subjectivity and reflecting on their own identity, learning, and activism. This reflexivity is also applied to me as an adult-researcher, leading the research project, and therefore implies that the power dynamics within interviews are imbued with the dynamics of adult-youth power relations (Mallan, Singh, & Giardina, 2010). Within a diverse range of participatory research approaches with children and youth, this research is limited by its ability to include young people in the development of the research idea, in the analysis process, or in writing. It is therefore situated as an attempt to provide a space for the 'voices' of youth to be represented, and at best directly stated in their own words and terminology, about the ways in which they understand their environmental learning and action in a connected world.

In this research project, youth participation was voluntary at all stages of the research process including: online questionnaire, interviews, social media data collection, and review of data analysis. In addition, informed consent documents were written to allow youth to have some control over both their identity and environmental projects in research publications. The following three sentences were advocated for in ethics approval in order to account for the youth's interest in having their names and projects reported:

- I consent for my name to be used when referencing my environmental project in research publications.
- I consent for my environmental project to be referenced in research publications.
- I consent for my name to be used in research publications when citing statements I make in interviews with my review of the statements.

Youth participating in this research project, were not directly contacted to participate, that is, youth saw the invitation to participate through a third-party entity, a teacher, or a friend and then left their contact information on the questionnaire if they were interested in

continuing in the longer observation period. This aspect of the research design was informed by dannah boyd's (2011) *Taken Out of Context*, in which she argues that initiating explicit contact with teens through private messages, "friending" them, or "poking" them, without a specific social context in which those actions would be socially appropriate, is unethical (2011, p. 71).

Data (text)/ persons

Within this research project, data collected from social media is positioned, understood, and analysed as an extension of the identity of the research participant who posted it. Within internet studies, large datasets may have enough identifying information to link "publicly-available" data to a person. The Association of Internet Researchers (2012) additionally suggests that a question to guide ethical decision-making in this regard is: "Does the connection between one's online data and his or her physical person enable psychological, economic, or physical harm?" (p. 7). However, within this project, youth participants had the option to consent to what degree their names and environmental projects are mentioned within published research. The data that was collected was with youth consent. If data was captured with NCapture, the data was anonymised and these data sets are not publicly available in order to ensure that any identifying information collected cannot be used to identify individuals outside of content parameters.

3.10 Issues of trustworthiness

Within qualitative research, positivist processes for checking validity and reliability cannot be applied in the same way to qualitative research processes. This section discusses strategies employed in this research study to ensure "trustworthiness" (Lincoln & Guba, 1985) of research processes.

Credibility within qualitative research, deals with the question "How congruent are the findings with reality?" (Merriam, 2009, p. 213). Additionally, Lincoln and Guba (1985) suggest that ensuring credibility is one of the most important factors for establishing trustworthiness. In this study, an individual youths' perspective was triangulated across multiple data sources (online questionnaire, two interviews, and social media data capture) over a six-month period. This allowed me to observe how an individual youth's reported actions, reflections on their participation, and observed actions corroborated across the various data sources (respectively, online questionnaire, interviews, social media data capture). Overall, youth reporting of actions, reflections, and observed actions were

consistent within reason across the data sources. One incongruent area appeared between what individual youth reported and what was observed regarding the number of environmental and social justice posts that youth reported in the online questionnaire and the observed number (See Figure 6.6 in Chapter 6). Many of the youth reported posting more than was observed; however, this requires qualification because I did not have access to all social media data that youth posted and therefore youth could have posted this content to various groups, rather than their personal profiles and the group I had permission to observe. Another example of how data was triangulated is that I was able to find some specific examples of digital content that youth referred to in interviews in social media data capture files that gave evidence to the youth's reflection.

Iterative questioning was also employed to add an additional layer of credibility, with two of the interview questions being asked in interview 1, which occurred at the beginning of the observation period, and then again in interview 2, which occurred at the end of the six-month observation period. Youth responses were consistent within reason and did not raise concerns of contradictory responses to the questions "Does the group do activist work/organizing?" and "Is there any specific content that you have posted that has been particularly influential to others? How did you know it was influential to others?"

Another form of triangulation occurred across the various social media interest groups when the groups were organized into informal groups and youth-created NGOs for the cross-case analysis. Through analysing communication across the sites, some similar results emerged. For example, within the informal groups the majority of communication was dependent on the founders of the group, while within the youth-created NGOs the majority of communication was conducted by the page administrator. Similarly, it was found that these networks were larger in membership and that the number of contributors on each page increases with the larger size of membership.

Another strategy for credibility is to ensure that participants are given opportunities to refuse to participate in the project so that data collection involves only those who are genuinely willing and prepared to participate (Shenton, 2004). Within the informed consent documents, youth were provided with the informational statement: "taking part in this study is voluntary and I am aware that I can stop taking part in at any time without explanation or prejudice and to withdraw any unprocessed data I have provided". One participant who initially agreed to participate in the six-month observation did withdraw from this study and their data was not included.

Finally, member checks were conducted, where youth were sent responses from the online questionnaire, interview transcripts, network visualizations, and social media data capture files and were asked to provide feedback or make revisions to transcripts and case study profile descriptions so that these texts reflected what youth intended to say and portrayed them accurately. Five of the eleven youth completed the member-check process and their revisions of the interview questionnaire were adopted into the case studies. No youth suggested changes to their online questionnaire responses, network visualizations, or social media data capture files.

Similar to the concept of external validity in quantitative studies, transferability as a construct determines if the results relate to other contexts and can be transferred to other contexts (Lincoln & Guba, 1985; Merriam, 1998; Miles & Huberman, 1994). However the findings of this research study, like many qualitative studies, are specific to a small number of participants in particular environments and it is difficult to demonstrate that the findings and conclusions are applicable to other situations and populations (Shenton, 2004). In this study, I have attempted to enhance transferability through providing a thick, rich description of the contexts for and perspectives of participant experiences. Through providing descriptive detail and sufficient contextual detail, readers can then decide whether the results are transferable to other contexts (Lincoln and Guba, 1985). I kept a logbook of the activities, ideas, and decisions that I made during the research process and this logbook has been critical for remembering specific details over this five-year research project.

Dependability within qualitative research refers to whether or not the results of the study are consistent over time and across researchers (Lincoln & Guba, 1985; Miles & Huberman, 1994). However, the changing nature of phenomena under study within qualitative research renders this problematic (Fidel, 1993). This is definitely the situation with the changing dynamics of social media interest group engagement. To address dependability, I have clearly outlined the methods and processes in detail so that another researcher could repeat this study and to allow the reader to assess the extent to which proper researcher practices have been followed in terms of “the research design and its implementation; the operational detail of data gathering; and the reflective appraisal of the project” (Shenton, 2004, p. 72). To address whether the findings of the study are consistent across researchers, I met frequently with my advisory committee and had another researcher evaluate my coding structure and codes within Nvivo to ensure inter-coder reliability. My advisory committee conducted frequent debriefing sessions throughout the data collection

and analysis processes. These discussions helped me to consider alternative approaches to interpreting the data and provided a sounding board for me to explore ideas and relevant literature to situate the research study findings (Shenton, 2004).

3.11 Chapter summary

This methodology chapter has outlined the theoretical perspective and methodological framing which positions this interdisciplinary study into environmental learning and activism within youth-created social media interest groups. A detailed explanation of methods and analysis was presented along with a consideration of ethics and trustworthiness.

Chapter 4 Mapping youth-created environmental social media interest groups

4.1 Chapter overview

This chapter presents research findings about environmental social media interest groups and comprises 1) a summary of an online questionnaire focused on youth who identify as active social media users for communicating about environmental issues, which provides background demographics and youth perspectives (Section 4.2); 2) a visual analytic proposed to theoretically map engagement in environmental and social media interest groups and subsequently referred to in chapters on learning and activism (Section 4.3); and, 3) selected youth respondents, along with their network of choice, are presented as 11 different cases that focus on structural characteristics of each network (Section 4.4). Individual youth networks, along with results from the online questionnaire, are again referred to in Chapter 5 (Learning within environmental social media interest groups) and Chapter 6 (Activism within environmental social media interest groups).

4.2 Online questionnaire summary

As discussed in the methodology chapter, the online questionnaire helped to identify youth between 16 and 18 years of age, who self-identify as active social media users, and who use social media to communicate with others about environmental issues. This brief summary is provided to give some background demographics on age, social media platform preferences, frequency and location of use, along with the amount of environmental and social justice related content youth report posting. The data collected in the online questionnaire was not representative of a wider youth population.

Youth demographics

The online questionnaire collected responses from 63 participants from 19 different countries (see Figure 4.1).



Figure 4.1: Online questionnaire respondents mapped

In terms of gender, 24 male, 38 female, and 1 lesbian, gay, bisexual, trans, queer [LGBTQ] responded, and 53 respondents indicated that the environmental work they were involved in was in their local community. 32 of the respondents lived in an urban setting, 24 in suburban contexts, and 7 in rural areas (Survey Question [SQ] 8).

Of the youth who responded, 26 were 16 years of age; 19 were 17 years of age; and 18 were 18 years of age (SQ 3). The majority of youth respondents were in high school (1 respondent in grade 9; 18 respondents in grade 10; 16 in grade 11; and 10 in 1st year university, and 3 on exchange or in alternative education programs) (SQ 10).

Respondents' views on environmental and social justice challenges

Respondents were asked to list the environmental and social justice challenges with which they are most concerned (SQ 12). Climate change was the most frequent response ($n = 19$); however, responses were coded and categorized according to broad themes developed by Taking IT Global, a leading NGO involved in environmental social media engagement of youth in the following way: Environment, Human Rights & Equity, Health & Wellness, Economics & Innovation, Peace & Conflict, Regional Governance, and Media & Identity.

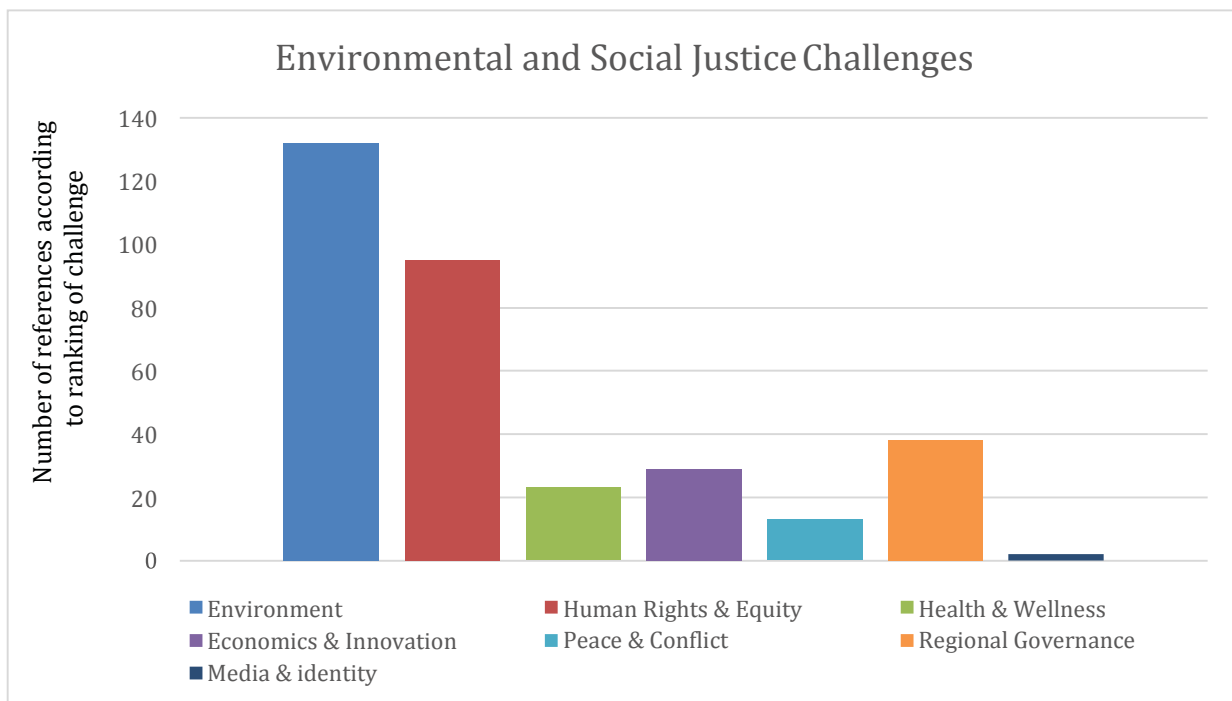


Figure 4.2: Environmental and Social Justice Challenges. Figure 4.2 has been categorized according to prominent themes and displayed according to ranking of challenge (first ranked x3, second ranked x2, last ranked x1) in questionnaire.

Respondents' views on online skills, motivations, and involvement

Respondents were asked to report the most important skills for their participation in online groups (SQ 16). Youth responses indicated the following skill areas: communication (e.g., writing & responding to posts, engaging an audience, active participation-interaction, using appropriate words, and creating wall posts or status updates); technology (e.g., knowing how to email, live stream, navigate websites, text message, sign petitions, and use social media); collaboration (e.g. knowledge sharing, managing a group, listening and learning from others); and critical thinking (e.g. researching and reasoning).

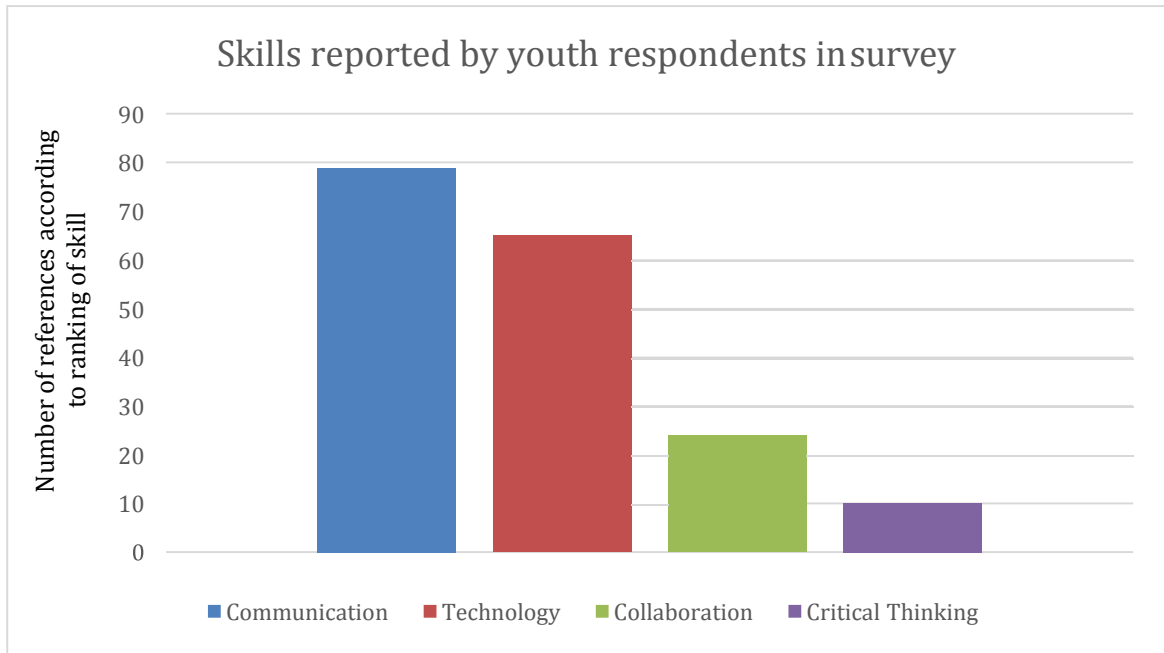


Figure 4.3: Skills reported by youth respondents in questionnaire are categorized according to prominent themes and displayed according to ranking of skill (first ranked x3, second ranked x2, last ranked x1) in questionnaire.

After coding for primary motivations for joining an online environmental group (SQ 18), youth responses indicate that youth join online environmental groups “to make a change in their communities or countries” ($n = 14$) or “to be informed and involved” ($n = 11$) or because they want “to discuss environmental issues and work out solutions” ($n = 4$).

Youth respondents indicated their level of involvement in two ways: 1) their involvement in groups (SQ 19) and 2) the amount of content they post on social media related to environmental issues (discussed in the next section). In terms of involvement in groups, 18 youth respondents identify as leaders or organizers, 15 youth respondents are heavily involved, 11 are moderately involved, 6 are not very involved.

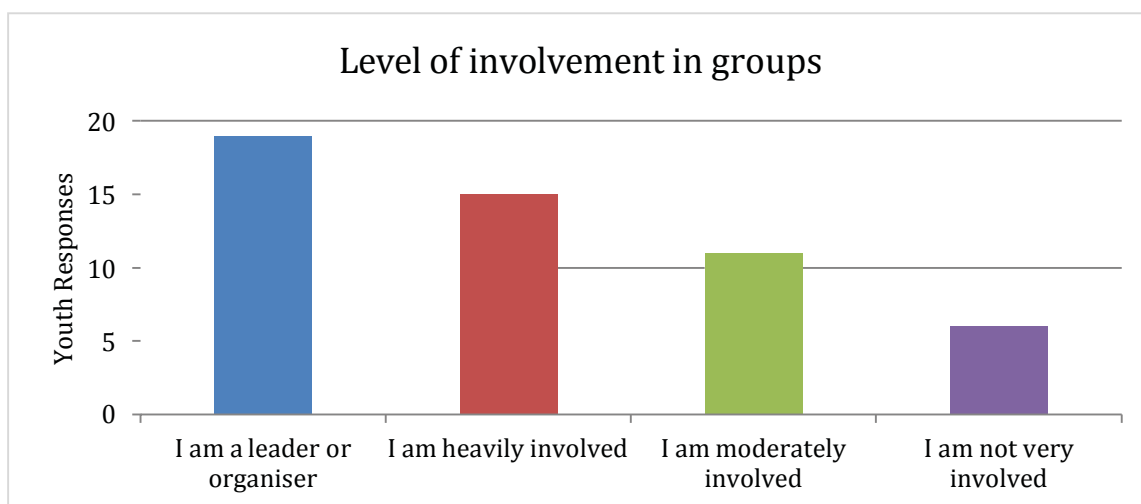


Figure 4.4: Level of involvement in groups reported by youth

Technology usage, social media platform usage, and environmental social media posting

Respondents reported that they use laptop computers more than once a day ($n = 37$) and smart phones more than once a day ($n = 29$). Desktop computers, tablets, and standard mobiles were used far less frequently (SQ 22).

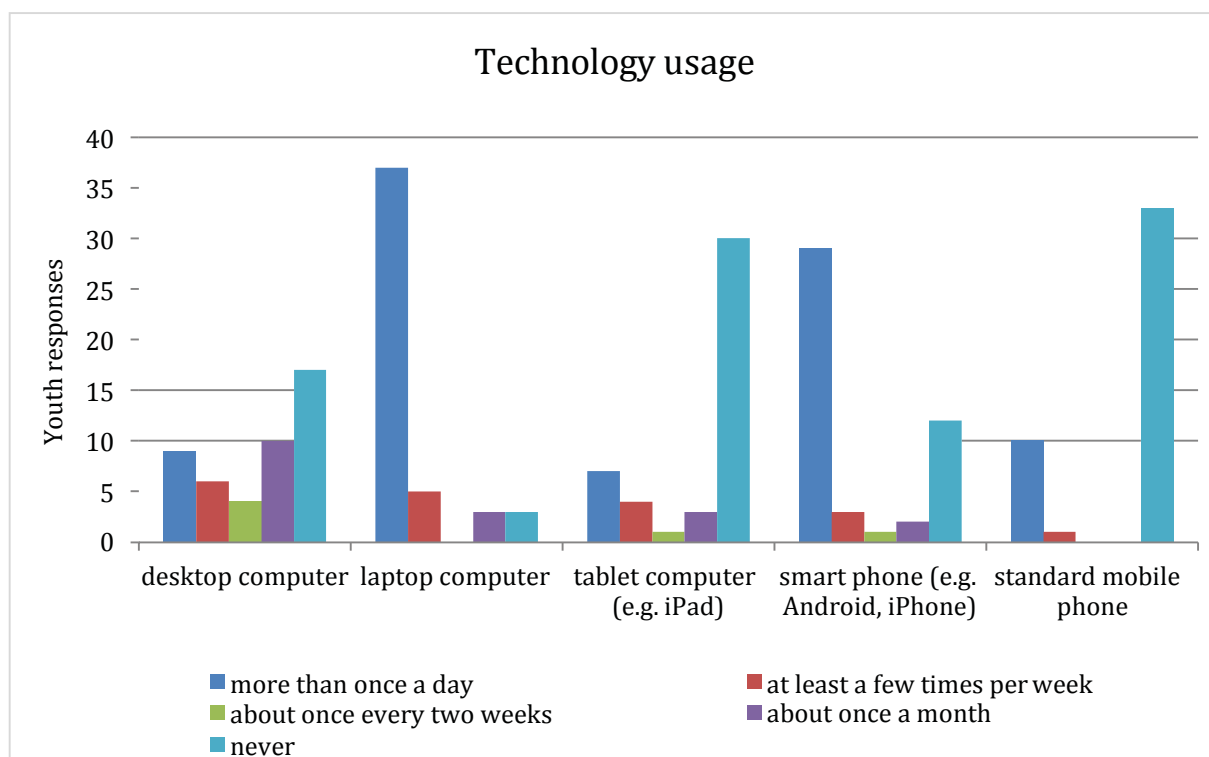


Figure 4.5: Youth technology usage and frequency of use

In terms of the platforms youth use, respondents use Facebook ($n = 30$) and email ($n = 22$) more than once a day (SQ 23). Some youth use Twitter, blogging platforms, and Skype

on an occasional basis; however, youth are less likely to use Ning, LinkedIN, or Google + and youth almost never use MySpace.

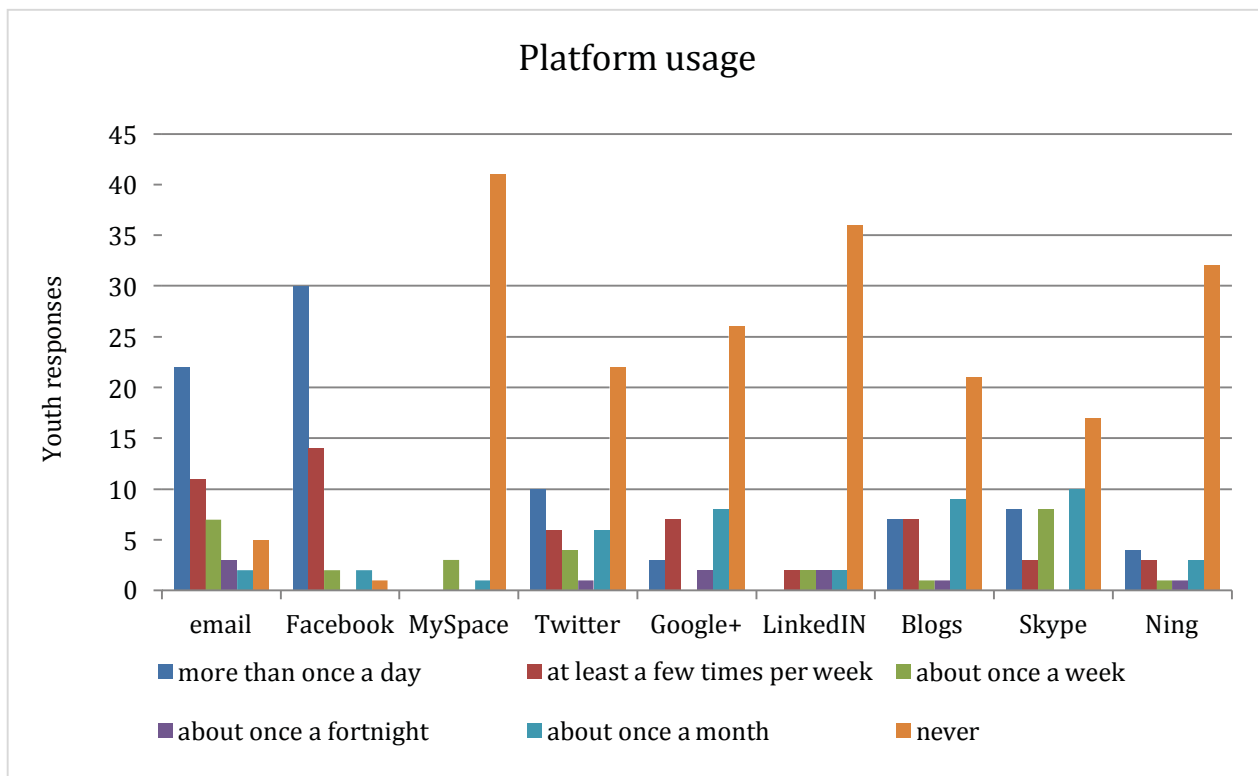


Figure 4.6: Youth Platform usage and frequency of use

Respondents were also asked where they use various platforms (SQ 23). 24 youth reported that they check Facebook on a daily basis from home and no youth reported checking Facebook at school; however, 20 youth check Facebook on their smartphones, which could be anywhere they are during the day, including school. Most youth frequent the various platforms from home or from their smartphones. The only platforms that youth reported using at school are: email, Google+, blogs, Skype, and Ning.

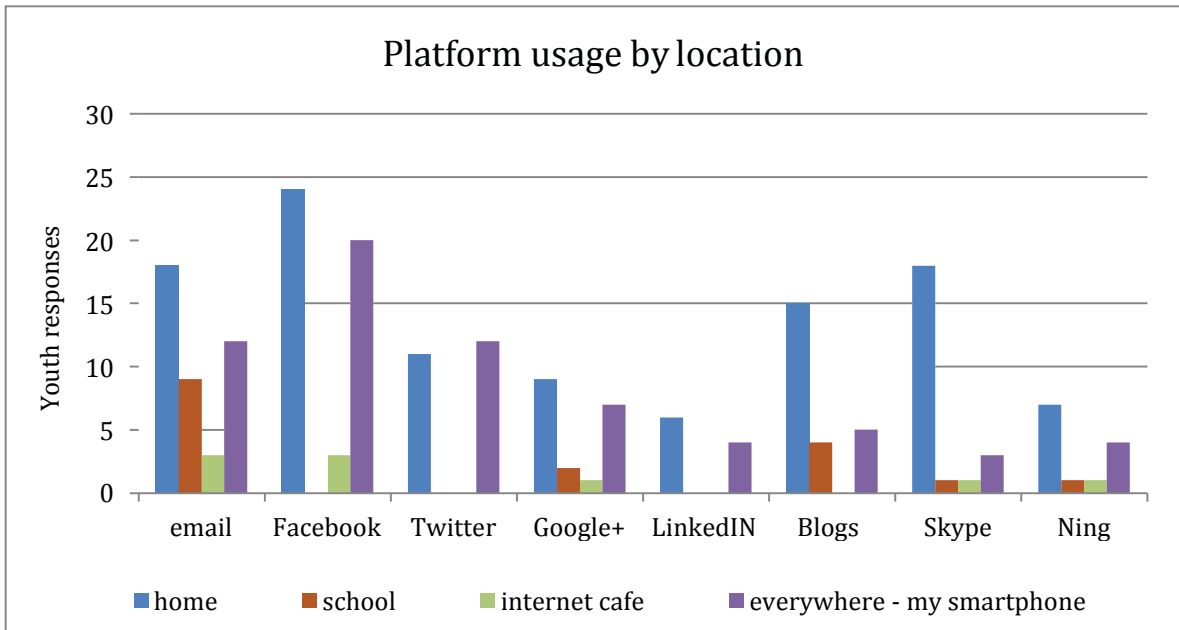


Figure 4.7: Youth Platform usage by location

In terms of involvement, youth also reported the amount of environmental or social justice content they posted on social media (SQ 25). 10 youth reported that “all or almost all of” the content they posted was related to environmental and social justice challenges with which they are concerned. 15 youth reported “most” and 16 youth reported “some.”

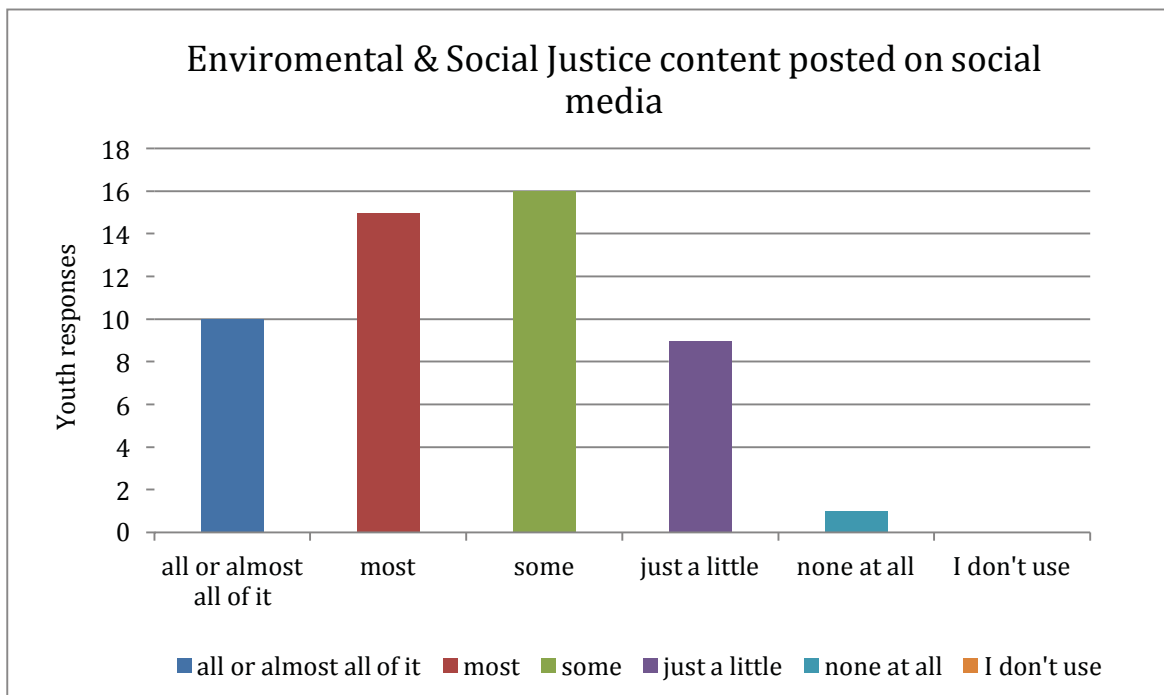


Figure 4.8: Environmental and Social Justice content posted on social media

Youth were asked if they had received negative reactions from “friends” when they had posted environmental or social justice related content (SQ 26). Youth responses show that 15 youth had received a strong negative reaction, 31 youth responded that they had not received negative comments and 5 youth said they did not know.

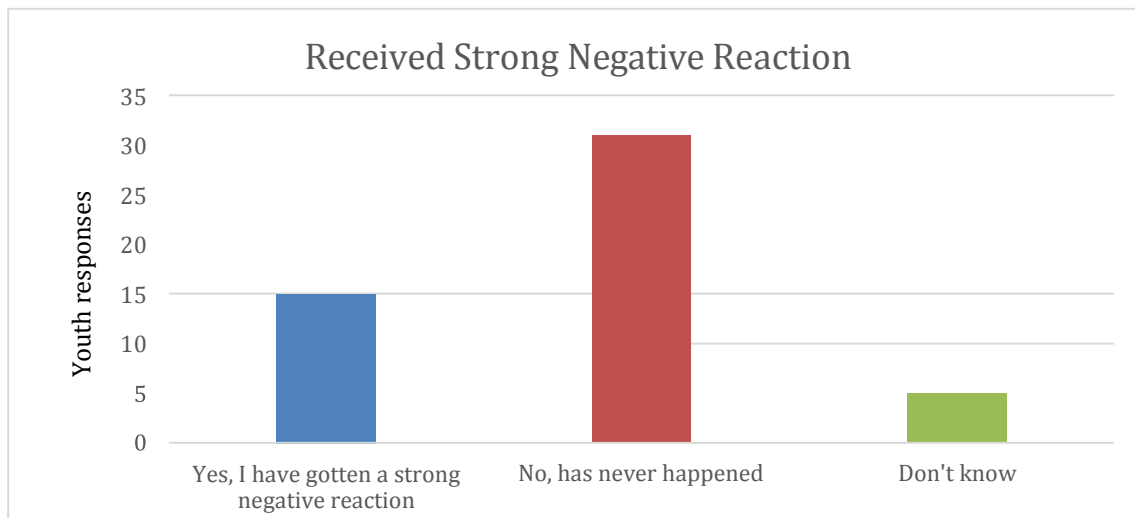


Figure 4.9: Received Strong Negative Reaction on Environmental or Social Justice social media post

This summary has been provided to provide some context to youth’s social media usage as it relates to environmental and social justice issues in terms of: the amount of environmental and social justice related content youth post, reasons for joining an environmental social media interest group, and how youth respond to negative reactions. Some of these findings are discussed in successive chapters.

4.3 Mapping youth-created environmental social media interest groups

This project has been situated as a mapping project because of 1) the exploratory and inquiry-based approach which has guided the research process, and 2) the under-researched and-documented area of environmental learning and activism within social media sites. With the focus of better understanding of how youth in various geographic contexts use social media platforms for informal environmental learning and activism, the project has explored many facets of youth identity, peer-to-peer engagement, learning, and activism within an increasingly connected and wired world. The project is grounded in the lived reality and perceptions that youth have about social media, environmental issues, and activism, and while

the project is informed by academic theory and pedagogies, the empirical research reflects how youth understand these technologies and phenomena.

The mapping has drawn upon several analytical methods such as thematic analysis, questionnaire analysis, and social network analysis (as discussed in Chapter 3). Unlike mapping a landscape, which is static for a period that is long enough to document typology, the cases within this chapter are situational and dynamic. The constructs of *affordance*, *culture*, *dynamics*, *structure*, and *substance* are employed to theoretically explore the phenomenon of engagement in environmental social media interest groups.

Cases

In this section, youth respondents who volunteered to participate in a 6 month social media observation period and interviews are presented as cases. Each individual youth respondent is described along with the network(s) they chose to discuss for this research project. For each network, structural characteristics are reported with attention paid to the following aspects: *geographic reach and network size*, *leadership positions*, *adult facilitators*, *communication tools used and group meetings*, and a *network communication visualisation* over a 6 month period. The structural characteristics of the networks in the cases give insight into one of the guiding research questions for this study: “What are some prevalent structural characteristics of youth-created social media environmental interest groups?”

The following cases draw upon information youth respondents shared through the questionnaire, interviews, and social media. Not all cases are equally robust, diverse, or interesting; however, 11 youth cases are described below as these 11 youth cases are included in thematic coding and findings presented in Chapters 5 and 6. Below, all 11 youth are presented in the area of the world where they are actively engaged in youth environmental social media interest group learning and activism.



Figure 4.10: Map of 11 youth cases

Aman Agrawal and networks: Saviors of the Environment and Plant for the Planet

Aman

Aman is a 16 year old in grade 10, who lives in Bulandshahr, in the state of Uttar Pradesh in Northern India. Bulandshahr has a population of 235,000 and is located approximately 100 km east of New Delhi. Bulandshahr is south of the Indian Himalaya and 50 km to the east is the Ganges River.



Figure 4.11: Aman, Bulandshar, Uttar Pradesh, India

Aman told me in a Facebook interview chat that as long as he can remember, he has always felt a deep devotion to the natural world:

i don't remember when i started, i talked to trees in primary school, then started learning about the environment and asking my friends not to harm the environment. as i grew, my interest became deeper, and i started thinking about solving these problems, mainly energy and climate change. i devoted myself to save our mother earth. (Facebook Messenger interview, August 11 - September 5, 2013)

Aman told me that he is “the only Environmental Activist” in his city and that he feels that the people in Bulandshahr have a very low level of environmental awareness. Aman feels that he has taught himself everything he knows about the environment and sustainability on his own and that he has been inspired by “other children working with [the] same goal that we don't have time to wait for growing. we need to act now, or our future would be destroyed” (Facebook Messenger interview, August 11 - September 5, 2013).

Aman is a very motivated young person and told me about different ideas he has had for saving or producing energy, such as harnessing the energy from exercise machines or building electromagnetic generators. Aman reflected on his motivation and said that he would describe his unique perspective as “i think acting for saving earth, and motivating others to do the same, is more important than big talks” (Facebook Messenger interview, August 11 - September 5, 2013).

Aman’s very busy schedule made it difficult to find time for interviews. He requested that I send questions to him through Facebook chat and he would respond to them when he had time. The quotes from Aman reflect his grammar usage within Facebook chat.

According to Aman, the three most significant environmental or social justice issues are: 1) climate change and renewable energy; 2) deforestation and sustainability; and 3) pollution and air and water quality. Aman explains climate change as “the biggest threat to the existence of mankind. we are already suffering from climate change, and the situation is getting worse day by day” (Facebook Messenger interview, August 11 - September 5, 2013).

In terms of deforestation, Aman shared with me that “forests are the lungs of the earth. they provide habitat, absorb C02, prevent soil erosion... i am concerned how the ecological balance can stay unaffected after disappearing of forests” (Facebook Messenger interview, August 11 - September 5, 2013). Aman also said that “pollution is also affecting our health and contributing to climate change. millions of people die each year due to ill effects of pollution. still we don’t take strict actions to stop pollution” (Facebook Messenger interview, August 11 - September 5, 2013).

Aman also informed me that all or almost all of the content that he posts to Facebook is related to environmental or social justice issues. He is a member of 25 different Facebook groups that are all focused on environment-related topics and activities.

In terms of technology usage, Aman checks his email and Facebook via a laptop more than once a day from his home in Bulandshahr.

Saviors of the Environment

In January, 2013, when Aman was in grade nine, he decided to start a non-profit organization called: Saviors of the Environment. The group is focused on “increasing awareness on environmental issues among youth, the most important part of our society and promoting sustainable and low-carbon lifestyle[s]” (Facebook Group Description, January, 2013). The group organizes activities in schools, gives presentations, and coordinates tree planting activities in Northern India.

Geographic reach and size of network

Saviors of the Environment uses a Facebook page rather than a Facebook group. The Savors of the Environment page has 1,362 likes, which means that 1, 362 people have liked the page and these people are able to receive updates in their respective newsfeeds when new content is posted. While Savors of the Environment was created in Bulandshahr, Uttar Pradesh by Aman, there are youth from various countries who have liked and contributed to content on the page. On the Savors of the Environment Facebook page, the group is also described as an international environmental organisation.

Leadership positions

As president and founder of the group, Aman sees his role as one of leadership, from which he guides all the members of the group and discusses with them ideas to make action plans. The plans are discussed and then worked on as a group; however, these discussions are facilitated through social media as the group does not meet often face-to-face unless they are attending an environmental conference or event. Aman also explained that he is also responsible for managing sponsorships, contacts and partnerships with other organisations or government agencies as president. Within Savors of the Environment, there are not formal positions for youth or processes for electing youth into positions.

Communication tools used

Youth use Facebook chat or post on the Savors of the Environment page to communicate with each other. Aman indicated that the group has occasional online meetings and generally does not schedule regular meetings. When group members are attending local events or a conference, they will organize an informal meeting at the event to catch up and discuss ideas or action plans.

Network communication visualization

The visualization below shows communication on the Savors of the Environment page over a 6 month period. It was created by collecting social media data by Nvivo10's NCapture function. The social media dataset was then imported into Gephi, a social network visualization program (see Methodology Section 3.6.4 for a full procedural explanation).

In the network visualization both the colour and size of each node represents centrality, which is understood as "influence on the network" and in this visualization the centrality measurements are based on the number of posts, tagged, and comments made by each group member to the Savors of the Environment Facebook page.

During this 6 month observation period from September, 2013 to March, 2014, 12 different members posted content. During this time there were 39 posts made and 33 comments.

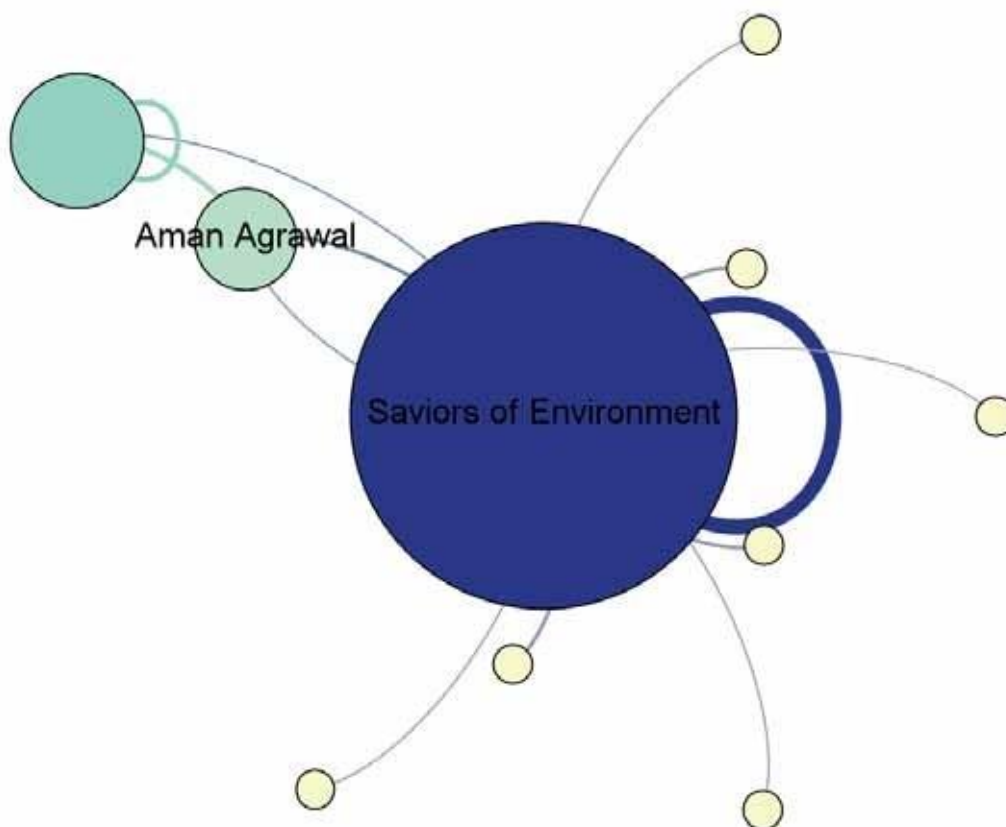


Figure 4.12. Saviors of the Environment Network Communication Visualization. This figure was created using social network analysis and shows centrality of Facebook posts, comments, and number of tags of page contributors. The size of the nodes indicates centrality to the network. The colour was selected using Gephi's colour palette.

In the network visualization, a majority of the communication on the Facebook page was made by Aman when he posted content as the Saviors of Environment administrator, which is evident (in Figure 4.14) with the size and centrality of the Saviors of the Environment node. He also posted regularly from his personal Facebook profile which is evident by the size and centrality of the Aman Agrawal node. One other youth posted or commented more than one time, and is depicted as the untitled green node. While other youth only posted once and are depicted by the small yellow nodes.

Aman, Saviours of the Environment administrator, and the other youth engaged in some commenting and tagging of each other and this is depicted by the connections between the three nodes. The other youth that only posted once to the Saviors of the Environment

page, did not engage in commenting or tagging and this is shown by the single connections to the Savivors of the Environment page.

Plant for the Planet

Aman is also on the board of Plant for the Planet, a German youth-run NGO, which focuses on climate change and global justice. Aman has been very involved in online meetings with the organization and encouraged me many times to include his participation with Plant for the Planet in this research project. Plant for the Planet was founded by Felix Finkbeiner when he was nine years old in 2007. For a school project, Felix came across the story of Wangari Maathai, who was awarded a Noble Prize for her work planting over 30 million trees across Africa as part of the Green Belt Movement. Felix was inspired by her efforts and he challenged himself to plant one million trees. He then imagined what would happen if every child pledged to plant one million trees in every country on Earth. In 2011, there were children planting trees in over 93 countries according to Plant for the Planet. According to the tree planting calculator on the Plant for the Planet website, there have been just over 14 billion trees planted by the Plant for the Planet initiative.

Geographic reach and size of network

Plant for the Planet has two Facebook pages, with one in English and another in German. The English version has 5,976 likes from youth from around the world.

Leadership positions and selection processes

According to Aman, Plant for the Planet, has 28 global board members, comprised of 14 youth representatives (aged 15 - 21 years old) and 14 children representatives (aged 8 - 14 years old) from regions around the world. In addition to this regional representation, there is a President of the Children Board and a President of the Youth Board, alongside Felix who acts as President and Founder. For all of the positions, children and youth are elected annually. Aman was elected as the regional youth representative for India.

Adult facilitators

There is an adult facilitator who attends meetings and takes care of specific tasks, such as finances and legal affairs. The adult staff facilitator is appointed by other adults who serve on the Plant for the Planet Foundation Board.

Communication tools and meetings

Plant for the Planet uses email and Google docs to discuss issues and set meeting agenda items. According to Aman, "we share a doc where everyone writes their ideas on any issue and then all of us comment on that. also for some very important things, we make a

working group out of the global board” (Facebook Messenger interview, August 11 - September 5, 2013). The board is required to meet once a month and all documents are shared in Google drive so all board members have access to and can contribute directly to the shared docs.

Plant for the Planet also has two Facebook pages: one of the pages is primarily in German and the other is in English. However, there is no Facebook group and Aman indicated that the global members do not regularly contribute to the Facebook page. Aman explained that children and youth interested in getting involved or finding out more information are asked to sign up for an email newsletter. He also indicated that interested children and youth are informed of academies that Plant for the Planet hosts in different places.

Network communication visualization

The visualization below shows communication on the Plant for the Planet English Facebook page from September 2013 - March 2014. During this 6 month observation period, 86 different members posted content, 232 posts were made and 328 comments.

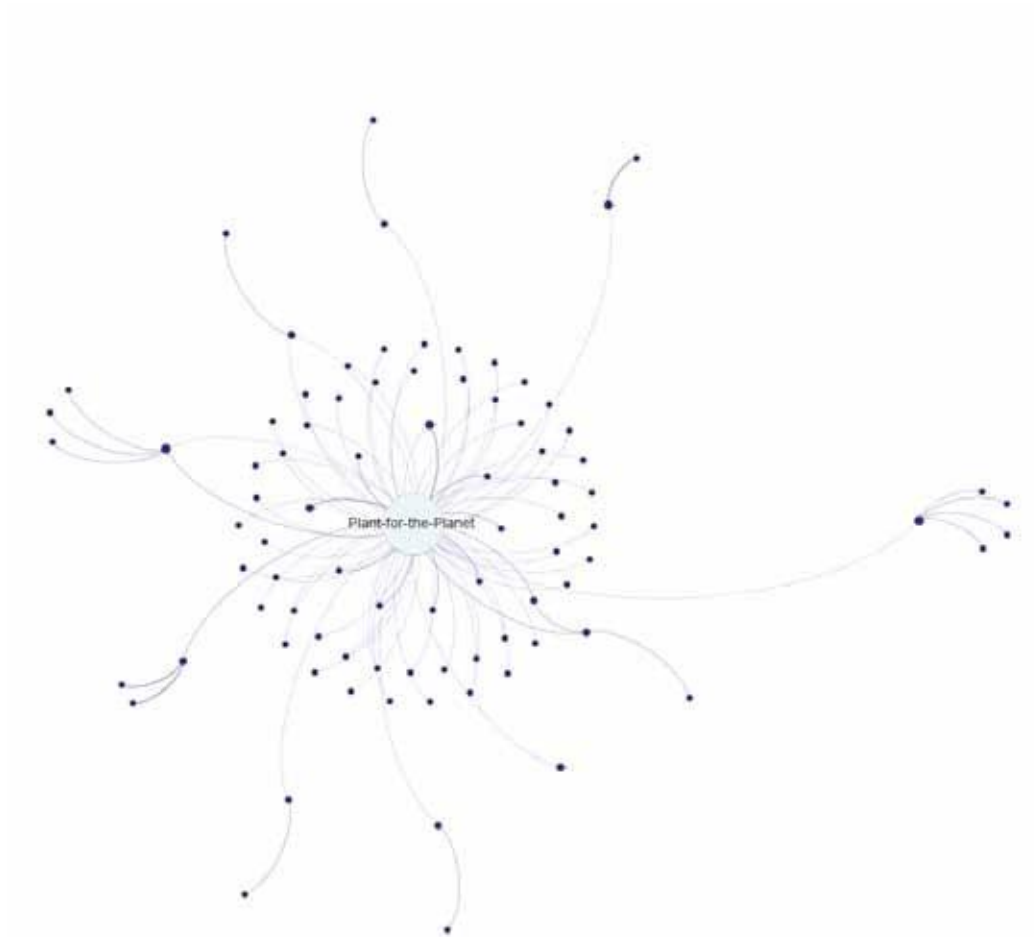


Figure 4.13. Plant for the Planet English Facebook Page Network Communication Visualization. This figure was created using social network analysis and shows centrality of Facebook posts, comments, and number of tags of page contributors. The size of the nodes indicates centrality to the network. The colour was selected using Gephi's colour palette.

In the network visualization, the majority of the communication on the Facebook page was made by the Plant for the Planet Facebook page administrator, which is represented as the pale blue Plant-for-the-Planet node. There is a moderately involved group of posters and commenters depicted around the Plant for the Planet administrator who appear to be supporters for broadcasting the content shared through Plant for the Planet page. In network analysis, this type of social media network is referred to as a hub and spoke network (because of its shape). The moderately involved posters and commenters help broadcast communication from the Plant for the Planet administrator. There is limited engagement between individuals as there are very few connections between the nodes. On the outer edges

are individuals who participated a few times or only once and some of these individuals engaged individuals who have no direct connection to the Plant-for-the-Planet page.

Anup Chalise and network: Peepal Plantation Project (later called MECT)

Anup

Anup is a 17 year old in grade 12 attending high school in Pokhara, Nepal. Pokhara is the second largest city in Nepal after Kathmandu with a population of approximately 250,000 people. Pokhara is a base for many trekkers who walk the Annapurna circuit. Within 50 km of Pokhara, there are three of the tallest peaks in the world creating many beautiful vistas.



Figure 4.14: Anup, Pokhara, Nepal

When Anup was ten years old, his father would take him walking through the city to collect and save peepal trees. Peepal trees have spiritual significance for Hindus as the trees are considered incarnations of the Buddha, according to a brochure Anup made for the Peepal Promotion Campaign. Anup talks of these formative experiences with his father as the motivation for continuing to organize projects around planting peepal trees.

While on Skype with Anup, the connection would be frequently lost due to rolling blackouts in Nepal. These network interruptions would set back our interviewing significantly; however, Anup would quickly call me back as soon as he could get online.

Anup sees the three most important environmental challenges as: conservation, socioeconomic inclusion, and psychosocial motivation. He explains why these are the most important challenges for him:

I have a vision, a concept that a project cannot be sustainable if it cannot address these three issues. So everything I do I try to make it sustainable so when environmental activities are done [they should be conducted] according to these three pillars. When environmental activities are done they should be able to address the economic issues, which are really important in countries like Nepal they are also important in order to maintain the social sustainability and you need them to be able to address these three issues (interview, March 25, 2013).

Anup describes his unique perspective as: “environmental conservation along with socio-economic development. I have been using [a] psycho-social approach of motivation to include people in my projects so I have been using my knowledge about our religion in it” (interview, March 25, 2013).

Anup primarily uses his laptop to access the internet via email and Facebook a few times a week from his home. He claims most of the content he posts to Facebook is related to environmental or social justice issues.

Peepal Promotion for Climate Action & MECT Volunteers

In 2009, at the age of 14, Anup created the Peepal Promotion for Climate Action, a project that plants peepal trees in rural and predominantly indigenous Nepalese communities. According to Anup, peepal trees are planted for their capacity to capture carbon dioxide, as well as for their social and spiritual significance within Nepalese culture. The project has planted more than 3 000 peepal trees in 14 districts in Nepal and was created to support UNEP’s Billion Tree campaign, although there is no formal partnership. The planting is coordinated by a youth group of volunteers, called MECT, which stands for Matsyanarayan Environment Conservation Trust. MECT youth, informally led by Anup, deliver training and tools to rural areas, and work directly with indigenous communities in these areas. The MECT Facebook group is where the youth who facilitate the Peepal Promotion project meet online. The Peepal Promotion project has delivered workshops to more than 2 000 young people in Nepal.

Geographic reach and size of network

MECT volunteers have a public Facebook group with 42 members and national reach. The majority of members live in Pokhara; however there are members from all over Nepal.

Leadership positions

Anup identifies as an informal leader in the group, “No. I am not the formal leader. I am an informal leader. We all have an equal role to play to the members, whether they want to [be] actively involved or follow us” (interview, March 25, 2013). Anup also shared that,

We don't have a formal organization. We are just a group of youths ... from Pokhara. I try to organize my group projects like I organize MECT volunteers. I try to mobilize them to motivate youths of those marginalized communities to get involved in conservation. I also have been in projects related to public health there. We are an action oriented group. So we don't have big organization expenses (interview, March 25, 2013).

There is a core leadership group of 15 members and there are no formal or paid positions within the group. The role of the 15 members is significant according to Anup: "As I am the informal leader, I advise them and take advice from them on communicating ideas with foreign organizations... We are a complete group. We have members of different fields. They have expertise in their own field[s] and I delegate my works and duty to them" (interview, March 25, 2013). Within the group are some first year engineering students and first year nursing and health care students.

Adult facilitators

All planning, coordinating, planting and fundraising is organized without adult facilitators; however, there are adults on the periphery who are consulted when the group needs guidance. Anup reflected, "Because sometimes we work in societies where we don't have experience of that area [in rural Nepal] or that culture and so we need to take advice of elders" (interview, March 25, 2013).

Communication tools and meetings

Planning and coordination is almost entirely facilitated through the group's Facebook page: "The initial discussion is made online because we don't have an office here so we then have to organize a meeting on Facebook. We take the help of social media" (interview, March 25, 2013). The initial discussion is most often conducted through Facebook chat because "everybody has a Facebook account and they are mostly available on Facebook rather than Skype" (interview, March 25, 2013). Once a group of youth shows their interest on Facebook, they will break into a smaller group and organize a face-to-face or Skype meeting.

Network communication visualization

The visualization below shows communication on the MECT Facebook page over a 6 month period from March to September 2013. During this observation period, only Anup posted content on the page as the group administrator. The communication was always from the "Inclusive Business Scholarship Program" administrator profile and this is represented with the large purple node, that is also central to the network. Anup would also post and comment from his personal Facebook profile and this is depicted with the connection between the large "Inclusive Business Scholarship Program" node and his personal "Anup

Chalise” node. In the visualization, 11 individuals were tagged in communication posts, and these individuals are each represented as a node. The post was an invitation to these youth to attend a meeting and discuss next steps for organizing launching a campaign to the Commission of Abuse of Authority in Nepal about companies exploiting protected glacier rivers.

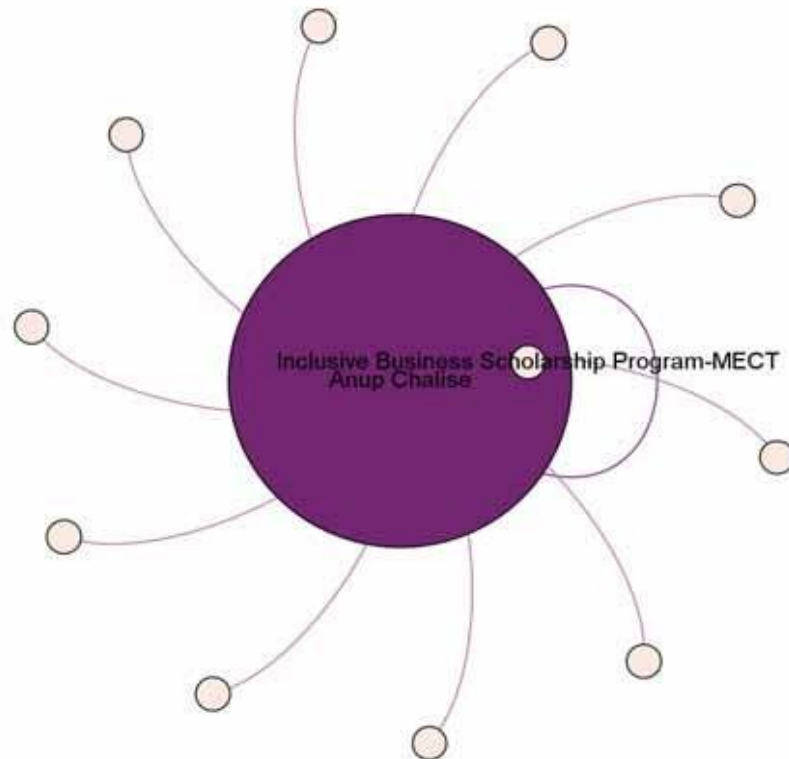


Figure 4.15. MECT Volunteers Facebook Public Group Network Communication Visualization. This figure was created using social network analysis and shows centrality of Facebook posts, comments, and number of tags of page contributors. The size of the nodes indicates centrality to the network. The colour was selected using Gephi’s colour palette.

The network communication visualization does not give a full representation of communication occurring in this group. Anup explained that he would post an invitation to discuss issues or organize projects and the group would often then have a discussion within Facebook chat, which is not captured on the Facebook group social media data visualisation.

Hussam Yaseen and network: King's Academy Green Club

Hussam

Hussam is a 16 year old, grade 10 student at King's Academy in Madaba, Jordan. The city of Madaba is in central Jordan about 30 kilometres southwest of the country's capital, Amman. The small city of 60,000 is known for Byzantine mosaics, which cover floors in houses and churches dating back to 600 CE.



Figure 4.16: Hussam, Madaba, Jordan

Hussam is focused on raising awareness in Jordan about social and environmental issues. For Hussam, his underlying motivation is his Islamic faith: “In Islam, our prophet Mohamed said that we have to care about the environment because we live in it” (interview, May 22, 2013). In particular, Hussam remembered one day when he was driving with his father and Hussam had a plastic bottle in the car and threw the bottle out of the window. His father spoke to Hussam about the importance of placing things in the right place and after that moment, Hussam says he was interested in environmental issues: “All it takes is one moment from each one of us” (interview, May 22, 2013).

Hussam explained that for him the three most important environmental and social justice challenges in the Middle East are the use of excess amounts of water, discrimination between different groups, and political issues. Hussam described how Jordan's water reserves were dangerously low and that many Jordanians are not concerned and still use excessive amounts of water. Hussam feels it is important “to raise awareness about the topic because after 50 to 100 years we will be out of water and [it] will be a big problem” (Skype interview,

May 22, 2013). Hussam indicated that most of the content he posts to Facebook is related to environmental and social issues. He uses a laptop, tablet, and smart phone more than once a day. Hussam checks email from school and also Facebook more than once a day at home.

Hussam is involved in the Green Club, an extra-curricular environmental club at his school. He is passionate about film-making and created a short documentary about the environment for his Green Club, which has been shown to the student body at King's Academy.

Hussam is also involved with an informal closed youth-group called The Young Jordanians, which focuses on social and environmental issues facing Jordan and encourages youth to share ideas for action campaigns. According to Hussam, The Young Jordanians is a secret Facebook group comprised of approximately 50 youth who post frequently about issues facing Jordan, as well as opinions and ideas on how to address these concerns. Hussam decided to focus the interviews on his involvement with the Green Club for this research study. The information presented is based on Hussam's reporting as I did not join either of these groups.

King's Academy Green Club

Geographic reach and size of network

The Green Club has approximately 30 students aged between 14 - 18 years old, who meet afterschool to discuss projects, campaigns, or activities that the group will run. The members of the Facebook page are primarily students at King's Academy (approximately 300); however, Hussam said that some community members, including adults in Madaba, had joined so they could learn more about the environmental issues affecting Jordan.

Leadership positions

The Green Club has a student-elected leader and two teachers.

Adult facilitators

Hussam explained that the teachers "control everything." He said that the teachers' roles are "to take attendance and to control us. But a lot of the discussion we do it alone. And if they have ideas they offer them or support us with their ideas. If we want something from the school either to film or to have an announcement, they help us" (interview, May 22, 2013).

Communication tools and meetings

The group meets after school on every Tuesday and students bring forward ideas that they are interested in exploring, or project ideas that they want to implement on campus. The majority of the meeting time is face-to-face. Hussam indicated that sometimes the students

communicate via a school email list, which contains all students involved in the Green Club. Students also post content to the Green Club's Facebook page. According to Hussam, the Green Club students will write the content they want to put on their club's Facebook page. The students often ask their teacher to proofread the content before they post. Hussam explained this as a measure to ensure that the information is reliable and credible:

I think it is important because we want to give people good information. We don't want to give information that we are not 100% sure that it is completely right or your teacher will check to see if there is something that you are not allowed to say for if there is something wrong with the structure (interview, May 22, 2013).

Hussam indicated that posting content to Facebook from the school is challenging because it is blocked on the school server, so students will post the teacher-edited content when they return home after the school day.

Network communication visualization

No network communication visualization was conducted on this group's page.

Kayla Kermit and network: TERRA

Kayla

Kayla is 16 years old and a grade 10 student at a high school in Guelph, Ontario, Canada. Guelph is a small city in Southwestern Ontario with a population of approximately 120,000. Guelph is 100 kilometres west of Toronto and surrounded by many small farming communities.



Figure 4.17: Kayla, Gueph, Ontario

Kayla explains her underlying motivation for the work in which she participates: to help empower young people by connecting to the natural world. When I was in the TERRA project, I had a spiritual experience in Algonquin Park and I felt a deep connection to the natural world. I have looked to many religions for a spiritual understanding but it wasn't until I found it in nature that I felt it (interview, August 26, 2013).

Kayla thinks the well-being of the planet, injustices to indigenous peoples, and corruption of government are the three most concerning environmental and social justice issues. Kayla explained that “the well-being of the planet ultimately affects ourselves in terms of health and prosperity. Most people work towards being successful but don't realize that that includes sustaining their progress, which cannot happen if their resources run out or are poisoned” (interview, August 26, 2013). Kayla also elaborated on her perspective of the injustices to indigenous peoples in the following way: “The injustice to these people who were so profoundly connected to the earth has maybe cut off a promising pathway for our own

communities to find that same bond with the natural world” (interview, August 26, 2013). Kayla also reflected on the Canadian government, under Stephen Harper’s leadership, as a government that

has become hypnotized by the greed in Sam’s hand and now sees a different green than Canadians see. The government is supposed to represent us, the people, and they are supposed to be the individuals capable of finding the best and most beneficial solutions and not looking for the most direct route to more income. They have become corrupted because they don’t understand how wrong they are (interview, August 26, 2013).

She participates in several groups including her school’s Green Team, Social Justice Group, in the community with CPAWS, and as a volunteer for a youth program with a nature conservancy. Kayla said that most of the content she posts to Facebook is related to environmental or social justice issues. Kayla uses a laptop and standard mobile more than once a day, checks email about once a month from home, and uses Facebook and blogs more than once a day from home.

After Kayla participated in a semester long integrated program focused on environment and social justice at her high school called TERRA, the class decided to create a private Facebook group to allow for them to stay in touch. Integrated high school programs in Ontario are offered in school boards where the curricula of 4 subjects has been bundled into a cohesive semester long program of study. Within these programs, the high school class may undertake experiential learning activities and field trips without the constraints of a high school timetable. In the TERRA program, students earn credits in Theology, Careers and Civics, Outdoor Activities, and English. Kayla is a leader and organiser of the group and sees the TERRA group as being “used for sharing event information and coordinating participation in community protests and events” (interview, August 26, 2013).

TERRA

Geographic reach and size of network

This private Facebook group is comprised of 30 students who participated in the semester-long TERRA program. All students are from the Guelph area.

Leadership positions

Kayla identifies as a leader and organiser for this group. “I believe it is important to first teach and model the kind of leadership you want the participants to have. At first I do a lot of facilitating and then eventually I remove myself more and more” (interview, August 26, 2013). Within TERRA, there are not specific leadership positions or processes for electing

leaders. Kayla estimated that 90% of the members were heavily involved in participating in the group with only about four or five members hardly participating.

Adult facilitators

TERRA has been entirely student-led since the group was created after the semester-long program as a space for the youth to stay in touch with each other once the program finished.

Communication tools and meetings

Kayla said that youth members are active all year on the TERRA page and they do not have organized meetings. The group uses the Facebook private group to post events and activities that relate to the types of participatory environmentalism they would engage in in the TERRA program.

Network communication visualization

The visualization below shows communication on the TERRA Facebook group over a 6 month period from April to October, 2013. During this observation period, Kayla authored the majority of content within TERRA, specifically 22 posts and 110 comments, and this is represented by the size and centrality of the pale blue node, titled "Kayla Kermit". Kayla estimated that 90% of the members were heavily involved in participating in the group with only about four or five members hardly participating. In the network communication visualization, this active communication is represented by the several large purple unnamed nodes, these are youth who are actively posting, tagging or commenting on the page. There are many connections between the various nodes and these connections represent some form of engagement (posting, tagging, or commenting) between the youth members. Kayla's node is the most central and largest because she authored the majority of the posts; however, many other nodes are of similar size and centrality, which shows that the communication was shared by the group members. The small and dark purple nodes represent less engaged youth as their nodes are much smaller and are less central.

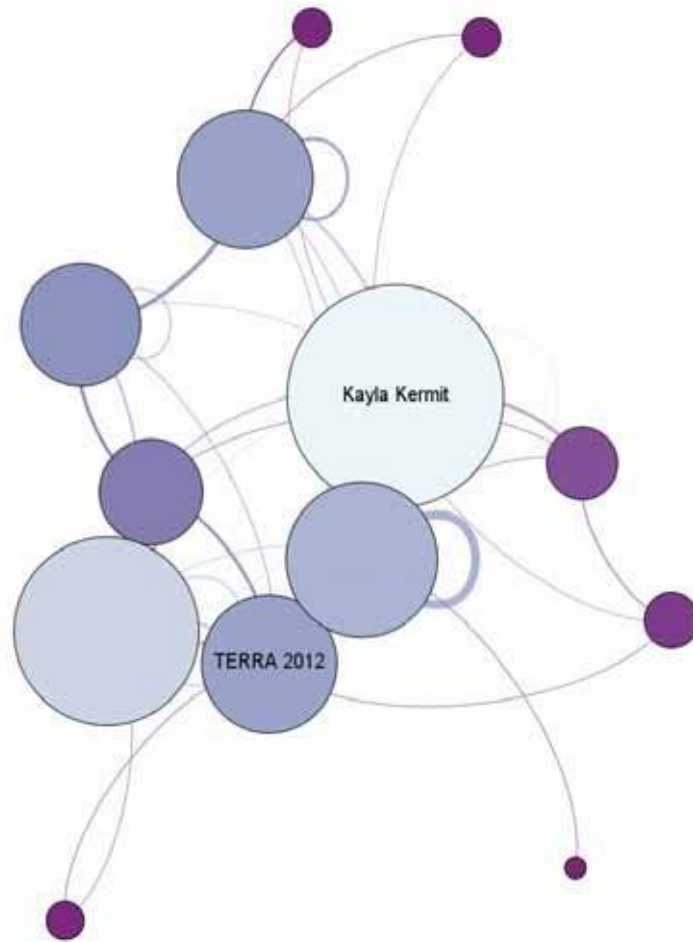


Figure 4.18. TERRA Facebook Private Group Network Communication Visualization.

This figure was created using social network analysis and shows centrality of Facebook posts, comments, and number of tags of page contributors. The size of the nodes indicates centrality to the network. The colour was selected using Gephi's colour palette.

Laura Rigg and the network: Dartmouth High EcoClub

Laura

Laura is a grade 12 student at Dartmouth High School in Nova Scotia, Canada. Dartmouth is on the eastern shore of Halifax Harbour, and the Halifax/Dartmouth amalgamated city has a population of close to 450,000 people. Dartmouth is surrounded by many lakes and is located on the Atlantic Ocean of Eastern Canada.



Figure 4.19: Laura, Dartmouth, Canada

Laura attributes her motivation to do environmental actions from formative experiences with her mom:

My mom was always teaching me that nature is really beautiful and old and although there are always other things in life like shopping and material possessions which people get caught up on, but really you just have to look around you and realize that you've been provided with so much just living on this planet (interview, November 5, 2013).

Laura also shared how humanity's legacy is a motivation for the work that she does: "I also think that it's really important to consider what we are going to leave behind future generations and it makes me sick to think that my kids might not be given the same opportunity because of environmental changes or the way that society is moving and it's happening every single day" (interview, November 5, 2013).

Laura indicated that the three environmental and social justice issues that she is the most concerned about are: genetically modified crops, fracking, and Canada's position on the

Kyoto Protocol. Laura explained that while listing the Kyoto Protocol is very specific as an environmental issue, she is “concerned in general about climate change policy” and policy-making in Canada generally (interview, November 5, 2013). She is involved as a member or volunteer in many environmental groups in the Halifax/Dartmouth area. Laura thinks that most of the content that she posts on Facebook is related to environmental and social justice issues.

She uses a laptop at least a few times in a week and uses her smartphone more than once a day. Laura checks email more than once a day at school; uses Facebook more than once a day while at home; and checks Twitter about once a week on her smartphone.

Dartmouth High Eco Club

Laura and her friend, in their grade 9 year conducted an extensive waste audit that resulted in the team reporting on the school’s environmental impacts at a Canada-wide science fair competition. Upon their return, the two young women decided to return to the school and implement some waste minimization strategies, which they later followed with subsequent school-wide waste audits. These actions were the impetus to begin a comprehensive Eco Club, which is led by Laura and her friend. The group grew in membership over the girls’ years at the high school and moved from waste reduction to include projects focused on conservation, area clean-ups, water bottle campaigns, and several partnerships with community groups.

All information presented below is based on Laura’s reporting. I did not access the group on Facebook.

Geographic reach and size of network

The Dartmouth High Eco Club Facebook was comprised of close to 100 members predominantly students from Dartmouth high and several community members.

Leadership positions

Laura and her friend decided to give the growing Eco Club some leadership positions; however, this was a difficult task: “We could see that categorizing people in different roles can make some people feel important but it can also make others feel less responsible or getting the credit they deserve” (interview, November 5, 2013). Consequently, Laura and her friend decided that they would become co-presidents of the club and there would not be any other formal positions.

Adult facilitators

The Eco Club is facilitated by a teacher at Dartmouth High School. Laura describes this teacher “as a huge part of the club and definitely a big help in making things happen.” When asked whether the club was teacher-led or student-led, Laura explained: “She [the teacher] would literally step back and say ‘You guys want to do that. I will help you.’ But she didn’t want to be running things. She wanted it to be student-led which is very important” (interview, November 5, 2013). Upon clarification, Laura explained that the teacher was only active in the face-to-face meetings and was not part of the Facebook group, “We made her a[n] [Facebook] account. And she doesn’t like using Facebook at all. She didn’t intend on using it for personal purposes. So we made a joke account so that she could see what was happening in the group but she was not on there very much” (interview, November 5, 2013). Laura also explained that she would sometimes email her teacher written text so that her teacher could edit it and then Laura would post the edited text to the Facebook group.

Communication tools and meetings

The Eco Club would regularly meet during lunchtime on Friday’s: “the lunchtime meeting was to organize and make sure that everyone knew what was going on” (interview, November 5, 2013). There would be additional meetings afterschool on other days when campaigns, projects, or events were running. Beyond meeting face-to-face, students would post and share files on the Facebook group page. When the students were working on a grant application, they would share files through Facebook and would also email, especially if the message included their teacher.

Network communication visualization

No network communication visualization was conducted on this group.

Leago Monareg and network: Generation Earth

Leago

Leago is 18 years old and lives in Pretoria, South Africa. He finished high school in 2013 and at the time of interview was applying to universities. Pretoria is one of three capital cities in South Africa and is located in the northeast of the country. The city has the largest white population on the African continent and has roughly 1 million Afrikaners living in or around the city. The main language spoken in Pretoria is Afrikaans. Other widely spoken languages are Pedi, Sotho, Tswana, Tsonga, Zulu, and English.



Figure 4.20: Leago, Pretoria, South Africa

Leago is motivated “to make a difference and change the way we live and use the world’s natural resource” (interview, May 26, 2013). Leago is unsure where his underlying motivation comes from: “I don’t know if there is a reason why...I am just really in love with nature and it just happened that I became involved with Generation Earth. It is more recent for me...over the past few years” (interview, May 26, 2013).

According to Leago, the most concerning environmental and social justice issues are: climate change and poverty. He reported that most of the content he posts to Facebook is environmental or social justice related. Leago uses his smartphone and laptop more than once a day and accesses email, Facebook, and Twitter more than once a day from his smartphone.

Generation Earth

Within the youth-created, youth focused NGO, Generation Earth, Leago is a regional president for a council. Generation Earth was created to address the gap between the environmental sector and the passion and drive of young people. Generation Earth supports the establishment of green councils in schools and universities to help facilitate the development and implementation of environmental projects and programs. As a volunteer counsellor, Leago organizes and facilitates weekly meetings in Pretoria. He also participated in COP17, (the 17th Conference of the Parties to the United Nations Framework Convention on Climate Change) held in Durban, South Africa in 2011 with Generation Earth.

Geographic reach and size of network

The Generation Earth Facebook page has 3,604 likes which are mostly regionally-specific. Leago explained that the group is planning on expanding the model throughout South Africa and Africa.

Leadership positions

Leago identifies as a leader or organiser within Generation Earth. He is a counsellor and organizes and facilitates weekly meetings in Pretoria. As a counsellor, he is required to oversee the number of schools that are within the Pretoria council and host meetings. He explained: “any problem that they [students] experience or any activities that they want to plan, they talk to a counsellor about. Then the counsellor takes these ideas to council meetings which happen every month, where we discuss issues and approve solutions.” Leago explained that all positions within Generation Earth are voluntary and filled by youth between 16 - 19 years old. Individual youth first volunteer with the organization and then can be elected into leadership roles on an annual basis. There are 40 active youth in leadership or volunteer positions within Generation Earth. Leago said that they are heavily involved in the group.

Adult facilitators

Leago explained each school council has one or two adults to help coordinate meetings; however, Leago said that the meetings can run without them as their schedules occasionally conflict with the youth meeting times.

Communication tools and meetings

Email is primarily used to make agenda items for school council meetings. Facebook is also used to promote the events Generation Earth is running. Through Facebook, Generation Earth also engages community organizations or businesses: “What we do is we engage companies and different agencies, like the Department of Foreign Affairs. We engage people

who know more about the environment. We invite them to come and educate us so that we have more knowledge. We also have people that we call sponsors in our Facebook network” (Leago Monareg, interview, May 26, 2013).

In terms of meetings, Leago reported that his council meets once or twice a week depending on projects happening at the school. There are also occasional meetings called the President’s Meeting where Generation Earth volunteers gather and plan for upcoming events and reflect on past events. Once or twice a year, the group has a summit:

where we invite all the members of Generation Earth. We come together in one place and we invite environmental ambassadors, people that can actually drive Generation Earth, people who have studied environmental management or studies, and people with more knowledge in terms of what we’re focusing on (Leago Monareg, interview, May 26, 2013).

Network communication visualization

The visualization below shows communication on the Generation Earth Facebook page over a 6-month period from June to December 2013. During this observation period, Leago did not post on the Generation Earth Facebook page using his personal Facebook account. In a follow-up interview, he indicated that he posts on the page as Generation Earth using the Facebook page administrator permissions. In this time period, the administrator for Generation Earth posted or commented 1 083 times, which is considerably more than any other contributor as the network visualization shows. The Generation Earth node is the largest and most central node to the network. The network visualization also shows a moderately involved group of youth engaged in commenting, tagging, and posting on the Generation Earth page. This network visualization aligns with the hub and spoke structure of a broadcast network, where the moderately engaged youth broadcast the content posted on the Generation Earth page. There are few connections between nodes which shows that the communication was not between individual members but was always directed to the Generation Earth page and its posts.

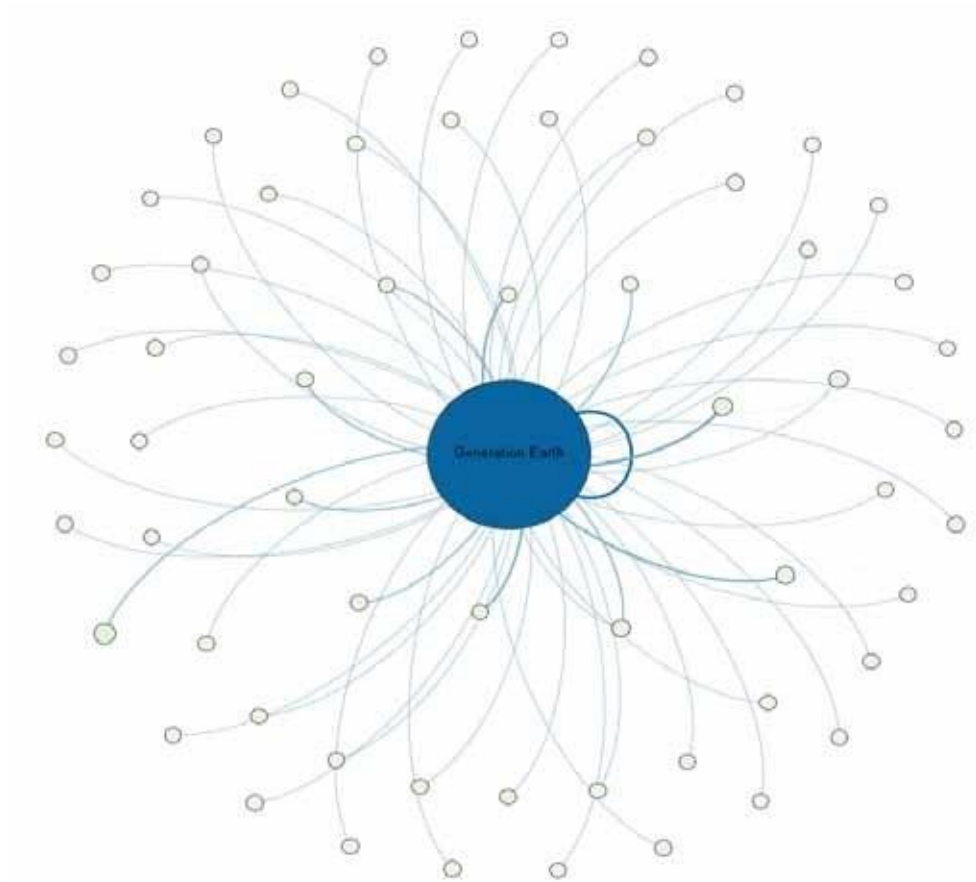


Figure 4.21. Generation Earth Facebook Page Network Communication Visualization.

This figure was created using social network analysis and shows centrality of Facebook posts, comments, and number of tags of page contributors. The size of the nodes indicates centrality to the network. The colour was selected using Gephi's colour palette.

Mary Konobo Jr. and network: Make A Change! Be Environmentally Friendly

Mary

Mary is 18 years old and completed grade 12 in 2013 in Port Moresby, Papua, New Guinea. Mary grew up in rural Papua, New Guinea before moving to Port Moresby as a teenager. In Port Moresby, Mary was surprised at the amount of litter in the streets and practices she saw on a daily basis including, people throwing garbage from moving vehicles, spitting betel nut, or using kerosene to burn rubbish. She was concerned that young people growing up in Port Moresby did not realise or know the consequences of these actions, especially if they saw them practiced in the city streets every day.



Figure 4.22: Mary, Port Moresby, Papua New Guinea

In her grade 10 year, Mary decided to create a Facebook page called “Make A Change! Be Environmentally Friendly” in which she makes posts and encourages others to contribute content “to raise environmental awareness and to educate each other on how our actions are affecting the natural environment” (Facebook Messenger interview, September 9 - November 7, 2013). Mary describes her underlying motivation as being formed when: “I grew up in the country side & enjoyed very much the wonders of the nature and Papua New Guinea being blessed with a unique biodiversity I have come to realise that I want to keep it that way. I have a strong conviction to do something for my country & that is keep to my country green” (Facebook Messenger interview, September 9 - November 7, 2013).

According to Mary, the three most concerning environmental or social justice issues are: 1) the careless attitude and actions of people towards our environment 2) how to educate

other people on the effects and consequences of the activities posed on the environment and 3) resolve and enforcing solutions to environmental issues. Mary elaborated on these issues:

In PNG, attitude problem is a very big issue, grassroots and ordinary citizens are very shallow minded on what is being done to our environment which includes the surroundings of our homes, streets, cities, the natural habitats & so forth....Iv seen people only concerned about money & how comfortable they can make their lives become & worry little especially of what our natural environment will become in the future. All these have sparked me to raise my concerns (Facebook Messenger interview, September 9 - November 7, 2013).

Mary reported that most of the content that she posts to Facebook is related to environmental or social justice issues. Mary uses a laptop a few times a week. She also carries a smart phone and a standard mobile, and uses both more than once a day. Mary uses the smart phone when she is at a location with Wi-Fi and her standard mobile when she is between locations without Wi-Fi access. Mary uses email about once a week from home and uses Facebook more than once a day from home.

Make A Change! Be Environmentally Friendly

Geographic reach and size of network

Make A Change! Be Environmentally Friendly is a closed Facebook group that has 205 members. The members are predominantly from the regional community surrounding Port Moresby, Papua, New Guinea.

Leadership positions

Mary is the founder and leader of the group and has invited friends, family, and community members to join and contribute to the group: "I am currently the only administrator for the group." There are no formal positions within the group.

Adult facilitators

There are adults involved in the group who are mostly Mary's family. She describes their role as advocates and "to help get the message out" (Facebook Messenger interview, September 9 - November 7, 2013).

Communication tools and meetings

The group is informal and all communication is on Facebook. There are no formal meetings, but the group will occasionally have an informal face-to-face gathering.

Network communication visualization

The visualization below shows communication on the Make A Change! Be Environmentally Friendly Facebook group over a 6 month period from September, 2013 -

February, 2014. During this 6-month observation period, Mary contributed the most content to the Facebook page, specifically 55 posts and 34 comments, which is represented by the large central blue node, “Mary Jr Konobo”. Mary always posted content from her personal Facebook account and Make A Change! Be Environmentally Friendly was tagged multiple times which results in the node’s relatively large size. The two unnamed large blue nodes regularly engaged in the FB group are family members who posted and commented regularly on the content. There are also several medium-sized pale blue nodes that engaged with both the “Make A Change! Be Environmentally Friendly” page and Mary’s personal profiles, these engagements are represented by connection lines between the nodes.

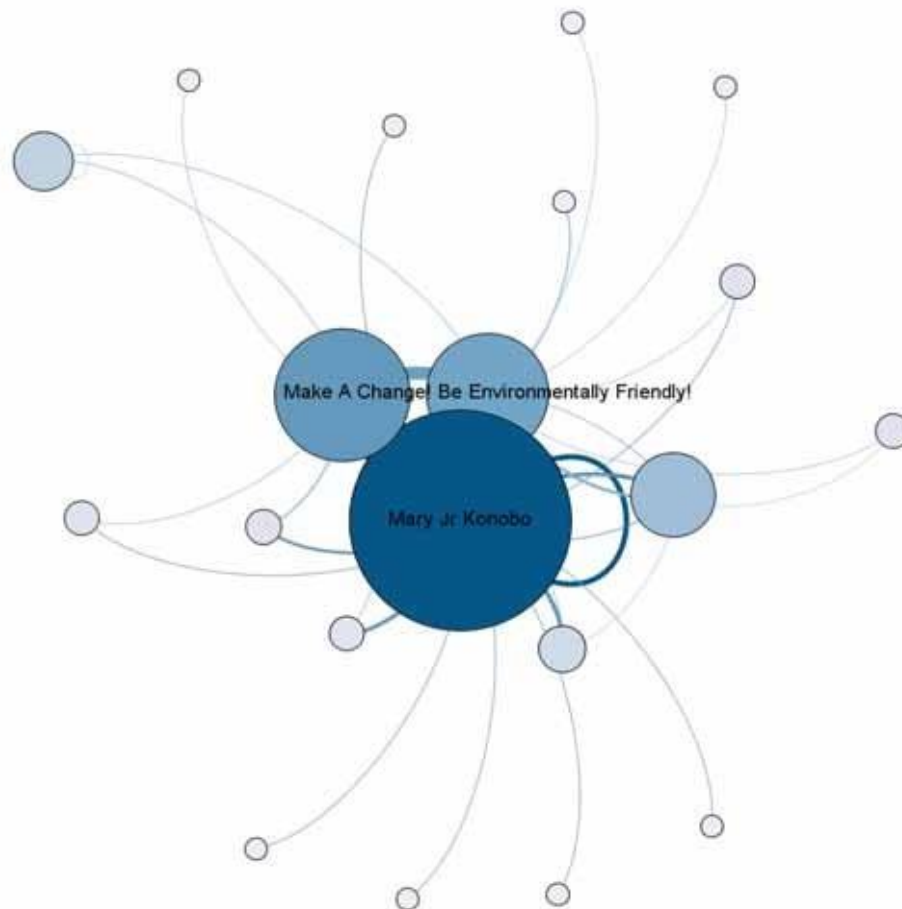


Figure 4.23. Make A Change! Be Environmentally Friendly Page Network Communication Visualization. This figure was created using social network analysis and shows centrality of Facebook posts, comments, and number of tags of page contributors. The size of the nodes indicates centrality to the network. The colour was selected using Gephi’s colour palette.

Michael Dillon and network: Australia Youth Climate Coalition - Cairns

Michael

Michael is 16 years old and at the time of interview was finishing grade 11 in Cairns, Australia. Cairns is located on the north eastern coastline of Australia, approximately 1 700 kilometres north of Brisbane. It is a small northern city with a population of 140 000. It is a popular destination for tourists because of its tropical climate and close proximity to the Great Barrier Reef and the Daintree National Park.



Figure 4.24: Michael, Cairns, Australia

According to Michael, the most concerning environmental and social justice issues are: 1) actively implementing more sources of renewable energy - perhaps finding better technologies 2) governments contributing to climate change combat, and 3) weaning Australia off fossil fuels and heavy mining. These issues are important to Michael because of documentaries he has watched on his own time or from studying these issues in school.

Michael explains his thoughts about these issues:

Through better research and design we can come out with alternatives and it is a really hard thing to do when there are all these big companies out there getting all the large profits from mining and it is going to be really hard to try and transfer from profits to something that is better for our future. And those are the challenges that we are facing (interview, March 28, 2013).

Michael joined the Cairns Facebook group for the Australia Youth Climate Coalition [AYCC] to gain background information and to get to know people that share similar ideas. At Michael's high school, there is no Environmental Club or other student-interest clubs apart from sports and so Michael thought that joining an online Facebook group could help him find

like-minded others and aid in having a more informed sense of whether he should pursue a university degree or career in renewable energy research and development. Michael explained that, at his school, “it is hard to find people that are my age who feel the same way and that go to school and that I can communicate with” and that speaking out about his environmental beliefs was also challenging, “because I don’t have friends that are as strong as I am towards being an environmental activist so I am kind of afraid of going out there and saying what I think for risk of criticism from friends” (interview, March 28, 2013).

Michael reported that most of the content that he posts to Facebook is related to environmental or social justice issues. He also uses a laptop and smartphone more than once a day and checks Facebook about once a week when he is at home.

Australia Youth Climate Coalition [AYCC]- Cairns

Geographic reach and size of network

The AYCC- Cairns is a Facebook public group that has 92 members. The overarching AYCC non-profit has a Facebook page with 37,000 likes and on their website claim that 110,000 young people are involved in the AYCC movement. The AYCC-Cairns group’s purpose is to be an online meeting space for youth, who are interested in climate change in the Cairns region.

Leadership positions

Within the AYCC-Cairns, there are no formal positions. Michael found that the AYCC-Cairns group had a low level of participation or involvement. He is also a member of AYCC-Brisbane where he felt there was a much higher level of involvement, posting information, and organizing of events.

Adult facilitators

According to Michael, there are no adult facilitators involved in the group.

Communication tools and meetings

From Michael’s experience, there were two face-to-face meetings that were organized when other AYCC groups were visiting Cairns; however, outside of these two meetings, the online space was underused. Michael was hoping that there would be more meetings and events of which he could be a part.

Network communication visualization

The visualization below shows communication on the AYCC- Cairns public Facebook group over a 6-month period from March to September, 2013. During this 6-month observation period, Michael contributed 1 post and 2 comments. Michael’s communication is

represented in the network communication visualization as a small node away from the centre of the network because of his limited engagement compared to other group members. Michael explained that his interest in joining the AYCC was “to get background information and get to know the people that share the same ideas that I do” (interview, March 28, 2013). Michael indicated he was looking for leadership or guidance on engaging with environmental issues, “A lot of the people are really proactive in the group so that sometimes gives me a bit of motivation to want to be like them and share my passion on sustainability” (interview, March 28, 2013). He also explained his participation as an observer,

I mainly just read the stuff that is posted. And when I am prompted to do stuff like sign a petition then I do it or I make a pledge...It’s mainly just reading and participating in things that they have done online. I haven’t done much physical involvement just yet. I am hoping things will start to kick off soon so stuff can get rolling (interview, March 28, 2013).

In the network communication visualization, the AYCC is the largest and most central indicating that the page administrator contributed the most communication engagement. However, there are several large green nodes that surround the AYCC node and these nodes’ centrality and size indicate engagement through posts, commenting, and tagging. It is most likely these members that Michael was referring to when he said “A lot of the people are really proactive in the group so that sometimes give me a bit of motivation to want to be like them and share my passion on sustainability” (interview, March 28, 2013). There are many connections between nodes within the visualization, which shows that communication was occurring across the network with members engaging with each other’s posts.

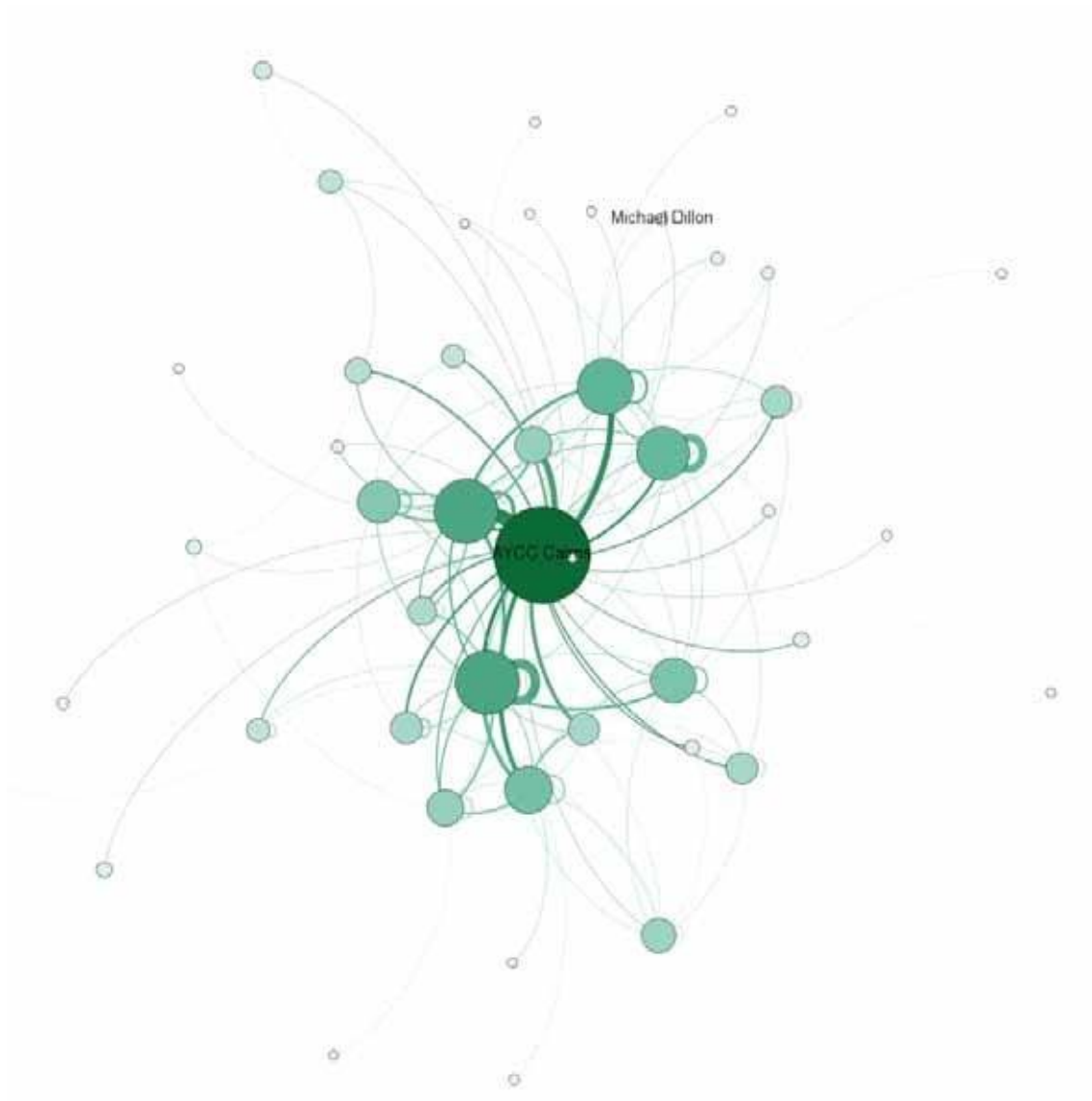


Figure 4.25. AYCC - Cairns Facebook Group Network Communication Visualization. This figure was created using social network analysis and shows centrality of Facebook posts, comments, and number of tags of page contributors. The size of the nodes indicates centrality to the network. The colour was selected using Gephi's colour palette.

Rebecca Feddema and network: Anti-Fur Action Group, Guelph

Rebecca

Rebecca is 17 years old and has completed grade 11 in southern Ontario, Canada. When I first interviewed Rebecca she was living in St. Catharines, a small city located in the Niagara Region with a population of 130 000. Iconic Niagara Falls is a 15 minute drive southeast from the city. In the second interview, Rebecca had moved to Guelph, which is 1.5 hours to the north of St. Catharines.



Figure 4.26: Rebecca, St. Catharines, Canada

Rebecca has been an animal rights activist for five years and sees animal rights issues as interconnected to many human and environmental issues. She has been involved in many local, regional, and international animal rights groups and volunteers to take care of animals and coordinate volunteer events, often working over 20 hours a week outside of high school, including occasionally spending five hours in the evening focusing on online activism,

I am going to sound completely insane but I would say the majority of my time is spent with activism because I'm doing it at school at work and I come home and I do it. So if I was to give a rough estimate in terms of physical activism I'm doing 20 to 30 hours a week and with online activism I would say it's at least five hours every night. I would say it's not five hours straight. It's activity every night and I am involved in so many different groups. I like to post things and I like to tweet things. I like to work in publisher and create new brochures. I think I sound crazy when I talk about it (interview, May 30, 2013).

For Rebecca, she would prefer to work at an animal shelter on a Friday night than do the types of activities many of her peers at high school do on weekends,

Most kids will be like I'm going to go hang out with my friends tonight. 'O come on its Friday let's go get drunk - it'll be so much fun - we'll go smoke some hash - or something like that.' And I am more like 'no, I am going to go home and I'm going to make a poster.' And I'll be so stoked or I'll go to the shelter and go hang out with some cats. And then I always get those comments where I post a few things about my successes that I've had like I posted that I got a \$20,000 scholarship and someone was like 'can I have a cup of success?' And I think with some hard work maybe. This is my fun. And I find it much more rewarding than doing drugs (interview, May 30, 2013).

Some of Rebecca's time online is allocated to maintaining a blog and several Facebook pages focused on animal rights issues. For example, during the observation period and interview schedule, Rebecca changed the name of the network she wanted to discuss from the Animal Rights Niagara to Animal Rights Canada. She decided during our last interview that she wanted to focus on a new group that she had formed called the Anti-Fur Action Group Guelph.

Rebecca has been living independently from her parents since the age of 12 and sees this as a source of strength as she believes she can set a good example to her peers. During this difficult time in her life, taking care of some kittens was formative to Rebecca's motivation for animal rights.

According to Rebecca, the most concerning environmental and social justice issues are: 1) land exploitation and habitat destruction 2) water issues and 3) waste disposal. She says that most of the content she posts to Facebook is related to environmental or social justice issues. Rebecca uses her laptop more than once a day and checks email about once a week, as well as Facebook a few times a week from home.

Anti-Fur Action Group Guelph

Geographic reach and size of network

The Anti-Fur Action Group Guelph is a closed Facebook group. It has 35 members and is based in the Guelph region.

Leadership positions

There are no formal positions within this group.

Adult facilitators

There are no adult facilitators in this group.

Communication tools and meetings

There are no formal meetings. Youth post items that are of interest and interact around posts. There are no other communication tools to facilitate participation in this group.

Network communication visualization

The visualization below shows communication on the Anti-Fur Action Group Guelph over a 6 month period from June to December, 2014. During this observation period, Rebecca made 1 post with her personal Facebook profile and 1 comment. However, Rebecca also posted content as the page administrator, so posts from the Anti-Fur Action Group Guelph profile were completed by Rebecca. In this group, members would tag the Anti-Fur Action Group Guelph on their posts to the group which is also evident with the centrality and size of the node. All of the nodes contributed at least one post and the large teal and unnamed node represents a group member that contributed two posts and a comment. The limited number of posts and engagement and the small group size is evident by the few connections between the few nodes.

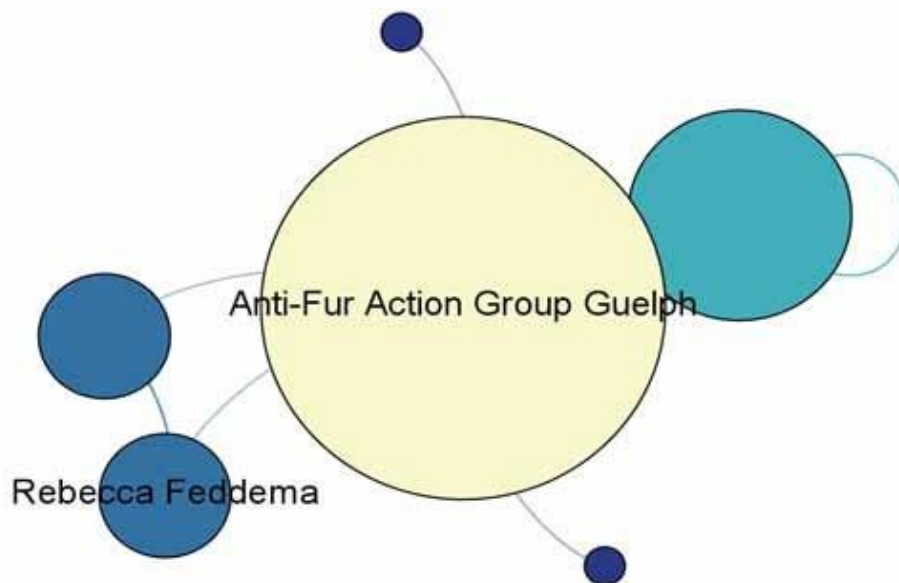


Figure 4.27. Anti-Fur Action Group Guelph Facebook Group Network Communication Visualization. This figure was created using social network analysis and shows centrality of Facebook posts, comments, and number of tags of page contributors. The size of the nodes indicates centrality to the network. The colour was selected using Gephi's colour palette.

Sagar Aryal and network: Sano Sansar

Sagar

Sagar is 17 years old, has completed grade 12, and lives in Kathmandu, Nepal. He also spent his grade 11 year attending high school in Sweden. Kathmandu is the largest city in Nepal with a population of just under 1 million people.



Figure 4.28: Sagar, Kathmandu, Nepal

Sagar sees Hinduism as informing his environmental values: in the “Hindu religion, nature is regarded as God - even all the plants and animals there is respect for everything in the planet...so I come to this spiritually” (interview, August 13, 2013).

In grade 5, Sagar created a group called Sano sansar, which later became a volunteer-run NGO, that offers programs and campaigns focused on social justice and environmental issues, predominantly in Nepal. Sano sansar’s first campaign was starting a library for children who were deprived of access to school in Kathmandu. The students then started to focus on environmental conservation and sustainable development and developed an extensive website and online network. In 2013, Sano sansar launched different programs in several different countries: Sri Lanka, Maldives, Germany, Nigeria, and Sweden. Seven years after he founded the organization, Sagar is still the leader of Sano sansar.

For Sagar, the most concerning environmental and social justice issues are: 1) climate justice 2) youth empowerment and inclusion in decision making and 3) extreme poverty and hunger alleviation. Sagar said that all or almost all of the content he posts to Facebook is related to environmental or social justice issues. Sagar uses his laptop and smart phone more

than once a day and checks email, as well as Facebook more than once day from his smart phone. Sagar was also elected President of the Global Youth Board for Plant for the Planet in 2012 to 2013. Aman and Sagar know each other through their work with Plant for the Planet.

Sano Sansar

Geographic reach and size of network

The Sano Sansar public Facebook group has 2 034 members. In addition, Sano Sansar has a website that has close to 5 000 youth members. According to Sagar, youth engaged in the Facebook group or through the website reside throughout the world.

Leadership positions

The organization is run primarily by children and youth volunteers. There are three formal leadership positions: president, vice-president, and global board members. There are also some informal positions such as social media volunteers. For all the formal positions, youth are elected by members for the positions. All of the leaders are 16 to 18 years old.

Adult facilitators

There are adult advisors who are on the board. Sagar explained their role as to respond to questions that children and youth have within the organization. If the group is organizing a large event, they may also consult with adult advisors. In Sagar's words, "So our advisors they are guiding us but most of the decisions, they are taken by children and youth" (interview, August 13, 2013).

Communication tools and meetings

There are not meetings for the whole membership, but there are organized meetings for specific projects. Sagar explains, "We call all the board members and volunteers when we need it and we talk about the programs that we want to launch and we discuss with them" (Skype interview, August 13, 2013). Most of the time, the group meets face-to-face in their office or in a community meeting place; however, occasionally, they will have online meetings with volunteers. For online meetings, the group uses Moodle or Skype. Any documents that members may need to access are also stored online.

Network communication visualization

The visualization below shows communication on the Sano sansar Facebook public group over a 6-month period from August, 2013 to January, 2014. During this observation period, Sagar made 24 posts with his personal Facebook profile and 7 comments. In the network visualization, Sagar's node is larger than other members due to his frequent posting and engagement. During this time, the administrator did not make any posts on behalf of Sano

sansar, but Sano sansar was tagged in many youth posts causing this node to become dominant in the network visualization. The network visualization also has a general hub and spoke structure with a moderately involved group of youth engaged in posting, commenting, and tagging on the page. The purple connection lines between the nodes represents the engagement of commenting and tagging between members.

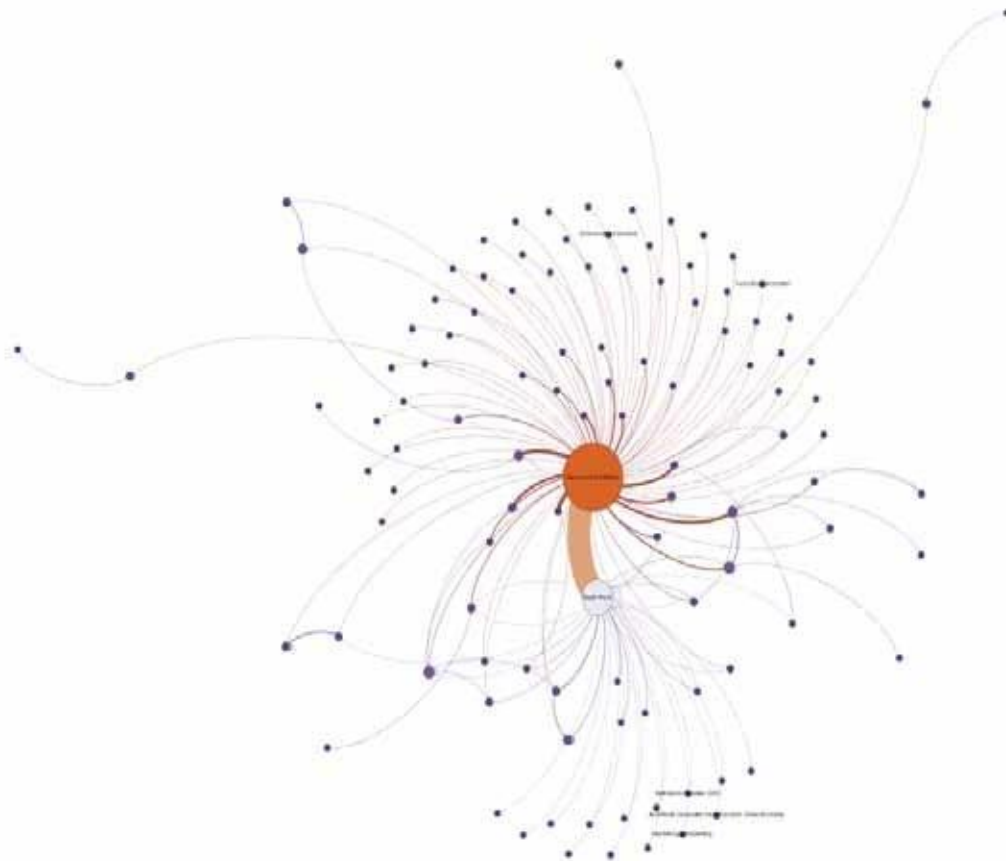


Figure 4.29. Sano sansar Facebook Group Network Communication Visualization. The figure was created using social network analysis and shows centrality of Facebook posts, comments, and number of tags of page contributors. The labelled nodes are organizations that are within and contribute communication on the Sano sansar Facebook group. The size of the nodes indicates centrality to the network. The colour was selected using Gephi's colour palette.

Srirejeki Nurannisa

Annisa

Annisa is in grade 9 and lives in Jakarta, Indonesia. Jakarta is the capital city of Indonesia and has a population of just under 10 million.



Figure 4.30: Annisa, Jakarta, Indonesia

Annisa described how she has observed air pollution change since she was a child in Jakarta. She has asthma and attributes it to poor air quality. Annisa told me there is no environmental club at her school and she is not a part of any online environmental groups focused in Jakarta or Indonesia. Annisa is concerned about global warming and pollution in both the air and water. She told me she has learned about these issues from surfing the internet and on social media. Annisa also shared that she has no friends who share about environmental issues offline or online.

She uses her various social media accounts to post environmental articles that she finds while surfing the internet or that come through her social media news feeds. Annisa explained: "im tryin to affect my friends first, so soon they can spread information to others" (Skype text message interview, August 7, 2013). Annisa uses her Facebook and Twitter account to share posts she sees in social media that are focused on environmental issues. Annisa's brief case is included because her perspective is not represented by any of the other cases.

4.4 Cross-case analysis

Through cross-case analysis, aspects of the network structures are compared across the 11 cases. To conduct the cross-case analysis, the networks were divided into 4 different groups. Informal groups are environmental social media interest groups that are voluntary and are not affiliated with an NGO, or do not have NGO-status (MECT volunteers, Make A Change! Be Environmentally Friendly!, and Anti-Fur Action Group - Guelph). Youth-created NGOs refers to the environmental social media interest groups that coincide with an NGO that is a formal NGO (Generation Earth, Sano sansar Initiative and Plant for the Planet), or are closely affiliated with an NGO (AYCC - Cairns). School Environment Clubs are social media interest groups that map onto an extracurricular school environment club. Lastly, an integrated high school program refers to the environmental social media interest group that aligns with an integrated high school program (TERRA). The cross-case analysis of the different networks compares *geographic reach, size, leadership roles, adult facilitators and the network communication visualizations*. The following table (Table 7.1) presents data for all groups across these categories.

Table 4.1 Cross-case Analysis of youth-created environmental social media interest networks

	Network	Primary Platform usage	Geographic reach of group	Size of group	Leadership	Adult facilitators	Meetings
Informal groups	MECT	Facebook	National	42 members	Leader & founder	Yes for consultation when	Informal through Facebook chat
	Make A Change! Be Environmentally Friendly	Facebook	Local region	205 likes	Leader & founder	Yes members of Mary's immediate family	No scheduled meetings
	Anti-Fur Action Group	Facebook	Local region	35 members	Leader & founder	No	No scheduled meetings
Youth-created NGOs	Generation Earth	Facebook	Local region with some national and international	3604 likes	Leader	Yes to help coordinate in school meetings	Once a week
	AYCC - Cairns	Facebook	Local region with support from national network	92 members	Not very involved	No (AYCC-Cairns) Yes (AYCC)	No scheduled meetings
	Sano sansar Initiative	Facebook	National with international	2034 members	Leader & founder	Yes on NGO board	For specific projects
	Saviors of the Environment	Facebook	Local region with international reach	1,362 likes	Leader & founder		Irregular
	Plant for the Planet	Facebook	International	5,976 likes	Leader	Yes for administrative	Once a month
School Environment Clubs	Kings Academy Green Club	Facebook	School/ Local region	Approx. 30 members	Heavily involved	2 teachers	Once a week
	Dartmouth High Eco Club	Facebook	School / Local regional	100 members	Leader and founder	1 teacher	Once a week
IHSP	TERRA	Facebook	Local regional	30 members	Leader	No	No scheduled meetings

Note: The size of the group listed is dependent on whether the group has chosen a Facebook group (members) or a Facebook page (likes). While the number of members and individuals who have liked a page are not the same for the purpose of this comparison they are considered as general indicators of network size.

Geographic reach and size of network

All of the informal groups have a local and regional reach; however, MECT also has a national reach with some members from different regions of Nepal because of the group's remote tree-planting projects. All of these informal groups had fairly small network sizes ranging from 35 members to 205 likes. While members and likes are not equivalent as a metric for comparing, the difference arises because some networks operate as Facebook groups (with members) and some operate as Facebook pages (with likes). Broadly including members and likes allows for a general reading of the number of individuals within a network.

The youth-created NGOs had local or national to international reach and the size of the groups were the largest of all the networks (92 members to 5,976 likes)

The School Environment Clubs' reach was predictably within the school population; however both school environment clubs had community members who joined the clubs to stay informed either about school activities (e.g., Dartmouth High Eco Club), or to learn about environmental issues (e.g., King's Academy Green Club).

The membership of Terra's integrated program was only the students who had participated in the semester long integrated program in 2012; therefore, the membership was the size of the class and the focus was on the local region as the students were from different high schools throughout the region.

Leadership Positions

The youth participants for all of the informal groups for this research study identified as the founders and leaders of the groups. Since the groups had been recently formed and had not incorporated into NGO status, Anup, Mary, Rebecca, as leaders, were contributing the most to the group's communication, meetings, or projects.

Within the youth-created NGO networks, two of the youth respondents are founders and leaders, two are leaders, and one is not very involved. The two youth who have founded NGOs, Sagar and Aman, are also both very involved in the Plant for the Planet organization, which strongly advocates for children-led climate justice and child and youth empowerment in decision-making processes. Sagar, Leago and Aman indicated that they were leaders within their organizations; however, both Generation Earth and Plant for the Planet are two of the largest networks in this study and both groups have formal positions and processes for electing youth. Michael indicated that he is not very involved in the AYCC-Cairns group

because he joined looking for youth who were interested in climate change and renewable energy. Michael also indicated he was afraid of criticism from his friends because they did not have the same environmental ethics, which also indicated that he did not have a strong environmental activist identity and would, therefore, take less of a leadership role within a group.

In terms of School Environment Clubs, Laura had founded the Dartmouth High EcoClub and maintained a strong leadership position. Hussam was heavily involved, but also indicated that two teachers were reasonably involved in running the club. Lastly, Kayla indicated that she is a leader within TERRA.

Adult facilitators

For several of the groups, there are adults involved; however, the degree of their involvement ranges across the groups. In the School Environmental Clubs, the teachers are more engaged than in any of the other groups. For most of the informal and youth-created NGO groups, the adults seem to offer advice, guidance, or administrative support when requested by the youth.

Meetings

For the informal groups, there were no regular meetings. For the youth-created NGOs, only Generation Earth and Plant for the Planet had regularly occurring meetings which is indicative of larger organizations. Sano sansar Initiative and Saviors of the Environment would have irregular meetings occurring when there was an environmental event. Leaders within Sano sansar would organize meetings for specific projects and only youth involved in the specific project would attend. The School Environment Clubs had consistent weekly meetings. The TERRA network did not organize meetings, but would organize around community events and meet informally at the event with youth who attended.

For all of the groups, the Facebook group or page was used to remind youth of meetings or in place of face-to-face meetings.

Network visualizations

The network visualizations were grouped according to different types of identified groups: Informal groups, Youth-created NGOs, School Environment Clubs, and Integrated High School program (Table 0.).

Table 0.2: Network communication visualization of youth-created environmental social media interest networks

Informal Groups



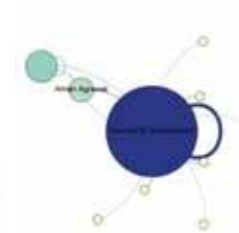
MECT



Make A Change! Be Environmentally Friendly!



Anti Fur Action Group Guelph



Saviors of Environment

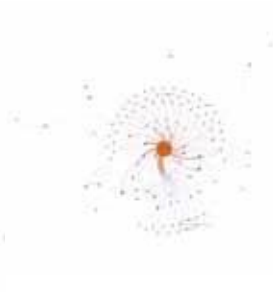
Youth-created NGOs



AYCC- Cairns



Generation Earth



Sano Sansar Initiative



Plant for the Planet

Integrated High School Program



TERRA 2012

Note: The Saviors of Environment network communication is situated as both a youth-created NGO and an

informal group because the group does not share the same amount of organizational administrative support and has a much smaller geographic reach and size of network than the other youth-created NGOs. In many ways, Saviors of Environment is more closely aligned with the network characteristics of the informal groups. Overall, these network communications are positioned as visual narratives which require contextual information from interviews in order to better situate communication flows, dynamics and relationships.

From the above groupings, the network communication visualizations have some shared structural patterns. Supplementing the network communication visualizations with quantitative data on the communication within each network helps situate these network structures (see Table 0. on posts and

Table 0. on comments).

Table 0.3: Network Communication Data on posts from 6 month data capture

	Network	Number of posts by youth respondent	Number of contributors	Total posts	% of youth respondent posts to total
Informal groups	MECT	17	1	17	100%
	Make a Change! Be Environmentally Friendly!	55	55	151	36%
	Anti-Fur Action Group	1	5	6	17%
	Saviors of Environment	2	5	39	5%
Youth-created NGOs	Generation Earth	11	386	2061	0.50%
	AYCC- Cairns	1	33	179	0.50%
	Sano sansar Initiative	74	86	244	30%
	Plant for the Planet	0	59	232	0%
IHSP	TERRA 2012	22	20	181	12%
Note: the percentages in this table reflect the number of posts contributed by youth from their personal profile. In some cases, youth also posted as the Facebook page administrator and these posts are not reflected in the data tables or captured in this study.					

Table 0.4: Network Communication Data on comments from 6 months' data capture

	Network	Number of comments by youth respondent	Number of contributors	Total comments	% of youth respondent comments to total comments
Informal groups	MECT	0	0	0	0%
	Make a Change! Be Environ-mentally Friendly!	34	23	102	33%
	Anti-Fur Action Group	1	2	2	50%
	Saviors of Environment	4	8	33	12%
Youth-created NGOs	Generation Earth	5	368	1021	0.40%
	AYCC- Cairns	1	35	276	0.30%
	Sano sansar Initiative	21	44	106	20%
	Plant for the Planet	0	233	328	0%
IHSP	TERRA 2012	110	20	966	11%
Note: the percentages in this table reflect the number of comments contributed by youth from their personal profile. In some cases, youth also posted as the Facebook page administrator and these comments are not reflected in the data tables or captured in this study.					

Within the informal groups, the majority of communication within the environmental social media interest group is dependent on the founders (Anup, Mary, Rebecca, and Aman). For example, Anup posted 100% of the posts on the MECT Facebook group; Mary posted 36% of the posts on the Make A Change! Be Environmentally Friendly! page and Rebecca posted 17% of the posts in her Anti-Fur Action Group. Saviors of the Environment's network communication visualization is included along with the informal group visualizations because of how closely its network structure aligns with the informal group visualizations. As the visualizations show in these networks, the youth leader contributes significantly to the communication on the Facebook page or group.

Within the youth-created NGOs, the majority of communication originates from the page administrator. For Generation Earth, Sano sansar Initiative, and Plant for the Planet, there are many members; however, they are not heavily involved in posting content within

the Facebook page or group as all the nodes are relatively small. The network visualizations also show how these networks (Generation Earth, Sano sansar Initiative, and Plant for the Planet) are larger in membership. Overall, Generation Earth, Sano sansar Initiative, and Plant for the Planet have centralized communication in which the page administrator is generating the majority of posts; however, the number of contributors on each Facebook page increases with these larger networks. For example, on the Generation Earth page 386 different contributors posted a total of 2061 posts; on the Sano Sansar Facebook group 86 different contributors posted a total of 244 posts; and Plant for the Planet had 59 different contributors post a total of 232 posts. Similarly, there is an increase in commenting within these more established networks. For example, Generation Earth had 368 contributors comment a total of 1021 times on the page; Sano Sansar had 44 contributors comment a total of 106 comments; and Plant for the Planet had 233 contributors comment a total of 328 times.

When considering the visualization of the AYCC-Cairns with the other informal group network visualizations, the AYCC-Cairns network shows how communication is shared by many members with nodes of varying sizes. The AYCC-Cairns network visualization aligns most closely with a decentralized network model, in which various contributors within a network post or share information but not all contributors share the same amount. The communication is not as centralized as is the case with Generation Earth, Sano Sansar Initiative, and Plant for the Planet.

Lastly, the network visualization for TERRA 2012 shows how there are many contributors to the content shared within the group, but not all members post or share the same amount. This network visualization aligns with a decentralized model of communication where there is not a specific communication leader and many individuals are engaged in communication in the network.

Interestingly, both AYCC-Cairns and Plant for the Planet had more comments than posts which also shows how commenting and participating in a comment chain is a common activity within an online network.

4.5 Chapter summary

In this chapter, a summary of findings from an online questionnaire was presented (Section 4.2). The online questionnaire was important for developing background and contextual information regarding the reasons why, how, and about what topics youth engage in environmental social media interest groups.

From responses in the online questionnaire, youth indicated that their reasons for joining groups are to make a change in their communities, become more informed and involved, or because they want to discuss environmental issues. Youth respondents' use of technology to connect to social media is through laptop computers more than once a day and smart phones more than once a day. Desktop computers, tablets, and standard mobiles were used far less frequently. Of all the social media platforms, youth use Facebook predominantly and check it at least once a day. From the online questionnaire, the most significant environmental and social justice challenges mentioned was climate change. When youth respondents were categorized environmental and equity issues were the most predominant challenges. Youth respondents indicated that communication and IT skills are the most important skills for participating in environmental social media interest groups.

In Section 4.3 a visual analytic was presented which consists of five constructs (*affordance, culture, dynamics, structure, and substance*). These constructs are employed in the proceeding chapters to theoretically explore learning and activism in environmental social media interest groups.

In Section 4.4 the cases of 11 youth and their respective networks were presented. For each network, structural characteristics were reported on with attention to the following aspects: *geographic reach and network size, leadership positions, adult facilitators, communication tools used and group meetings, and a network communication visualization*. The network communication visualizations create a strong visual, like aerial photographs of a crowd, showing the rough size, composition of the population, engagement, and relationships within the networked public.

In Section 4.5 a cross-case analysis of the structural characteristics described in the case studies was presented. From this cross-case analysis, it is evident that the groups are in different stages of development and the communication and structure reflects these stages. The informal groups (MECT, Make A Change! Be Environmentally Friendly! Anti-Fur Action Group Guelph, and Saviors of the Environment) are in early stages of development and they do not have NGO status or are affiliated to a school program. In these groups the majority of content posting was created by the leader (Anup, Mary, Rebecca, and Aman). In all of these groups the leader was also the founder of the group and so the engagement of others and the responsibility of keeping the group on track was the responsibility of these young leaders. These informal groups are examples of how motivated youth can use social media groups to engage with like-minded peers and have a platform to post their ideas and goals.

With the larger groups, that are youth-created NGOs, the communication was often organized through a page administrator. The number of contributors on each Facebook page increases with these larger networks. With a larger population engaged in an interest group, then the onus of posting content does not rest as heavily on the founder or leader of the group. Both AYCC-Cairns and Plant for the Planet had more comments than posts which also shows how commenting in a comment chain is a common means of engagement, and that commenting engages a broader group.

Through mapping these structural characteristics, this research project has attempted to describe various structures of youth-created environmental social media interest groups. While there is considerable variation in the groups and their structures, the network communication visualizations create a strong visual, like aerial photographs of a crowd, showing the rough size, composition of the population, engagement, and relationships within the networked public (see Chapter 7 Discussion for more discussion).

In Chapter 5 learning within environmental social media interest groups is investigated by consideration of youth reflections on their learning within online groups, skills youth deem important for participating in online groups, a comparison of 21st Century learning youth attribute to learning in online groups to their high school experiences, and lastly the role of teachers and adult facilitators.

Chapter 5 Investigating learning in youth-created environmental social media interest groups

5.1 Learning

Social networks within the literature are deemed to offer new democratic and collaborative models of education practice. According to the literature, the affordances of social networking sites can facilitate positive educational learning potentials such as: *peer-to-peer learning*, *diversification of cultural expression*, *skill development for the modern workplace*, and a more *empowered sense of citizenship* (Jenkins et al., 2006), *synchronous and asynchronous feedback*, and the ability to *augment social contexts* such as school, university or local community (Mason, 2007). Peer-to-peer learning is one of the most frequently cited learning affordances of social networks (Greenhow, 2011; Jenkins et al., 2006). However, many questions arise in terms of quality and type of learning that occurs within these networked spaces: Are there shifts in substantive topic knowledge? What types of content influences youth's substantive topic knowledge? How do youth see their own participation and posts influence others within groups? How do youth respond to positive or negative comments?

5.2 Chapter overview

Within this chapter, youth perspectives and reflections on their learning within environmental social media interest groups are thematically reported upon drawing on data collected from interviews, individual social media data, and group social media data. This chapter refers to *substance* and *dynamics* in terms of how substantive topic knowledge is shaped by *dynamic* processes of learning and engagement within social media and group contexts. *Substance* refers to the substance of learning that has taken place within an environmental social media interest group and this construct aligns with the sub-research question "What types of learning do youth attribute to their participation in youth-created environmental social media interest groups?" This sub-research question is addressed through considering the following different aspects of *substance*:

- knowledge and content learning (i.e. environmental and social justice topics, increased environmental understandings, and content that influenced youths' environmental understandings)

- skills learning (i.e. types of skills required to participate in social media interest groups, and a comparison using the Framework for 21st century learning that youth attribute to learning in high school compared to an environmental social media interest group)

Dynamics refers to the dynamics of learning and aligns with the sub-research questions that consider the dynamic aspects of peer-to-peer learning: “how did this learning occur?” and “what and who shaped this learning?” These sub-research questions are addressed through considering the following different aspects of dynamics:

- content that influenced other group members
- how responding to positive and negative comments influenced individual youths’ learning and confidence

The last section of this chapter considers the role of teachers or adult facilitators within these networks.

In this chapter, youth respondents and their networks presented in previous cases (Section 4.4) will be referred to throughout this section. Youths’ reflections have only been revised where clarity of expression was absolutely required for readability. I have used consistent usage of different adjectives to show the number of respondents whose responses align with themes that have emerged from interview and survey data. For example, if *several* youth responses aligned with a specific theme then that would signify *five to seven* youth.

Adjective	one	couple	some	several	most	all
Number of youth	1	2	3-4	5-7	8-10	11

Figure 5.1: Adjective usage as it relates to number of youth responses.

5.3 General reflections on learning in social media about environmental and social justice issues

Before considering specific aspects of learning, this section reviews some general reflections that youth shared when considering their learning in environmental social media interest groups. Several youth reported that their learning is characterized by receiving news and information from like-minded others, in this sense, social media can act as a *conduit for learning*.

Anup explained how the sharing features within Facebook allows the MECT group to be a *conduit for learning* about climate change or environmental activism: “We can’t know

about new innovations or new findings in the field of climate change or environmental activism unless some people in our group also post these new findings” (interview, October 25, 2013).

Laura described how social media can be *a conduit for learning* about shared interests,

I want to say it is, like, infectious, because someone will post a video or an article that they see and it'll pop up on someone else's newsfeed. And then again, they are like 'oh, I'm going to share this, this is crazy, and, like...it does spread, it's like a virus. I mean a post can spread so quickly and people start to try and look more into it, and some people engage with it more (interview, December 17, 2013).

Kayla described how social media is a conduit to what is happening in the world around her,

I would kind of put it as proactive learning because with environmental issues and even with social justice issues or any other worldly issues that we're having in this day and age that we really can't fully understand until we go out and make those self to world connections on our own, I feel definitely that social media is a way that gets us, that motivates us, that shows us what is out there (interview, December 1, 2013).

Youth also described very specific uses of social media for interest-driven environmental learning. Laura explained how posts made in the EcoClub network were *placeholders for ideas*, “We would share content on the Facebook page that we would refer to in our meetings” (December 17, 2013). Mary reflected on how social media is *a platform* where she can post her ideas and they are read, “Well I would say it's very educational in terms of the learning that takes place. It's just like, nowadays many people are into social networking so it's like you put something out there and it's just....it gets, how should I say, gets digested quickly, unlike the newspaper” (December 16, 2013).

These general reflections suggest that youth see social media as *a conduit* and *a placeholder for their learning*. Mary's reflections also highlight that social media is a space where ideas and perspectives can be shared and in this sense gives youth *a platform* to share their perspectives within a broader network.

5.4 **Substance - content knowledge**

This section focuses on *substance* in terms of content knowledge that youth attribute to learning to an environmental social media interest group: first, in terms of environmental and social justice challenges that are of interest to youth-participants; second, in terms of increased understanding of environmental topics and civic processes; and third, in terms of the types of content that influenced youth-participants' environmental topic knowledge.

Environmental and social justice challenges

Youth were asked what environmental challenges they are most concerned about in both the online questionnaire and the interview. For almost all of the youth their responses aligned with the focus of the environmental social media interest group that they participate in.

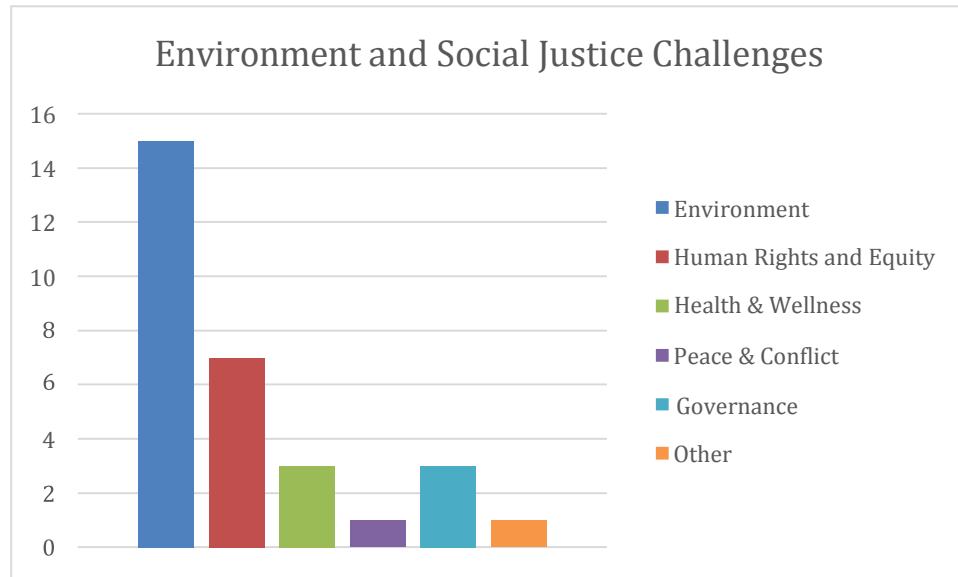


Figure 5.2: Environmental and Social Justice challenges that youth are most concerned about shows, youth responses were categorized and collated. Displayed according to ranking of challenge (first ranked x3, second ranked x2, last ranked x1) in questionnaire.

Responses were coded and categorized according to broad themes developed by Taking IT Global, a leading NGO involved in environmental social media engagement of youth in the following way: Environment, Human Rights & Equity, Health & Wellness, Economics & Innovation, Peace & Conflict, Regional Governance, and Media & Identity. Youth responses were predominantly categorized as Environmental topics, for example, “climate change”, “trash reduction”, “environmental and wildlife conservation.” However not all responses were categorized as Environment, the following are examples for each categorization.

- Human Rights and Equity: “injustice to Indigenous people”, “extreme poverty and hunger alleviation”, and “youth empowerment and inclusion in decision making”
- Health and Wellness: “psychosocial motivation” and “genetically modified foods”
- Peace and Conflict: “political problems in the middle east”
- Governance: “corruption of government”, “Canada’s position on Kyoto” and “governments contributing to climate change combat”

- Other: “animal rights and welfare”

In interview, youth were asked to explain why the challenges they listed were of concern in order to elaborate on their understanding of the topic. Youth-participants’ responses ranged in their abilities to discuss the relevance of the topic. Some of the youth who identify as leaders were able to discuss in great detail the relevance of the specific challenge in relation to projects that they had been involved in or had organized. Other youth had chosen topics that they had learned about in their high school classes or had learned about through the news or social media and their ability to speak to the importance of the issue to their local community ranged (between low and high ability).

Increased understanding of environmental topics and civic processes

When youth were asked to explain how their understanding of a specific environmental challenge changed based on their participation in a social media interest group, two themes emerged from youth responses: 1) a deepened understanding of the environmental topic, and 2) an increased understanding of civic processes.

Anup explained how his understanding of environmental conservation deepened through his participation in the MECT network,

First of all, yes it has changed. I used to only do environmental activities as a social work but when I get involved in MECT I came to know about many issues and that environmental conservation is much more than social work. It is often related to economic detriment or social reform. Also I concluded that environmental conservation is an important tool also to develop a green economy in our country especially when conservation-based micro-enterprises with economy will address this issue (interview, March 25, 2013).

Sagar explained how working with Sano sansar for many years has deepened his understanding of hunger and poverty alleviation,

I used to think that anyone without money was in poverty but right now what I think is that anyone with a skill but is still unemployed and is still in poverty, this is not poverty. When we say extreme poverty, we are talking about people who are unable to get out of poverty even if they are working. Someone who has been working but are unable to get out of poverty. That is extreme poverty (interview, August 25, 2013).

Mary reflected on how her understanding of how people in Port Moresby value and act towards the environment. She explained how her understanding of community members’ values and actions has deepened based on her participation in Make A Change! Be Environmentally Friendly,

Well I have come to realise that it will take a lot of effort, time & [sic] energy into changing the way people think & behave (especially the adults & grassroots). In fact,

there's very little one can do to change another individual even after all the awareness, campaigns & advice because here, the way people think & behave is inbuilt & it's more to do with the type of life we live (Facebook Messenger interview, September 9 - November 7, 2013).

Aman reflected on his work with Plant for Planet and how his participation in the network increased his understanding of civic processes: "i got to know how much trees are being plant, and cut every day, and what steps are being taken by people, govt and United Nations" (Facebook Messenger interview, August 14 - September 11, 2013). Michael also reported that his understanding of renewable energy changed with an increased understanding of civic processes:

I would say, yeah. In terms of writing and signing petitions and getting them off to parliament. For an understanding of the mechanical basis of how things work in parliament, and how things get push[ed] through and get rolling. It certainly got me to realize how hard it is for the government to implement new things (interview, December 2, 2013).

Types of content that influenced youths' environmental content knowledge

When students were asked to reflect on whether a specific kind of content influenced their knowledge and understanding of environmental topics, *videos, articles, and other students' research* emerged as influential.

Several youth immediately named a specific video that they had watched and that watching the video deepened their understanding of an environmental challenge:

Hussam reflected,

On youtube I watched an animation about water and then he [the narrator] started listing the ten countries most in need of water at that time and one of them was Jordan. He gave a lot of statistics which shocked me a lot because I didn't know that the water issue was that serious (interview, May 22, 2013).

Anup reflected on how friends on Facebook had sent him an article about carbon capture:

Many people have their own ideas and they share with me on Facebook. One friend sent an article about the significance of carbon capture. I came to know about this fact from social media. Previously I didn't know about it. I didn't know about this research so through social media I came to know about it (interview, March 25, 2013).

Laura explained how her friend Maggie posted her school research project on their EcoClub:

Yeah my friend Maggie did a research project on Canada's position on dropping out of Kyoto [Protocol] and she posted some links that she found so I got to read more about it. They weren't like huge explanations from the government explaining why they did this but they were news articles from CBC explaining what the consequences are and this is what they are going to be doing. So reading up on that was really important for our understanding (interview, November 5, 2013).

5.5 *Substance - Skills*

In this section, the construct of *substance* is considered by exploring the Framework for 21st Century Learning, in terms of knowledge and skill areas that youth attribute to learning from an environmental social media interest group, and then secondly through the general skills that youth report learning from participating in an environmental social media interest group.

Framework for 21st century learning

In the second interview, youth were sent a 2 page PDF document of the Framework for 21st century skills (see Appendix K) through a Skype videoconference file share. I explained to youth that the Framework for 21st century learning was created to outline additional skills and literacies that some educators think should be included in K-12 schooling to prepare students for life in the 21st century. I briefly explained how the framework has four main sections: Key Subject and 21st Century Themes, Learning and Innovation Skills, Information, Media, and Technology Skills, and Life and Career Skills (see Appendix K).

The Key Subject and 21st Century Themes are considered “essential to student success” (Partnership for 21st Century Learning, 2007, p.2) and is comprised of several key subjects: English, reading or language arts, mathematics, economics, science, geography, history, government and civics. The 21st Century Themes which are intended to be integrated into the core subjects are: Global Awareness; Financial, Economic, Business and Entrepreneurial Literacy; Civic Literacy; Health Literacy; and Environmental Literacy (Partnership for 21st Century Learning, 2015).

According to the Framework, Learning and Innovation Skills are “what separate students who are prepared for increasingly complex life and work environments in today’s world and those who are not” (Learning and Innovation Skills include Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration) (Partnership for 21st Century Learning, 2007, p.2). Additionally, the Framework explains that Information, Media and Technology Skills were developed to prepare “citizens and workers to be able to exhibit a range of functional and critical thinking skills” that are required within today’s world that is “marked by access to an abundance of information, rapid changes in technology tools and the ability to collaborate and make individual contributions on an unprecedented scale (Partnership for 21st Century Learning, 2007, p.2). The last section

focuses on Life and Career Skills, and these skills are demarcated as necessary skills required to “navigate the complex life and work environments in the globally competitive information age” and are comprised of the following: flexibility and adaptability; initiative and self-direction; social and cross-cultural skills; productivity and accountability; leadership and responsibility (Partnership for 21st Century Learning, 2007, p.2).

In interviews, youth were asked to go through the five sections of the Framework for 21st Century Learning and reflect on which themes, literacies, and skills they attribute to learning or practicing within an online environmental group. After participants had worked their way through their reflections for each of the four sections, I then asked them to go through the same process and reflect on which skills they attribute to learning or practicing in high school (for results see Table 5.1)

Table 0.1: Youth reflections on 21st Century Learning attributed to an environmental social media interest group and to high school classes

Aggregated youth responses	Online Group	High School Classes
	<i>21st century interdisciplinary themes</i>	<ul style="list-style-type: none"> • Global Awareness (7) • Financial, Economic and Entrepreneurial Literacy • Civic Literacy (1) • Health Literacy (2) • Environmental Literacy (5) <p style="text-align: right;">Total (15)</p>
	<p><i>Learning & Innovation Skills</i></p> <ul style="list-style-type: none"> • Creativity & Innovation (2) • Critical Thinking & Problem Solving (3) • Communication & Collaboration (6) <p style="text-align: right;">Total (11)</p>	<p><i>Learning & Innovation Skills</i></p> <ul style="list-style-type: none"> • Creativity & Innovation (2) • Critical Thinking & Problem Solving (7) • Communication & Collaboration (3) <p style="text-align: right;">Total (12)</p>
	<p><i>Information, Media & Technology Skills</i></p> <ul style="list-style-type: none"> • Information Literacy (5) • Media Literacy (5) • ICT (Information, Communications, and Technology) Literacy (4) <p style="text-align: right;">Total (14)</p>	<p><i>Information, Media & Technology Skills</i></p> <ul style="list-style-type: none"> • Information Literacy (3) • Media Literacy (2) • ICT (Information, Communications, and Technology) Literacy (2) <p style="text-align: right;">Total (7)</p>
	<p><i>Life & Career Skills</i></p> <ul style="list-style-type: none"> • Flexibility & Adaptability (3) • Initiative & Self-Direction (3) • Social & Cross-cultural Skills (4) • Productivity & Accountability (2) • Leadership & Responsibility (5) <p style="text-align: right;">Total (17)</p>	<p><i>Life & Career Skills</i></p> <ul style="list-style-type: none"> • Flexibility & Adaptability (1) • Initiative & Self-Direction (2) • Social & Cross-cultural Skills (3) • Productivity & Accountability (2) • Leadership & Responsibility (1) <p style="text-align: right;">Total (9)</p>
	<p><i>Other</i></p> <ul style="list-style-type: none"> • Support for each other (1) <p style="text-align: right;">Total (57)</p>	<p style="text-align: right;">Total (38)</p>

Table 5.1 the numbers in brackets refers to the number of youth that reported theme or skill.

From this research activity, a few notable differences stand out based on where youth attribute learning some of the themes and skills from the Framework for 21st Century Learning. Specifically, Global Awareness stands out as a thematic area that about half youth reported learning from an environmental social media interest group. Environmental Literacy was reported by some for online but only one for in school, which is expected given the area of focus for these groups. Civic literacy was reported by a few youth in terms of their learning in high school classes (3 youth from Canada and 1 from Australia), which may be a result of a Grade 10 Civics class which occurs in most provincial curricula in Canada. Overall, these youth attributed learning more of the 21st century interdisciplinary themes from their participation in an environmental social media interest group.

Within Learning and Innovation Skills, only a few youth reported Critical Thinking and Problem Solving as being practiced or learned within an environmental social media interest group, whereas double the number indicated it was learned in high school. Upon closer analysis, many of the ways that youth refer to Critical Thinking and Problem Solving is in relation to process, i.e. setting up a campaign at school. Overall, youth attributed learning more Learning and Innovation Skills in high school. Lastly, Communication and Collaboration was reported by several youth as attributed to learning in an environmental social media interest group. Overall, however, more youth attributed learning Learning and Innovation Skills in high school.

For Information and Literacy Skills, more youth attributed their learning to their involvement in an environmental social media interest group than to school. For this section, youth reported various ways which Information Literacy, Media Literacy, and ICT skills are important for their engagement in these groups. Rebecca considered the steps that she takes when posting,

Information and literacy are a bit tied together, because you need to look at credible sources. You need to look at multiple sources. I've learned that in the different initiatives, because I usually, before I quote something, or before I post it, I will look at multiple sources to make sure that it's saying the right things (interview, November 5, 2013).

Rebecca also explained how she has learned ICT skills from her peers, "I'm not totally good with technology. I am now, but I wasn't before, so I had a lot of peers help me with that. 'Oh, you can share this here' and all that jazzy stuff" (interview, November 5, 2013). Anup attributes his motivation to learn new ICT skills from his involvement in an environmental social media interest group, "Actually it was my involvement in MECT that influenced me to gain some knowledge of website development" (interview, October 15, 2013).

When considering Life and Career Skills, almost double the number of respondents attributed acquiring these skills from their involvement in an environmental social media interest group compared to their school classes. Anup explains how his involvement with the online network of MECT and tree planting activities that MECT runs in rural and indigenous areas of Nepal has helped him develop Life and Career Skills,

First one I'd like to mention is Life and Career Skills. It's about flexibility, adaptability and leadership responsibility, and social and cross-cultural skills. So, I've learnt these kinds of skills through MECT because in MECT, and involving the activities of MECT I came in contact with many kinds of people from different cultures, different point of thinking. So, dealing with them has actually helped me develop these kinds of skills (interview, October 15, 2013).

When youth considered where they had learned about the themes and skills within the Framework for 21st Century Learning, their responses were often a combination between their involvement in (an) environmental social media interest group(s), other extra-curricular or community groups, and some from high school. However, some youth were able to highlight clear demarcations around their learning. For example, Anup explained in his consideration on ICT and Life and Career Skills,

Regarding ICT, I have learned from my involvement in networks instead of classroom discussions, and even the life and career skills, I think it's from my experience and working in groups rather than school, because school is where we just learn about the curriculum and what's in that (interview, October 15, 2013).

It is important to note that respondents had some difficulty differentiating between their learning in an online network, especially if the network also has face-to-face meetings and activities, and other community groups, and learning in classes that may relate to environmental issues or civics. This also speaks to the integrated relationship between a group's face-to-face meetings and the environmental social media interest group space that aligns with the face-to-face meetings. These two spaces reinforce conversations, learning, and group dynamics that each space affords. To try to clearly differentiate and demarcate learning from one space and the other, when participants attend both, is problematic as to what this will teach us. In other words, caution is warranted in interpreting these findings and drawing conclusions from them.

Skills reported

In the survey and in the interviews, youth-participants were asked to describe what they think are the most important skills for their participation in online environmental social media groups. Youth responses were coded using youths' words as thematic categories. These themes generally align with information, communication and technology skills or leadership skills (Figure 5.3).

Information, Communication and Technology Skills	Leadership Skills
<ul style="list-style-type: none"> • Writing and Reading 	<ul style="list-style-type: none"> • Motivating members
<ul style="list-style-type: none"> • Writing letters to the government and signing petitions 	<ul style="list-style-type: none"> • Build self-confidence to start projects
<ul style="list-style-type: none"> • File sharing 	<ul style="list-style-type: none"> • Leading protest
<ul style="list-style-type: none"> • Instant messaging 	<ul style="list-style-type: none"> • Learning and sharing with community
<ul style="list-style-type: none"> • Posting articles, quotes, videos, and photos 	<ul style="list-style-type: none"> • Managing the group
<ul style="list-style-type: none"> • Research 	
<ul style="list-style-type: none"> • Making videos 	
<ul style="list-style-type: none"> • Updating status 	
<ul style="list-style-type: none"> • Making wall posts 	
<ul style="list-style-type: none"> • Commenting 	

Figure 0.3: Skills reported by youth organized into ICT and Leadership Skills.

5.6 Dynamics

This section considers *dynamics* of learning and addresses the question of how the learning that youth attribute to learning in an environmental social media interest group occurs by considering 1) content that appeared to be of interest or influential to other members in the group and 2) how responding to positive and negative comments influenced youth-participants' learning.

Content that interested or was influential to other members

When youth respondents were asked if they could recollect if particular content that they had posted to a social media interest group had been of interest to other group members, a variety of responses were given.

A few youth reported that a particle video they had posted resulted in either an increased motivation in activities in the group or an increase in membership in the group. Many youth also explained that the number of views, likes, and comments were indicators to them of how interesting the post was to the group.

Laura explained that the most influential posts she had made were a poll where students could indicate their preferences for bottled water, juice, milk, or chocolate milk (interview, November 5, 2013). She took the results to her principal to advocate that the high school should not sell bottled water.

Mary relayed a specific example that illustrates how dialogue can occur within social media through commenting. On May 8, 2014, Mary posted into her Make A Change! Be Environmentally Friendly group in Port Moresby, a quote from Art Buchwald. The post read: “And Man created the plastic bag and the tin and aluminium can and the cellophane wrapper and the paper plate” She explained that two adults and a young person responded to this post. “The comment which caught my attention was from the young person, my street mate in fact, a 20 year old who lived just across the road from where I lived” (written communication, May 31, 2014). He wrote below her post in a comment, “blamim white marn. Hahaha. Day da 1 hu started it. Not us blacks” which Mary translated as, “Blame the white-men. Hahaha. They are the ones who started it. Not us the blacks.” Mary then explained the subsequent exchanges,

I responded by telling him how despite many of the things invented by the Western people, we the black people were greatly influenced by their culture and we adopted many of their ways. Therefore, partly we were responsible because we used these many ‘inventions’ for our day-to-day needs and wants. The more we use them, the greater the demand causing more production of these many things. And I stated by making my point clear on the purpose of the quote and that was managing and taking care of the wastes we created. My street mate actually agreed to the western influence and I was pleased that I got the message across and he gladly took it in (written communication, May 31, 2014).

Mary’s example highlights how conversations within social media can result in individuals reflecting on their own perspectives and discussing their views. This aspect of communication within social media is discussed in greater detail in Chapter 7, Section on Participating in commenting is an important aspect of learning in social media.

Responding to positive and negative comments

Youth were asked if they had ever posted content and received positive or negative comments, and to explain how they responded. Interestingly, several youth reported that receiving a negative comment motivated them.

Most youth reported that they had received *positive comments* as praise for content they had posted. Kayla explained,

Yes. Like definitely like the best comment you can get is, you know, someone going woohoo. I’m all in for it. How can I help? You know, do you want me to do this, this, or this? You know, volunteering, you know, asking what they can do with their time to help, asking, you know, how to get involved and whatnot. That’s the best sort of reaction you can possibly get (interview, August 26, 2013).

Kayla also explained that having a critical comment can also be a positive comment from which learning can occur:

Another really good one is I have, like I said, a friend who's in politics who we argue all the time different sides between the politicians and the environmentalists and just going back and forth and that's very helpful and I think in a way that is a positive response because when we all get together and we talk about issues we can all start to develop the perspectives and I think that's really what people who are in any sort of activism need to be able to do is look at it from different views and be able to see concepts and different visions of how it can benefit both sides simultaneously (interview, August 26, 2013).

Several youth had received *negative comments* on posts that they had made. Interestingly all youth implied that these negative comments did not affect their motivation or willingness to post similar-related content.

Leago explained "Yes not everyone is as passionate about... not everyone is passionate about the environment as we are, so we are bound to come across some criticism every now and then" (interview, May 26, 2013). I asked him how he responds to negative comments and Leago replied "They usually give me the courage to keep on doing what I'm doing and educate as many people as I can, irrespective of the negative feedback that we got from a few people" (interview, May 26, 2013).

Rebecca shared that she had been hesitant to post after receiving negative comments but that a friend encouraged her. She explained: "There was one point where I was hesitant, but then one of my activist friends told me to stay sharing and caring. So, if it's something I care about, then it's my right to post it" (interview, May 30, 2013).

In a Facebook messenger interview between September 9 and November 7, 2013, Mary explained how she responds to negative comments, "Yes, I did come across a few people with negative comments about some of the posts that I posted. But I tried to come up with a good response in which it wouldn't provoke them to say more". I asked her if her response was an explanation of why she had made the post and Mary replied, "Yes, mostly it was just explanations on why I posted that particular post. Or why I said this or why I said that." So I followed up by asking Mary, "How did it make you feel?" Mary responded, "Well, I felt good when I actually did that. I mean, it was like I was standing up for what I believed in, so yes. I felt good about myself." I then asked Mary if the negative comments cause her to hesitate to post something on that topic again and she replied with a definitive, "No."

Kayla explained how sometimes *when no one responds it can feel like a negative comment*,

Yes. I mean, sometimes the negative feedback or responses come from no response and so it's, you know, like at least when you get a response, even if it's negative, you could either argue it about the environment or something, you know, just get more of your thoughts out there so that other people can read them as well and maybe you can turn the person around, but definitely I'd have to say the most negative impacts come from the ones that you don't get because then you don't

know if people aren't looking at it or if they don't just care or something like that (interview, August 26, 2013).

Rebecca implied the same sentiment that no response can feel like a negative comment,

Any response for me is a positive reaction. So, if somebody likes something, surely it's the best possible thing. And commenting, whether it is, yes, I agree with it, or no, I disagree with it, any response is positive. Ignoring it's not good, because that means I haven't done my job (interview, May 30, 2013).

With Kayla and Rebecca both explaining that *no response can feel like a negative comment*, suggests that for these youth both positive and dissenting responses are welcomed practice within these networks. Mary also indicated that receiving a *negative comment* motivated her to respond back in a way that explained her position. All of these responses suggest that *dialogue* around substantive topics is practiced. However the degree with which this dialogue is reflected upon and internalized within youth-participants' perspectives is unclear.

Kayla also explained how she is selective and filters through comments and decides who she will engage in dialogue with,

Sometimes it's something that you just have to ignore and depending on the person you can only argue so much before you realize you can't change someone's point of view so if it's something like that then I usually just leave it. I usually try to keep it in a positive light but I will argue it back so, yes, it's just different ways of dealing with people and trying to figure out how you can... the big challenge is trying to figure out how the other person thinks and their perspective so that you can try to turn it around and say, I know this is what it looks like to you but, you know, maybe just think of it in this way or, you know, just kind of sway it so that their perspective is seen more but you still get your underlying message through (interview, August 26, 2013).

While Rebecca reflected on when negative comments became too much for her and she felt that she had to delete a friend to stop the dialogue,

Depending on the severity of what somebody says, I will act. The way I feel about respect is I need to respect myself and respect the other person. I once posted something that I didn't believe was offensive. I posted a video about delicacies around the world, and the majority of the delicacies were things that were animal related. And as a joke, I posted 'I'm glad I'm a vegan as the caption.' And I got a lot of comments from somebody personally - not on the post, but a personal message - asking me to stop posting things like that, and that 'it's none of my business to post something pro-vegan or pro-lifestyle.' And I responded in the best way that I could. Facebook is a very subjective thing. And I said, first off, Canada is a freedom of speech country. Facebook is free speech. And if you don't have the ability to edit my posts, then there's probably a reason for that. And if you feel insulted by what I have posted, then you're welcome to delete me from your Facebook. But I've personally chosen to post this, and I do not find it offensive. So she tried to continue the argument with me, and I ended up deleting her because I... I've never gotten a comment telling me not to be active about something (interview, May 30, 2013).

Youth participation in commenting is explored in more depth, especially in terms of how this commenting relates to personal development and confidence building in Chapter 7, Section 7.5, “Participating in commenting is an important aspect of learning in social media”.

5.7 Teachers’ roles in youths’ environmental initiatives

When youth were asked in what ways teachers have supported their learning about the environmental sustainability topics that they are involved in, youth responded in two ways: 1) a teacher had supported and inspired them, or 2) that there had been no support.

In terms of teacher support, the youth that mentioned their teachers were involved in an extra-curricular school group that related to the environmental sustainability topic of their interest. For example, Hussam said about one of his teachers that runs the Green Club,

She is the one who had the idea about Green Club. She is always trying to get us to be active and doing thing for the environment. She is the one who invited her friend to start a company recycling and it was one of the first companies in Jordan for glass and paper recycling. She really motivates us to do things inside and outside school (interview, May 22, 2013).

Kayla also mentioned her teacher, who developed the TERRA project, which is an integrated semester long program. The students named their network after TERRA as a way to stay in touch after the program had ended. She explained, “When I would bring up an issue or event, instead of saying, ‘go look into it and do something about it’ my teacher would say, ‘you are right, we need to do something about that’ and he would work with me/us” (interview, August 26, 2013). Laura also mentioned how her school EcoClub had a lot of support from teachers,

I did have a lot of teachers and vice-principals around the school who really thought that the work we were doing around the school was important and that was really nice. When we would run events, they would come and they would say, “Wow this is fantastic.” They are not at all involved in the EcoClub or not necessarily the most environmentally-conscious people but they would come up and say “Wow this is really fantastic. You really did that.” But having that kind of support - especially if they are overly concerned in anyway or involved in the club (interview, November 5, 2013).

Other youth did not mention teacher support. Aman felt that part of the reason that he did not have teacher support was because of a low level of environmental awareness in his community,

i am from a small town where environmental awareness is really low. i never had a teacher to teach me what’s happening. we just have a optional subject as

Environment studies, which is seen as a wastage of time. so not much visible in the schedules and curriculum. but as i told you earlier, i love nature, so learned everything by myself. I am the only Environment Activist in my city (Facebook messenger interview, August 14 - September 11, 2013).

Anup also felt that part of the reason that he did not receive support from teachers was due to Nepalese people being unfamiliar with the kind of environmental economics he was promoting,

actually I didn't receive much help from teachers. I have to say that many people don't understand this concept in Nepal. Many people don't know the significance of a green economy so they don't have the concepts and I did not have much help from my teachers (interview, March 25, 2013).

When I asked Michael a slightly different question, "Has there been a teacher who has inspired you around these issues [climate change and renewable energy]?" Michael responded, "No not really" (interview, March 28, 2013).

Lastly, when I asked Sagar if he had any teachers that supported his learning in relation to his organization, he responded,

No. I would say no to this question. Because I have changed my schools almost every year. I was looking for an education that could really make a difference in my life. I changed schools because I was looking for a school that would be exciting or something that would make my education better. So I would say no (interview, August 13, 2013).

5.8 Chapter summary

Within this chapter, youth perspectives and reflections on their learning within environmental social media interest groups were presented. Specifically, the chapter addressed general reflections from youth on learning within social media (Section 5.3). Several youth reported that their learning is characterized by receiving news and information from like-minded others, and, in this sense, social media can act as a *conduit for learning*. From youth responses, social media can be a *conduit to what is happening in the world* around them; it can also be a *placeholder for ideas*, or a *platform* to share their perspectives within a broader network.

This section was followed by a consideration of the substance of the learning in terms of content knowledge. Youth were asked what environmental challenges they are most concerned about in both the online questionnaire and the interview. The majority of youth were concerned with environmental challenges and for almost all of the youth their responses aligned with the focus of the environmental social media interest group that they participate in.

Next, youth were asked to explain how their understanding of a specific environmental challenge changed based on their participation in a social media interest

group, from youth responses two themes emerged: 1) a deepened understanding of the environmental topic, and 2) an increased understanding of civic processes. This finding aligns with Robelia et al. (2011)'s study of youths' environmental learning within the Facebook app, Hot Dish (see Section 7.5 in Chapter 7 for discussion). Youth attributed video within social media as the type of content that influenced their environmental understandings and this is an emerging area for environmental education research to investigate.

This discussion on *substance* was followed by a consideration of the Framework for 21st century Learning (in terms of knowledge and skill areas) that youth attribute to learning in a high school compared to an environmental social media interest group. Overall, youth reported learning more 21st Century Learning themes and skills from their participation in an environmental social media interest group than from their classes at high school. This is not to claim that youth learned more content and skills from their participation in an environmental social media interest group, but rather that they self-perceived more learning of 21st Century Learning Themes and Skills from an environmental social media interest group. Of particular note, many youth reported Global Awareness - in fact, the highest number for any theme or skill - as an understanding they acquired from participating in an environmental social media interest group. As one might expect, youth also reported developing many ICT associated skills with their participation in an environmental social media interest group more than through their high school experiences.

Next the chapter considered the *dynamics* of learning and addressed the question of how the learning that youth attribute to learning in an environmental social media interest group occurs by exploring content that appeared to influence other members in the group and how responding to positive and negative comments influenced youth-participants' learning. One of the most significant findings from this research study is how youth perceive both positive and negative comments on content they have posted. Most youth reported they had received positive comments on environmentally-related content they had posted and that these positive comments were affirming and motivating to them. Several youth reported receiving a negative comment did not affect their motivation or willingness to post similar environmentally-related content. Some youth indicated they considered receiving a negative or critical comment as a positive comment because it showed "friends" were interested in discussing the issue. Several youth explained how engaging with others who have posted negative comments can be a rewarding and positive experience because the debate offers them an opportunity to consider issues from different perspectives. These debates can be very positive experiences of standing up for

what they believe in and demonstrating their knowledge on the specific environmental issue.

The last section of this chapter, focused on the the role of teachers in the youths' environmental initiatives. Youth responses reflected that for some youth a teacher had inspired and supported their initiatives and for other youth there had been no support from teachers. A detailed discussion of the findings related to environmental learning in online social media groups and relevant literature is in Chapter 7.

Chapter 6 Investigating activism in youth-created environmental social media interest groups

6.1 Activism

Individuals are increasingly engaging with politics, civic expression, and activism within social media networks (Smith, 2014). The observed and potential affordances of social networks as avenues for civic expression and activism are noted within the literature (Arora, 2015; Bennet, Wells & Freelon, 2009; Dahlgren, 2003; Jenkins et al., 2006; Rotman et al., 2011; Smith, 2014; Theocharis, 2015). Terms like “new politics”, “life politics”, “life-style politics”, or “sub-politics” (Dahlgren, 2003) have emerged to describe civic engagement outside of conventional civic forums. “Life-style politics” connotes a shift from politics of traditional ideology to politics guided by personal values. Life-style politics become not only an instrumental activity for achieving specific goals but can become a performative activity expressing individual identity construction (Dahlgren, 2003). This shift in social identity formation has increased individual responsibility for managing personal identity as individuals have become distanced from modern institutions that traditionally provided social membership and status (Giddens, 1991). When I began this research project, I was interested in investigating if youth used their online social profiles for environmental social media activism and to what extent. The overall answer, from observing the 11 youth cases, is yes, to various degrees these youth do.

6.2 Chapter overview

This chapter on activism is organized around two research questions: “How do youth define and engage in environmental social media activism?”, and “In what ways and to what extent do youth respondents view online environmental activism as contributing to social and environmental change?”. To attend to these questions some contextual framing is first offered that clarifies how activism is defined and conceptualized by youth (Section 6.3), how youth identify or do not identify as “activists” (Section 6.4), and reported environmentally-related content shared by youth in social media (Section 6.5). These sections are followed by examples of online environmental activism practices (Section 6.6), youth distinctions between online and offline environmental activism (Section 6.7) and lastly, youth reflections on environmental social media activism as contributing to environmental and social change processes (Section 6.8).

This chapter refers to the constructs of *substance*, *dynamics*, and *culture* proposed in the visual analytic (see Chapter 4, Section 4.3). In terms of *substance* the chapter

considers the amount of environmental or social justice content that youth reported that they post to Facebook and the amount that was observed. In terms of *dynamics*, several quotes imply that there is a spectrum of activism engagement within online and offline contexts. Lastly, section 6.4 on activism identity relates to the individual youth and how their identity may influence the culture of the group.

Similar to the previous chapter, I have consistently used different adjectives to show the number of respondents whose responses align with themes that have emerged from interview and online questionnaire data. These adjectives relate to the 11 youth that were interviewed and observed.

Adjective	one	couple	some	several	most	all
Number of youth	1	2	3-4	5-7	8-10	11

Figure 0.1: Adjective usage as it relates to number of youth responses

6.3 Environmental activism

In interviews, youth were asked to describe their conceptions of environmental activism. Several common themes emerged from their responses: *Education as activism*, *Action as activism* (including activism as community work, government lobbying, and sharing petitions through social media).

Leago explained how *education* is an activist intervention, “To me, I think that environmental activism is going out there and making sure that people know about the challenges that we face” (interview, May 26, 2013). Sagar also expressed how education is an act of activism,

Environmental activism is an action for protecting our mother planet. By educating people about different sustainability ideas, educating children and youth, letting them know what is going around, what should they do in terms of different activities that will reduce the emissions, which is currently being produced by different avenues all over the world (interview, August 13, 2013).

Rebecca also discussed how education is a part of activism; however, for Rebecca education is part of learning about the topic so that others see her as a credible activist, rather than education being an act of activism,

I think there are two major components to being activists one is to educate yourself to know what you're actually talking about because when you're credible people listen to you.....And part two of being an activist - speaking in mind, standing up for what you believe in, and sticking to it because once again if you're educated and if someone challenges you can argue right back (interview, May 30, 2013).

Other youth focused on *action* as examples of environmental activism. Hussam

explained how raising awareness through being active in the community is a form of activism, “I think environmental activism is to be active about environment and raise awareness about it within the community you are living in” (interview, May 22, 2013). Similarly, Kayla felt that action is a defining feature of activism, “I believe that environmental activism is about action. It is not just protests and people holding placards. I believe it is more than preaching words, it is action. It is about doing actions and activities and working with others to create change” (interview, August 26, 2013).

Beyond activism being described as *action*, there was a sense among some youth respondents that activism is action when it occurs in a *surrounding community*. Anup implied that activism is community work when he responded, “The original climate action really only happens when we go to the field” (interview, March 25, 2013). Laura discussed activism on different scales but felt that for her developing a personal connection with other community members is important for her understanding of activism,

I think that having online petitions is definitely good if you're trying to reach a huge group of people... But I think if you're trying to implement something in a community or create change on a regional level or even provincial and national usually depending on who you are as a person, if you think you can engage large amount of people, you could try and do that but you know I feel for me personally activism does begin on a face-to-face kind of basis and it's really important to engage with the people around you in your community. You have to really be there showing that you are passionate that's a huge thing... I think being there and having that personal connection is really important (interview, November 5, 2013).

Michael described activism as educating people about the issue and *government lobbying*, “I suppose going out into the public and making people aware of what is going on and I suppose petitions are a part of activism, like trying to encourage the government to use renewable energy sources” (interview, March 28, 2013).

Annisa in a Skype chat described activism as raising awareness through social media. She was the only respondent who defined activism as solely occurring on social media,

Ellen Field: Can you tell me about the environmental activism you are involved in?

SR. Nurannisa Jayanegara: actually i didn't join on any environment group. i do it individually

Ellen Field: That's great. What do you do?

SR. Nurannisa Jayanegara: i prefer to share everything bout environment

Ellen Field: Where do you share this information?

SR. Nurannisa Jayanegara: by my socmed (Skype text interview, August 7, 2013).

Some other youth respondents mentioned social media activism but they also referred to activism as occurring in their local offline community.

6.4 Activist identity

When youth were asked if they identify as environmental activists, three respondents were *uncertain* if they would identify as environmental activists because they were afraid of criticism or they felt that had to do more. Michael explained that he probably would not because of being afraid of criticism,

Probably not. I am kind of afraid of criticism from my friends because I don't have friends that are as strong as I am towards being an environmental activist so I am kind of afraid of going out there and saying what I think for risk of criticism from friends (interview, March 28, 2013)

Both Laura and Mary reflected that they felt they need to do more in order to describe themselves as environmental activists. Laura seemed to frame activism in terms of personal lifestyle rather than trying to influence others. She said,

That is such a big question. I think I could be in some people's point of view but I don't think I would necessarily call myself an environmental activist because I care about making changes that will better our environments and create a more sustainable community but I definitely feel like I'm at fault for some things as well. You know I sit here on my laptop get a shower and drive around every day but I think if I was a serious environmental activist I would be reconsidering my lifestyle a lot more. You know what I mean like if I really wanted to be that (interview, November 5, 2013).

Mary expressed a desire to become an environmental activist but explained that she needs to do more in order to earn the title,

Ellen Field: Do you identify as an environmental activist?

Mary Konobo Jr: I would like to think so but I believe I am not at the moment. I have to do more to become one (Facebook messenger interview, September 9 - November 7, 2013).

Seven respondents indicated that they do identify as environmental activists, either because they feel they are doing their best, or it is their duty. For example, Leago identifies as an environmental activist because "I am interested in the topic and I am trying to do my best to work on it, everyday. So I am always active" (interview, May 26, 2013). Aman relayed in Facebook messenger that he is an environmental activist out of a sense of duty, "what i am doing is just for saving our common future. it's my duty. yes, you can call me an activist. but i think i am just doing what all should" (Facebook messenger interview, August 14 - September 11, 2013).

6.5 Content related to environmental or social justice issues

In the questionnaire circulated in 2012, youth respondents were asked how much of the content they post to their personal profile page is related to environmental or social

justice issues. The responses given by the youth, who participated in the six month observation period, were collated (Figure 6.2).

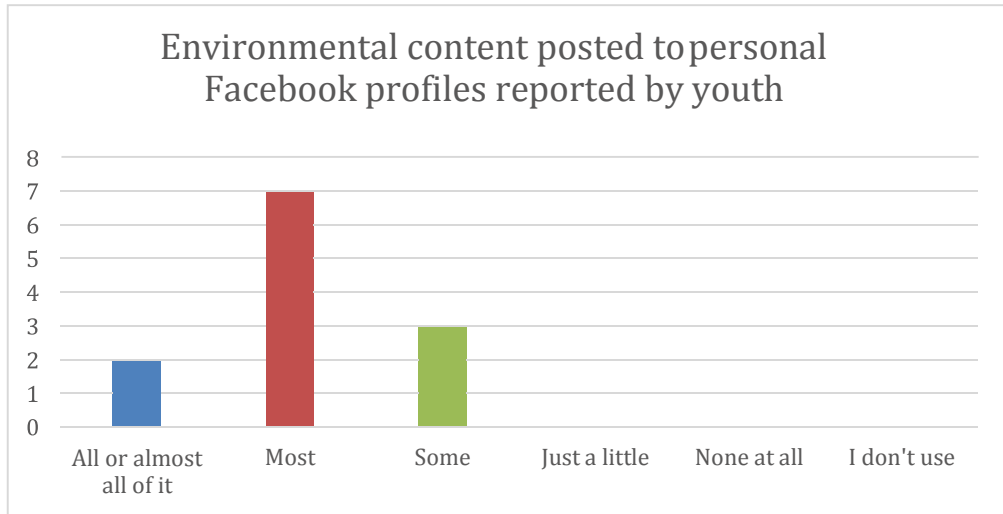


Figure 6.2: Amount of environmental content posted to personal Facebook profiles reported by youth.

After the six month observation period had passed, youths' personal profiles were analysed to consider the percentage of environmental content that they had posted to Facebook. Within Nvivo10, profile data captures were coded according to whether the post related to an environmental issue. The number of posts for each youth was collated. For each category, the following percentages were assigned: All or almost all of it = >86% of posts; Most = 84-70% of posts; Some = 69-30% of posts, Just a little 29%-1%, and None at all = 0. The figure below shows the comparison between environmental content posted to Facebook that youth reported and what was observed.

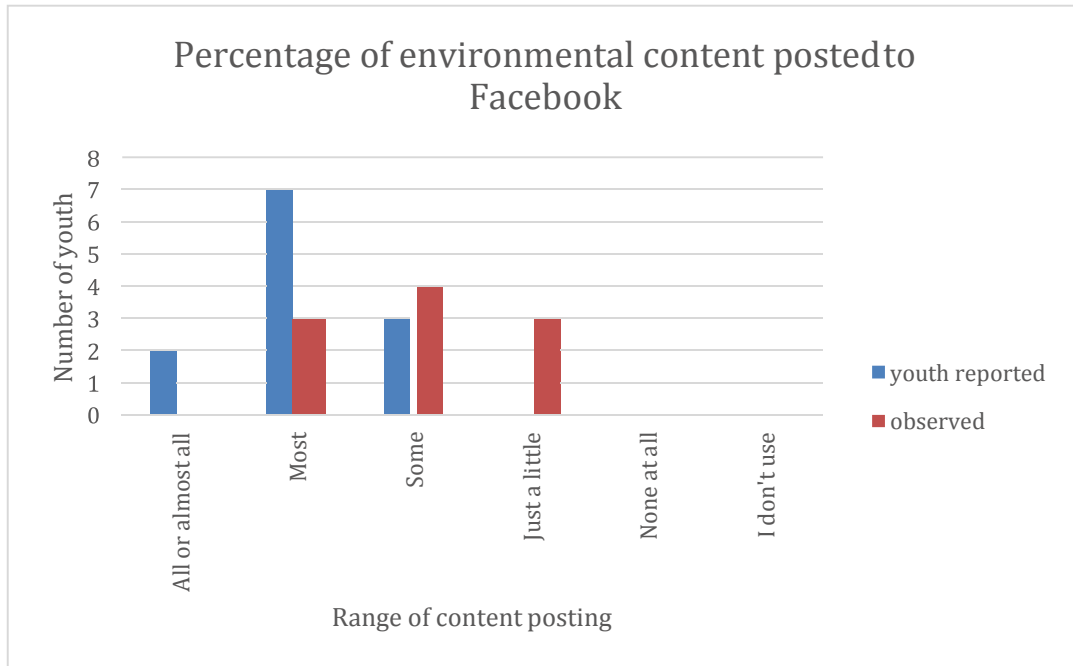


Figure 6.3: Amount of environmental content posted to personal Facebook profiles reported by youth compared to observed environmental content posted

Overall, the above analysis indicates that participants report posting more environmental content than was observed. However, there are several issues with this analysis as participants were not given the same rubric to reflect on the percentage of environmental content that they post. Also participants may have posted more environmental content in a specific interest group or as a group or page administrator rather than on their individual personal profile pages. Without full access to all of a participant’s Facebook activity, it is difficult to capture and quantify the full spectrum of their participation and engagement.

6.6 Environmental activism practices within Facebook

This section specifically addresses the research question “In what ways do youth use social media for online environmental activism?”. Social media datasets of youth personal profiles and group interaction were coded to explore the various environmental activism practices of youth within Facebook. The following practices were observed:

- *Sharing resources of information*
- *Share digital media and add his/her perspective*
- *Petition sharing*
- *Sharing content and inviting others to add their perspectives*
- *Creating digital media content*
- *Engaging in discussion through comment chains*
- *Promoting meetings and events*

- *Video remix with environmental content*
- *Sharing inspirational quotes*

Within the social media datasets, there were a total of 18 occurrences where 7 different youth *shared resources or information*. Because of the “share” button within Facebook and across websites in general, an individual can easily *share digital media content and add their own personal opinion* on the topic or issue. The post below is an illustrative example of object-centred sociality. Object-centred sociality is a term coined by Engestrom (2005) to explain that in many online social networks, it is not just the social relationships but the artefacts or objects which get shared that are also important for understanding the dynamics of engagement. In the post, Aman shared a photo that was posted by XLDISSENT, which is a non-governmental organization in the US that organized 398 youth to stop the development of the Keystone XL Pipeline. Under the photo, the caption says: “This is what youth power looks like. This is what the movement to end dirty energy and the Keystone XL pipeline looks like. This is what democracy looks like. Click LIKE to thank the youth who dared to think big, and make XL Dissent a huge success.” Aman added his own opinion to the “shared” post and wrote: “This is just completely wrong way of action against activists. it would have been much better if they sent those polluters and corporate to jail!”

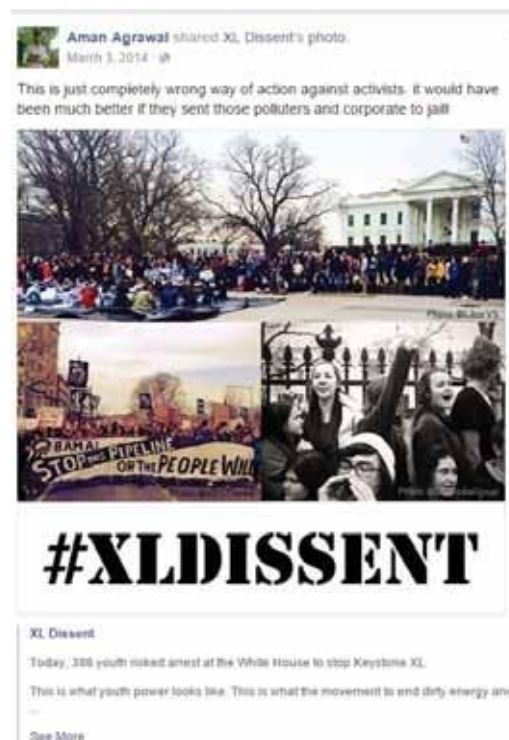


Figure 6.4: Example of youth sharing digital media and adding his own personal opinion

Youth respondents posted a few petitions during the observation period. Online petitions are often shared to an individual's personal profile. It was observed that s/he would add her/his opinion or perspective as to why s/he believe the cause is important and worth signing. For example, Michael posted in his status update,

Because I don't want to see our generation go down in history as the one that didn't act quickly to help save our precious environments and resources. Renewable energy is important and vital to the prolonging of a healthy environment for humanity in the future. It's a change that needs to happen, as soon as possible (Facebook post, May 2, 2013).

This text was followed by a hyperlink to a petition on change.org to the Australian government to introduce a bill that outlines Australia's transition to renewable energy.

In the next example, Mary invites members of the group to share their perspectives through responding to comments. Mary summarized a news article in *The National*, a Papua New Guinean newspaper about a plastic bag ban. She then added her own question: "Should POM city have the implementation & enforcement of this policy? How effective will this ban be if implemented?"

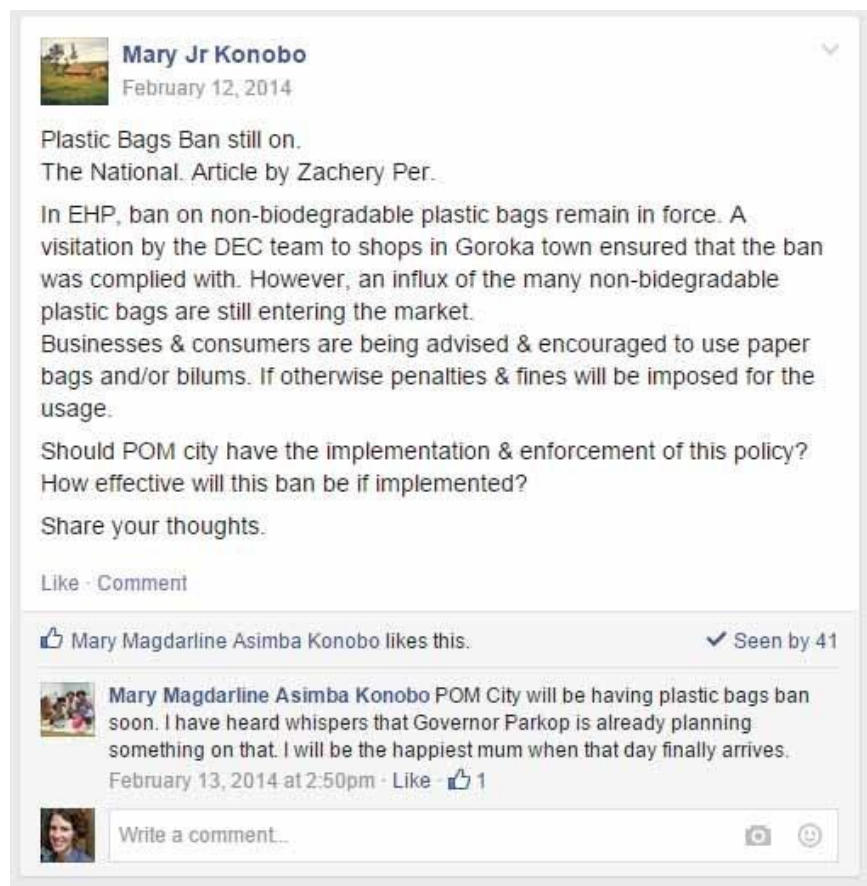


Figure 6.5: Sharing content and inviting others to add their perspectives

Aman created and posted unique digital media content. In the post below, Aman wrote his views on water usage during holi celebrations in India. Along with his prose, he

created a collage of images and wrote captions to illustrate his message. The images were collected through online searches and then collaged and the text was added by Aman.



Figure 6.6: Example of creating digital media content

In the comment chain, following Aman's post, he engaged *in discussion through multiple comments* about water usage during the holi festival. Aman engaged with one "friend" specifically who argued that the focus should be on using natural dyes rather than refraining from the holi festival. Aman refocused the discussion and then the friend suggested the issue is with water treatment facilities and Aman again refocused the discussion to the water usage issue.

MOMENTS FROM THE YEAR

- Graduated from Azad Public School
- Left Job at Azad Public School

PHOTOS - 2014

PLACES - 2014

Visited 2 Places

Aman Agrawal was at Indira Gandhi International Airport T3 and 1 other place.

Comments:

- ye b koi holi h!!!! (March 15, 2014 at 1:15pm)
- Okay, let's not celebrate holi, but will it ensure that those billions will have an access to clean drinking water? (March 16, 2014 at 2:13am)
- Aman Agrawal Nimit Nikky Singh yehi to asli holi ha (March 16, 2014 at 1:32pm)
- Aman Agrawal Shiv Raj Aryan it would ensure that we and our future generations don't face scarcity of water. secondly, it's not morally right to waste a resource which is a dream for many. (March 16, 2014 at 1:33pm)
- Aman Agrawal in ancient times, holi was played using natural colours, so water wasn't polluted, bu now, people use harmful colours and chemicals, WHICH MAKE THE WATER UNFIT FOR FOR DRINKING (March 16, 2014 at 1:35pm)
- Then we should probably use natural colours instead of retaining from celebrating a festival...! (March 16, 2014 at 1:52pm)
- Aman Agrawal still, the water table would be lowered (March 16, 2014 at 1:53pm)
- Aman Agrawal the water would be taken out of ground, then it would flow into sewage (March 16, 2014 at 1:54pm)
- Aman Agrawal it won't go back to ground like it would have in absence of concrete grounds (March 16, 2014 at 1:54pm)
- It would be replenished again! (March 16, 2014 at 1:56pm)
- Afterall, the water that'd be used during holi won't be going anywhere out of this world... (March 16, 2014 at 1:58pm)
- Then possibly our water treatment facilities are to be blamed...! (March 16, 2014 at 1:58pm)
- Aman Agrawal not all water is going to be treated, we know how good our water treatment facilities are. also, the harmful chemicals like lead and mercury are difficult to remove. it is just a waste of resources. (March 16, 2014 at 5:47pm)
- Aman Agrawal and the water would never be potable like before and we won't be able to drink it. (March 16, 2014 at 5:48pm)
- Aman Agrawal also, prevention is better than cure. (March 16, 2014 at 5:48pm)
- Aman Agrawal we could be able to purify water, but why should we waste it? (March 16, 2014 at 5:50pm)
- Aman Agrawal waste billions of liters of water today, and then look around and make some damn water? (March 16, 2014 at 5:50pm)

Figure 6.7: Example of youth engaging in discussion through comment chains

Several youth used their personal profile pages to *promote upcoming meetings and events*. Michael posted about Power Shift 2013 in Melbourne.

Michael Dillon
April 30, 2013 · 🌐

Anyone want to come along to the AYCC's Power Shift event in Melbourne in July? Discounts are still up for tickets I think.
<https://www.youtube.com/watch...>

Power Shift 2013
Australia's largest ever youth climate summit.
Melbourne, July 13-15th. Get your ticket today.

POWERSHIFT.ORG.AU

Share · Hoofel

Figure 6.8: Example of youth promoting event on Facebook profile page.

Anup created an event within Facebook and then shared the event to promote it to his friends in order to build awareness about the group. Anup explains,

In the online network we share about some really important issues, some new concepts or new issues. I posted contents in the MECT Facebook page. It is also helpful to inform other people about the event. And what I create event pages in Facebook I invite many people my Facebook friend for the event, people come to know about what the group is going to do and when the project will be done (interview, March 25, 2013).



Figure 6.9: Example of youth creating and promoting an event on Facebook

Anup also posted photos of meetings that were underway as another means to promote the club and build awareness.



Figure 6.10: Example of youth promoting meeting of environmental interest group.

There was one video example which featured Sagar and his friend. The video was created after Sagar had visited the Spaceship Earth in Epcot Centre in Disney World and through a video program, a photo of Sagar and his friend was imposed on characters who live in a future environmentally friendly landscape. The video explains some of the

features of a sustainably designed house. Sagar's peers were very interested in this video and left many comments following the video being posted.

Among youth's personal profile pages, there were 14 posts of inspirational quotes. These posts were either an inspirational quote meme, a direct quote from a famous person, or youth-created expressions of hope. It is arguable whether posting an inspirational quote is not necessarily an activist position or an activist act (Hudson, 2014). Regardless of whether posting an inspirational quote is seen as an activist act or not, it is practiced by these youth.

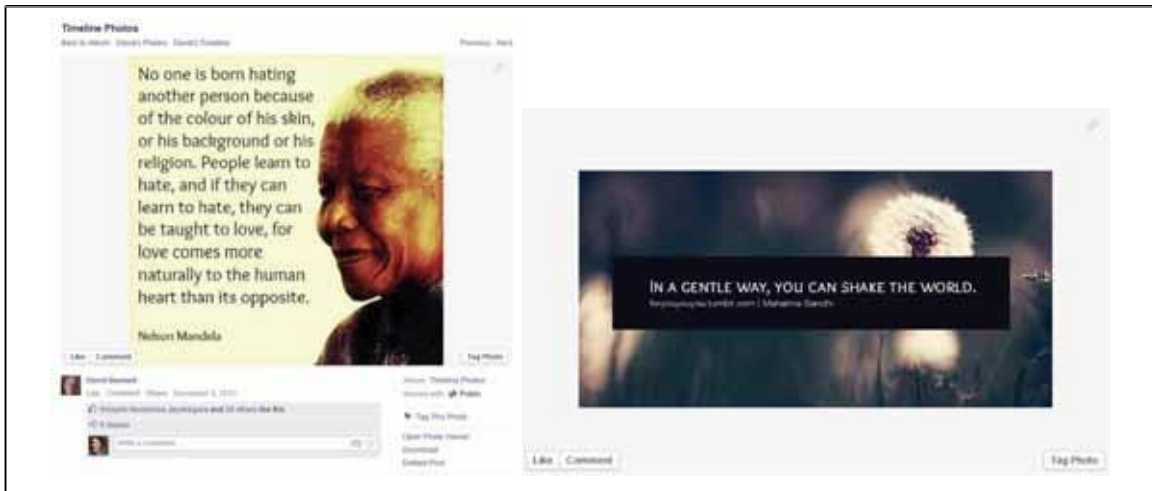


Figure 6.11: Examples of inspirational quote memes

Both Annisa and Sagar posted inspirational quote memes whereas Aman cited Mother Teresa in his status update.



Figure 6.12: Example of youth quoting a famous person for inspiration.

Aman also composed several of his own inspirational quotes and would post these statements in his status update citing himself:

What i have learnt in life: never start conversation by telling about your positions and things which make you proud. never tell you are in a leading position, or graduated from world's best college. if you do, the topic would change to your life and you won't be able to learn anything from the person. So first talk and then introduce yourself. try to impress by your thinking instead of positions. Harvard

graduates would never keep telling everyone about their college. but people would be able to distinguish them. Practical experience after so many conferences. - Aman Agrawal (Facebook post, March 26, 2014)

6.7 Distinguish between online and offline activism

Most youth in this study do distinguish between online and offline activism and they engage in activism in both contexts. The participants preferred either online or offline activism. For example, Hussam explained that he prefers engaging with other activists online out of convenience, “because sometimes you can’t go to some place to see someone. It may take a long time for you. But if it is online when you are sitting at home, you have your laptop, you have an internet connection and you can talk to them whenever you want” (interview, November 14, 2013). Whereas Laura feels that offline activism is more productive,

I think at Dartmouth high a lot of the activism is being done face-to-face. The Eco group is mostly there, I mean we did do a lot of Facebook posting to the larger community so that people know what's going on like last week there was green Halloween and people made costumes out of recyclable materials and that kind of thing and there is a lot of advertising about something like that for the general community but in terms of the actual activism getting down to doing it a lot of it is done face-to-face with the group (interview, November 5, 2013)

Anup also strongly expressed that activism requires being in the field and offline, “The original climate action really only happens when we go to the field” (interview, March 25, 2013). Sagar indicated that a progression in relationship is required for meeting face-to-face and engaging in offline activism,

most of the people I know today... we met online before we met, because that helped us to get in touch through the [Sano sansar] online platform. It is helping people to know people with similar ideas, because if I’m interested in debating or I’m interested in working for the environment sector, I can find some people who are linked with people like me, so we can have an online discussion about what they are doing. We can have some sharing and later on it’s like, ‘let’s meet.’ We come up with new ideas to go ahead, because they have some ideas... we have some ideas and we discuss those ideas and think how they can be effective when implemented in society; that’s how we work (interview, December 3, 2013)

6.8 Reflections on environmental and social media activism as contributing to social and environmental change

Youth were asked to reflect on whether environmental social media activism contributes to social and environmental change. All indicated that social media is a powerful medium for raising awareness about issues, increasing group membership, and promoting meetings and events. Almost all youth expressed that social media activism however is only one aspect of activism and while it is important it is often viewed as a primary step of movement building along a continuum of activist engagement.

Some youth reported that social media activism had increased the size of their group membership. However, when asked if they considered that increase in membership as change, all youth reported that social and environmental change was monitored by how their peers enacted changes. For example, Leago responded to my question about whether environmental social media contributes to social and environmental change, "I would say so in terms of the response that we're getting. Initially when Generation Earth was formed the response that we got wasn't really that great, but as time went by we've actually increased from five members to 2,928 members" (interview, November 11, 2013). Then when I asked Leago to explain in more detail how he thinks Generation Earth is making change, he clarified that Generation Earth raises awareness and then it is individuals who enact change in their communities,

In terms of us creating change, when people actually come and learn about the issues that we are faced with, more and more people are responding towards the environment and the changes within the community in which they live, so Generation Earth creates the change and then we encourage them to implement a change within their respective communities (interview, November 11, 2013).

Similarly, Anup explained how social media had helped him gain new members for his MECT group and, like Leago, when I asked him to explain in more detail how he thinks environmental social media activism contributes to environmental and social change, Anup explained,

I believe my contents in my social networking sites have contributed to actually making people aware about environmental issues, but it's not that everyone is really interested in those contents and goes through them totally. But I believe some people have actually been aware about some issues through my social networking activity. I use my artist skill to make people aware about the environmental issues, so when I post my paintings and my posters in Facebook, people get more clear, get more aware about the issues, so it's an effective medium to share my work as well as to make people aware (interview, October 25, 2013).

Rebecca explained how she sees social media contributing to a larger continuum of activist engagement,

I have recruited a lot of friends for the pages that I'm a part of. And I have gotten a lot of conversations started. And that is one of the big purposes of me posting, is to start a conversation. So my goal is to educate more people and to personally encourage actions. And I believe that, from the responses that I've gotten from my friends and from my peers on social media that I have recruited many people for pages that related to animal rights. As well as, I think at least ten of my friends in the past year have gone either vegetarian or vegan. And then, often, the conversation will start from there. And when I talk to them personally about my beliefs, often then I will see an action made on their part to change. (interview, November 5, 2013).

Mary also reflected on how her social media activism has contributed to changes she has noticed within herself, and among her friends and family,

Yes. I would say that because I've seen a lot of changes with myself and my family... I've noticed a lot of changes because, whenever I'm with my friends or my family, I don't know if they just pretend to be, how should I say it, more environmentally friendly, but I see that whenever we are together they try their best to be mindful of the surroundings and all that as well. Yes, I have seen changes (interview, December 6, 2013).

Mary also explained that her page Make A Change! Be Environmentally Friendly has provided an important forum for community members and family to discuss community-issues outside of traditional conventions. Mary said that without her Facebook page, she would not have discussed in a face-to-face conversation litter in the streets with her elders unless they had brought up the topic. Her page has provided her a platform to raise issues to her elders in a way which does not break traditional conventions. In Mary's own words: "The significance of this group is that a conversation involving two people or more that has very little chance of taking place in a face-to-face situation is able to take place in this group" (interview, December 6, 2013).

Kayla expressed how easy activism has become because of social media and argues that social media activism is a first step along a longer continuum of engagement,

I think it's good and it shouldn't be that environmentalists are like, okay, we don't have to go out anymore. We can just sit at home and click away. It should be that the general population who wasn't an activist before is doing that because I think that was their main focus, to get more people aware of issues and so that more people who weren't into activism could help but now because people are like oh, I click a button, I'm an activist. It's like they don't understand that there's more behind that, that that's just the first step into it. That's just how you get your head into the water, you know? (interview, August 26, 2013).

Laura also reflected on social media activism as easier than traditional activism and at first does not include Facebook sharing as activism and then qualifies her response,

I think compared to the past, like, our activism today is nowhere near the same level - because everything's so much easier, like, sharing, overall, we live, like, a pretty slack lifestyle compared to some people in the past. So, I think there definitely should be a spectrum - I don't know if sharing on Facebook is an activist activity, I don't think it is activism actually. I think it's a part of a movement, I think it's like spreading learning or information and getting more people involved, but I don't think sharing something on Facebook makes you an activist. You know, it definitely is ... it contributes, you have to create awareness, but I don't think you're an activist, necessarily (interview, November 5, 2013).

Overall, youth expressed that social media activism does contribute to social and environmental change. For several youth, social media's contribution to change is dependent on the longer continuum of engagement and resultant actions. The youths' responses, from a connective inquiry of practice perspective, suggest that it is important to

not get caught in distinctions between offline and online activism but to consider how activism practices are shaped by both.

6.9 Chapter summary

In this chapter, some contextual framing (Section 6.3 and Section 6.4) was provided before addressing two main research questions: “How do youth define and engage in environmental social media activism?”, and “In what ways and to what extent do youth respondents view online environmental activism as contributing to social and environmental change?”. As context, youth conceptualizations of environmental activism were presented as two emergent themes: *Education as activism*, *Action as activism* (including activism as community work, government lobbying, and petition sharing). Seven of the eleven respondents indicated that they identify as environmental activists because they feel they are doing their best or that their activism is out of a sense of duty. Three respondents were uncertain either from fear of criticism or that they had to do more to earn the title of being an activist. Several youth indicated that “most” of the content they post to Facebook is related to environmental issues; however, when analysed with youth’s personal profile data, this analysis showed that youth report posting more environmental content than was observed.

The research question, “In what ways do youth practice online environmental activism?” was attended through examples of various Facebook activism practices that were observed such as: Sharing resources of information; sharing digital media and adding his/her perspective; petition sharing; sharing content and inviting others to add their perspectives; creating digital media content; engaging in discussion through comment chains; promoting meetings and events; video remix with environmental content; and sharing inspirational quotes.

Next, the chapter considered whether youth differentiate between online and offline activism and youth in this study engage in activism in both contexts. The only youth in the study who only engaged in online activism did so because there were no face-to-face groups in her local area she was aware of with which she could engage. The rest of the participants indicated that they engaged in activism in both contexts. Another youth indicated how online activism was more convenient because he didn’t have to travel to meet people, whereas most other youth were very clear that engaging in activities with community members through offline activities was “more productive” or “meaningful”. One youth explained that activism falls along a spectrum of engagement since he meets many young people online and they will first discuss and organize online, meanwhile, if there is interest, they will meet up to discuss ideas and activities further. From the

interviews, most of the youth were aware of the limitations of solely engaging in online contexts and also seemed to privilege and focus on face-to-face events in their communities.

The last section of the chapter considered how youth view online environmental activism as contributing to social and environmental change. Almost all youth expressed that social media activism however is only one aspect of activism and while it is important it is often viewed as a primary step of movement building along a continuum of activist engagement. Some youth reported that social media activism had increased the size of their group membership. However, when asked if they considered that increase in membership as change, all youth reported that social and environmental change was monitored by how their peers enacted changes (see Chapter 7 for discussion of these findings).

Chapter 7 Discussion

7.1 Chapter overview

This chapter begins with a brief overview of this project as an aid to the reader (Section 7.2). This summary is followed by a discussion of why social media networks are important sites for youth (Section 7.3) and a consideration of results from mapping network structures of environmental social media interest groups (Section 7.4). The majority of the chapter is devoted to a synthesis of findings with contemporary theory and literature in relation to 1) learning that youth attribute to environmental social media interest groups (Section 7.5) and 2) environmental social media activism as understood and practiced by youth (Section 7.6).

7.2 Overview of study

The project has been situated as a mapping project because: of 1) the exploratory approach which has guided the research project and 2) the under-researched and documented area of environmental learning and activism within social media sites. This project has attempted to develop a comprehensive and holistic understanding of youth interest-driven environmental learning and action within social media sites through mapping environmental social media interest groups with social network analysis. The project has also attempted to better understand how youth in various geographic contexts use social media platforms and perceive their engagement as related to environmental learning and activism through collecting data from interviews, social media data capture, and questionnaire responses.

Through conducting online participant observation and semi-structured interviews, this research has contributed to a multiple-site case study that helps to elucidate the *substance*, *structure*, and *dynamics* of youth engagement in self-motivated and interest-driven environmental social media interest groups. This case study comprises narratives from different youths' perspectives, maps characteristics of these informal networked ecologies, and explores practices and mechanisms of learning and activism.

This research project has not been designed to test theories from previous case studies on interest-driven learning and participatory culture (boyd, 2008; Ito et al., 2009; Jenkins et al., 2006), but to extend and explore how online participatory culture and practices are shaping youth online interest-driven learning and activism from a connective approach, which recognizes online spaces as related to other social spaces.

Within this research project, the cases and following sections on learning and activism offer evidence that within informal environmental social media interest groups

important learning, identity development, and antecedents of democratic civic processes can occur. Within the cases, there are several examples of substantive knowledge about environmental sustainability issues deepening as a result of youth participating in environmental social media interest groups. Within the learning and activism chapters, it is also evident that youth engage in debate about environmental issues and learn about civic processes on social media. There are also examples of the importance of the relationships which are developed, fostered, or continued through online engagement in these spaces.

This research has culminated in results which provide insights and considerations into how interest-driven learning can be fostered and supported through adopting a connected learning approach within formal education systems, along with important considerations for education for sustainability and hopeful educational futures.

7.3 Why social media networks are significant for youth

As previously discussed, visiting a social network is the number one activity that youth do online (Lenhart, 2015) and the ease of access to social media through mobile devices has increased to the point where, according to Lenhart, there has been a “frenzy of access” (p.2). Youths’ almost “always-on” relationship with social media warrants meaningful research and discussions about harnessing positive impacts and mitigating detrimental effects of social media (Reid & Boyer, 2013).

Social media sites have been referred to as networked publics because of how they serve many of the same functions as other types of publics - they allow people to gather for social, cultural, and civic purposes and they help people connect with a world beyond their close friends and family. According to boyd (2011), networked publics are “simultaneously the space constructed through networked technologies and the imagined collective that emerges as a result of the intersection of people, technology, and practice” (p.2).

Networked publics have shifted distribution of content to circulation which signals a movement toward a more participatory model of culture, one which sees the public not as simply consumers of preconstructed messages, but as people shaping, sharing, reframing, and remixing media content in ways which might not have been previously imagined (Jenkins, Ford, & Green, 2013). Engagement around content is a central organizing characteristic embedded within the design architecture of any social networking platform, complex algorithms specify what content is shared, for how long, and to whom. This design feature is referred to as “object-centred sociality” (Engestrom,

2005) and it affords opportunities for users, to add their opinions to published content and then broadcast them to their respective networks.

The ease with which identity is constructed and shared within social networking sites is one of the reasons why social networking sites allow for individuals to find like-minded others or to express their values and feelings in ways which face-to-face communication or public spaces do not afford (Reid & Boyer, 2013). In social networking sites, there are no corporeal bodies, so users rely on the identity information that an individual has selectively chosen as representative. The selection, curation, and presentation of personal identity information requires users explicitly “write themselves into being” (boyd, 2008, p. 121) through creating a profile, adding photos, biographical information, and status updates. You can imagine what the physical comparison of representing all the information that a user shares on a social networking site and having to physically represent it on your corporeal body. The analogy would be like carrying a placard (or several) with you throughout the day as you traverse and move through public spaces.

Facer (2011) argues that as young people’s access to public space has declined, their participation in virtual worlds and online social spaces has massively expanded and these online sites are increasingly important for the development of social and civic identities (Smith, 2013). I would argue that while access to public spaces for youth may be on decline, there are also few private or public spaces where youth can actively connect with others who share in their interests with the ease that online networking affords. For instance, the mall has long been a site for youth to socialize in their free time (Kato, 2009); however, it is unlikely that youth would seek out like-minded others who share their environmental concerns while they are hanging out at the mall - one cannot imagine youth in the food court at the mall carrying placards stating their environmental concerns in hopes of meeting others. It is much more likely that these relationships are formed in extracurricular groups and special interest clubs; however, as several participants in this research study indicated, their school had no environmental club in which they could participate and so they joined a social media interest group.

From online questionnaire results, coded youth responses indicate that youth join environmental social media interest groups in order to:

- 1) “make a change in their communities or countries,”
- 2) “to be informed and involved,” and
- 3) “to discuss environmental issues and work out solutions.”

These responses highlight how youth perceive their joining an environmental social media interest group as a means to learn about environmental sustainability issues,

be engaged in action in their local communities, and as a space where they can engage in debate about issues and possible solutions. These responses show that for some youth, their social media accounts are not solely being used for aimless distraction, but as extensions and, in some cases, embodiments of the interests, values, hopes, and actions of youth and their relationships to their local environments and communities.

7.4 Mapping characteristics of youth-developed environmental social media interest groups

While the physical world has been mapped in great detail, the typology of networked publics, which are increasingly where knowledge is shared and created, public discussions take place and disputes fall out, are mostly unknown. With emerging tools for mapping social networks, this project has integrated network analysis to help interpret environmental social media interest groups. Focusing on structural characteristics of the networks (*geographic reach and size of network, leadership positions, adult facilitators, communication tools and meetings, and a network communication visualization*), the importance of these networked spaces for youth environmental learning, activism, and engagement is made evident.

Within the environmental social media interest groups studied, the cross-case analysis showed a varying range of geographic reach and size (informal groups had between 35 members to 205 likes; youth-created NGOs had between 92 members and 5,976 likes). The smaller groups had a local geographic reach where the larger groups had national to international reach. From this research, there is no indication that a specific size in a network will result in increased engagement; however, within a larger network this research showed that larger networks have regularly scheduled meetings, and posting of content is not solely done by one youth leader.

Among the informal groups (MECT, Make A Change! Be Environmentally Friendly! Anti-Fur Action Group Guelph, and Saviors of the Environment) that are in early stages of development and that do not have NGO status or are affiliated to a school program, the majority of content posting was created by the leader (Anup, Mary, Rebecca, and Aman). In all of these groups the leader was also the founder of the group and so the engagement of others and the responsibility of keeping the group on track was the responsibility of these young leaders. For example, Anup contributed 100% of the posts to the MECT Facebook page and Mary contributed 36% of the posts to her Make A Change! Be Environmentally Friendly! Facebook page. These informal groups are examples of how motivated youth can use social media groups to engage with like-minded peers and have a platform to post their ideas and goals.

With the larger groups, that are youth-created NGOs, the communication was often organized through a page administrator. The number of contributors on each Facebook page increases with these larger networks. For example, the Generation Earth page had 386 different contributors post a total of 2061 posts and on the Sano sansar Facebook group 86 different contributors posted a total of 244 posts. With a larger population engaged in an interest group, then the onus of posting content does not rest as heavily on the founder or leader of the group. Also of note is the number of contributors who engaged in commenting on posts in these larger networks, with Generation Earth having 368 contributing commenters. Both AYCC-Cairns and Plant for the Planet had more comments than posts which also shows how commenting in a comment chain is a common means of engagement, and that commenting engages a broader group.

Through mapping these structural characteristics, this research project has attempted to describe various structures of youth-created environmental social media interest groups. While there is considerable variation in the groups and their structures, the network communication visualizations create a strong visual, like aerial photographs of a crowd, showing the rough size, composition of the population, engagement, and relationships within the networked public (see Chapter 4 for network visualizations). All of the network visualizations make strong cases for the significance of these groups as “quasi-public” spaces for youth to connect with like-minded others at a time when young people’s access to physical space has declined. The network visualizations also make a strong case for affording youth spaces where they can take leadership roles, express their ideas and values, and connect with like-minded others to address environmental and social issues in their communities.

7.5 Learning youth attribute to environmental social media interest groups

This research study has attempted to map learning in environmental social media interest groups with a focus on the following research questions: “What types of learning do youth attribute to their participation in youth-created environmental social media interest groups?”; “How does this learning occur?”; and “What and who shapes this learning?” Drawing upon the visual analytic (Figure 4.10), within this section *substance* and *dynamics* are referred to in terms of how substantive topic knowledge is shaped by dynamic processes of learning and engagement within social media and group contexts.

Within educational research, policy, and practice, learning has been framed as an ongoing, lifelong process, rather than a discrete activity (Wenger, 1998). More specifically,

the 21st century has also seen a shift in focus on learning environments in the following ways: 1) a shift from education (bound by institution) to learning (which can happen anywhere); 2) a shift from consumption of information to participation and production of content; and 3) a shift from educational institutions to educational networks (MacArthur Foundation, 2011).

Social network sites have many features which can facilitate positive educational environments; however, some research has shown that only a small number of youth use the online world to explore their interests or find information that goes beyond what they can access in their schools or communities (Ito et al., 2009) and the types of activities that young people engage in online are often not ground breaking, but mundane (Luckin et al., 2009; Buckingham, 2008). Learning which occurs within social networking sites has been referred to as endogenous learning (Rosenfeld Halverson, 2011) because the learning goals are intrinsic and specific to the individual's interests, as opposed to more conventional exogenous learning, associated with formal education environments where the learning goals are extrinsically set by Departments of Education, universities, etc. The endogenous appeal within social networking sites to learn about intrinsic interests allows for learning to occur individually or individuals to form groups around specific topics of interest. The dichotomy between endogenous and exogenous learning goals is an over-generalization as some formal education learning environments encourage students to draw upon their endogenous interests to create learning opportunities where endogenous and exogenous learning interests are congruent.

For this research project, the environmental challenges that youth reported they are concerned about aligned (for almost all of youth participants) with the focus of the environmental social media interest group in which they participated or created. With this environmental concern as motivation for their learning, findings from the case studies and interview data show that youth participating in an environmental social media interest group, developed: 1) increased environmental understandings (on specific environmental topics) and 2) increased understandings of civic processes.

Within the intersection of environmental sustainability and social media learning, there are limited studies exploring types and processes of learning and engagement within these networked spaces. In an article mapping future trends for environmental education research, environmental academics were surveyed and they reported that "the rise of social media" is a medium to high impact trend within the field; however, few of the researcher-respondents referred to media, communication, or information technologies as areas within which they would like or plan to conduct research (Ardoin et al., 2013). One of the few studies that has been conducted, focused on how youth participating in a

Facebook application changed participants' environmental knowledge and environmental behaviours (Robelia et al., 2011).

Environmental understandings

The research study conducted by Robelia et al. (2011) showed that after eight weeks of participating in Hot Dish, a Facebook app created specifically for the study, youth were more informed about climate change science than the general public at state and national levels in the United States. Their study showed how youth participation in an environmental social media interest group resulted in deepened environmental knowledge. Both Robelia et al. (2011) and this dissertation are evidence that youth engaged in interest-driven learning in social media interest groups results in youth developing increased environmental understandings; however, it is very important to avoid falling into a techno-pedagogical determinism and assume that participation in an environmental social media interest group will necessarily result in newly acquired or deepened environmental knowledge. The learning process is far more complex and dependent on the interplay between individual participants, content shared, the other group members, and the affordances of the platform. These aspects relate to the various constructs (*affordances, culture, dynamics, structure, and substance*) in Chapter 4 to help map learning and activism within environmental social media interest groups.

Types of content that influenced youths' environmental understandings

Unlike Robelia et al's (2011) study, I was also interested in the types of content that youth felt influenced their understanding of environmental challenges. As reported in Chapter 5, several youth quickly named a specific video they had watched or been shared on social media and how the video taught them new information about an environmental challenge with which they were concerned. Data on youth video usage shows that youth in developed countries watch approximately 3.5 hours a day of videos and two-thirds of this time is focused on TV (Thinkbox, 2015); however, the remaining one-third of their video watching is from many different video sources (Netflix, YouTube, video posts in social media, etc.) predominantly accessed through smart phones or laptops. This distinction between TV and video, however, streamed through a smart phone is not clear as new online digital media are increasingly integrated with older broadcast TV (Chadwick, 2011). Research has shown that for many teenage youth, they may have to share the main TV set at home, and so a primary driver for youth viewing video on secondary devices like smartphones is so they can have control and space to select content that appeals to them (Thinkbox, 2015). Given that youth indicated that videos, shared through social media,

influenced their understanding of environmental challenges, this is an emerging area for environmental education research to investigate the learning realized from youth video viewing practices and knowledge acquisition from video. Beyond video consumption, youth video production of environmental digital media (McKenzie et al., 2010) - especially when taking into consideration the numerous youth environmental video competitions that many environmental NGO's coordinate - is another emerging area for environmental education research.

Participating in commenting is an important aspect of learning in social media

One of the most significant findings from this research study is how youth perceive both positive and negative comments on content they have posted. Most youth reported they had received positive comments on environmentally-related content they had posted and that these positive comments were affirming and motivating to them. Several youth reported receiving a negative comment did not affect their motivation or willingness to post similar environmentally-related content. Some youth indicated they considered receiving a negative or critical comment as a positive comment because it showed “friends” were interested in discussing the issue. Several youth explained how engaging with others who have posted negative comments can be a rewarding and positive experience because the debate offers them an opportunity to consider issues from different perspectives. These debates can be very positive experiences of standing up for what they believe in and demonstrating their knowledge on the specific environmental issue. For example, in Chapter 6, as an example of online environmental activism practices, Aman engaged in a debate about the use of water during the holi festival in India. Throughout the comment chain, his “friend” argued that the focus should be on using natural dyes, rather than refraining from the festivities. Aman considered his “friend’s” point, but raised concerns about lowering the water table. In another example, Mary explained that after she had engaged in a debate with a neighbor in Port Moresby on Facebook, “I felt good....it was like I was standing up for what I believed in” (Facebook messenger interview, September 9 - November 7, 2013). The importance of reading and writing comments for youth to process information they have gained from content posted within the social media interest group is also supported from findings reported by Robelia et al (2011).

Among youth participants, there was an underlying acceptance they would encounter dissenting views when they posted environmental-content on social media. Among at least some of the students in this study there was also an interest in engaging with dissenting views, and these instances raise the question whether SNS are ideal spaces

for individuals to engage in dialogue and debate over environmental sustainability issues. These issues inherently involve diverging world views, values, and understandings of future steps, which need to be unpacked to engage in meaningful dialogue (Stevenson & Field, 2015). For many reasons, this sort of learning is incredibly difficult to map and measure as an individual's positional change on an issue may not be publicly communicated until a critical mass is reached around the issue (Adam, 2011). As discussed in Chapter 5, within the social media interest groups, there were varying levels of transformative learning (Sterling, 2010).

Within the youth responses about engaging in social media debates, some youth demonstrated first order learning, "where there is change within particular boundaries and without examining or changing the assumptions or values that inform what you are doing or thinking" (Sterling, 2010, p. 22). For example, Leago reflected on negative comments he had received and he did not consider opposing comments or think about how these comments may shift his position, assumptions, or values on the issue: "not everyone is passionate about the environment as we are, so we are bound to come across some criticism every now and then" (interview, May 26, 2013).

Sterling (2010) also refers to second-order learning, which is more critically reflexive, where the learner may change his/her beliefs, values, and assumptions. This level of learning was present in the sense that some youth were aware of how their own perspectives may differ from others' perspectives and that through the discussion they may see the issue in a new way. For example, Kayla reflected on her engagement with a politically-motivated friend, "I think that's really what people who are in any sort of activism need to be able to do is look at it from different views and be able to see concepts and different visions of how it can benefit both sides" (interview, August 26, 2013). Additionally, Rebecca explained her purpose for engaging with social media as "to recruit a lot of friends for pages...and to start a conversation" (interview, November 5, 2013).

The third-order learning proposed by Sterling relates to epistemic learning, which involves a shift in epistemology or way of knowing and thinking that constructs how people perceive and interact with the world. This form of thinking requires a level of reflexivity allowing us to "see our worldview rather than *seeing with our worldview*" (2010, p. 23). Within the cases, I did not find evidence of this transformative level of reflection and learning⁵, which raises several questions:

⁵ However, mapping and measuring this level of transformative reflection and learning is incredibly complex which raises further questions of how to capture evidence of an onto-epistemological shift within social media.

Whether engagement and learning within social media might afford rich digital democratic debate?; in what ways social media culture, dynamics, and affordances could foster transformative learning - allowing for individuals to reflect critically on their own worldviews?; and what might be the enabling conditions for third order learning to occur in such spaces?

Birds of a feather flock together

Contrary to many claims on the democratizing and diversifying potentials of Web 2.0 (see Papacharissi, 2002), research conducted at the Pew Research Centre suggests that individuals in social networks (Facebook and Twitter) are more willing to share their views if they think their audience will agree with them and conversely, when individuals do not feel their Facebook friends or Twitter followers agree with their opinion, then they are more likely to self-censor their views in personal and online settings (Hampton et al., 2014). Similarly, research on whether Twitter users are exposed to content that differs ideologically from their own showed that users are unlikely to be exposed to cross-ideology content (Himmelboim, McCreery, & Smith, 2013). Other research conducted by the Pew Research Centre and the Social Media Research Foundation has shown that not only do Twitter users prefer to affiliate with like-minded individuals, Twitter users in general choose to reinforce their existing political opinions through their actions online (Smith, Rainie, Himmelboim, & Shneiderman, 2014). These studies present a case for what has been called a balkanization of content within social media which is based on social media users preferring to have affinity with like-minded others.

This tendency within social media for “birds of a feather to flock together” suggests that environmental learning within social media interest groups is best suited for developing and deepening environmental understandings for those who already have an affective disposition (Schultz, 2000; Schultz & Zelenzy, 2013) towards environmental sustainability issues and who have a general shared interest in a specific environmental topic. While youth participants engaged in debate with others who held dissenting views, no research data was collected on whether the other person in the debate changed their position. In addition, the youth participants did not seem to critically reconsider their own worldview or assumptions around the environmental issue, but more often considered another’s position to better argue their own position. As Kayla explained:

the big challenge is trying to figure out how the other person thinks and their perspective so that you can try to turn it around and say, I know this is what it looks like to you but, you know, maybe just think of it in this way or, you know, just kind of sway it so that their perspective is seen more but you still get your underlying message through (interview, August 26, 2013).

Youth participants were not only engaging in posting environmental content on their personal profiles as individuals, but the youth in this study (excepting one) were also participating in an environmental social media interest group which was composed of other youth with a shared interest about a specific environmental issue, who most likely held similar and shared perspectives. For several youth, participating in the environmental social media interest group provided a space to engage, be motivated by, and share ideas with like-minded others. For example, Michael felt he could not relate to his peers at high school for they did not share an environmental ethics, so for Michael his primary motivation for joining the AYCC was to find like-minded others. Kayla's TERRA group was created for her classmates who had participated in a semester long program so they could stay connected and for organizing and attending environmental events in their community after they had finished the program. For these students, the shared Facebook group was an online placeholder for the face-to-face interactions and group processes that the students shared when they were in the TERRA program together. In Robelia et al's (2011) study on Hot Dish, youth participants indicated that they were significantly more likely to use the Hot Dish app to 'interact with like-minded people.' For youth, it seems that being affiliated with an environmental group of "like-minded others" helps them feel confident in exploring their environmental identities and activist identities within social media. As Rebecca indicated, when she had received several negative comments after posting, a fellow social media animal rights activist, told her "to stay sharing and caring" which she then adopted to remind herself that "if it's something I care about, then it's my right to post it" (interview, May 30, 2013).

The challenge for fostering transformative learning within social media requires overcoming this balkanization of representation of issues and culture to create a deliberative space to discuss environmental sustainability issues through a focused forum. Within social media platforms, I can foresee this kind of engagement occurring within a Facebook interest group or around a Twitter hashtag. The group would need to have a commitment to diversity among participants' perspectives and membership could be curated in a Facebook context or individuals with diverse perspectives could be invited within Twitter. The biggest challenge for facilitating transformative learning within social media, however, is the requisite to foster a sense of social cohesion amongst participants. Social learning research has shown that for a constructive dynamic that allows for diversity to unfold amongst participants' perspectives and for developing routine-breaking solutions, groups require sufficient social cohesion (Wals & Rodela, 2014).

Individual routine social media engagement does not facilitate social cohesion among actors with diverse perspectives and research shows that cross-ideology exposure

within social media platforms is limited and individuals with similar values and perspectives seem to flock together online. Moreover, engagement around specific posts have short lifespans within social media news streams (lifespan of an average Tweet is 24 minutes, but ranges from 18 min to 48 hours depending on its quality and circulation (weRSM, 2015); an average Facebook post has 75% of its engagement within just under 2 hours (Ayres, 2015) so developing a focused group would not only require activities to develop social cohesion, but also require moderation to focus the topic of discussion at set times. For all of these reasons, it is unlikely that transformative sustainability learning that focuses on deeply engaging with diverse perspectives will spontaneously occur within social media. However social media can show individuals that diverse perspectives do exist, which is the first step for deeply engaging with them.

Framework for 21st century learning

As discussed in Chapter 5, the Framework for 21st Century Learning was used to develop a picture of how youth perceive their learning in environmental social media interest groups compared to their high school experiences. Overall, youth reported learning more 21st Century Learning themes and skills from their participation in an environmental social media interest group than from their classes at high school. This is not to claim that youth learned more content and skills from their participation in an environmental social media interest group, but rather that they self-perceived more learning of 21st Century Learning Themes and Skills from an environmental social media interest group. Of particular note, many youth reported Global Awareness - in fact, the highest number for any theme or skill - as an understanding they acquired from participating in an environmental social media interest group. As one might expect, youth also reported developing many ICT associated skills with their participation in an environmental social media interest group more than through their high school experiences.

Youth in this study are considered to belong to Generation Z, the generation following Generation Y or Millennials, and are described as “true digital natives,” having lived their entire lives with the internet and have predominantly come of age within Web 2.0 social technologies. Sweeping generational characteristics of a cohort of “digital natives” is problematic because empirical research has demonstrated variation in both internet skill and usage across the generational cohort (Hargittai, 2010); however, some of the generational characteristics can be helpful for orienting pedagogy overall, while leaving space for these sweeping characteristics to be attended to through focused needs-based instruction. Generation Z learners share many similarities with Generation Y

learners and approach learning from an intuitive, personal relevance, and visual and kinesthetic mindset (Faust, Ginno, Laherty, & Manuel, 2001). These students are generally averse to lecture-oriented or text-only modes of instruction and are not sequential thinkers (Black, 2010). Youth from this research study reporting that they learned more of the 21st Century themes and skills overall from their involvement in an environmental social media interest group than from their high school classes is supported by the generational learner profile that has been presented.

While the environmental social media interest group supports the learning style of the youth in the study, youth identified high school classes where they developed critical thinking and problem solving skills. Developing critical reflection, which is beyond finding pertinent information, seems to be one of the most challenging tasks in online environments, where information is limitless (Ling & Fraser, 2014). Within social constructivism, where meaning is constructed from interactions with others, the importance of feedback to help learners reconsider misunderstandings or inappropriate responses is necessary, especially when learners have the same level of expertise or experience. Within an environmental social media interest group, there generally are not teachers who align learning goals to activities or provide feedback when inaccurate or inappropriate content is shared within the space. Overall, research suggests that SNS are being increasingly used as tools for developing individual learning platforms or personalized learning environments [PLEs] which enable individual knowledge management and construction and knowledge is socially mediated (Dabbagh & Kitsantsas, 2011)

The affordances of endogenous learning, (i.e., without external learning outcomes) may seem like a necessary prerequisite for youth to feel a sense of ownership of their learning; however, from this research study, some youth would email their teachers drafts of what they wanted to post online and request feedback to ensure what they were sharing was accurate and relevant. When other adult facilitators were involved in the environmental social media interest groups, youth indicated they would seek the adult facilitators when they needed support, but the adults were not heavily involved in managing or making decisions for the group. As long as teachers and adult facilitators allow for youth to lead, manage, and facilitate environmental social media interest groups, then youth are encouraging their involvement and inclusion, and recognize the importance of their involvement for support and advice.

This raises several questions in terms of whether interest-driven learning occurring in social media can be appropriated into formal education settings, and whether it ought to be since learning is already occurring with these youth online spaces (Facer &

Selwyn, 2010). These questions are addressed in Section 8.4 where implications from this study are discussed in terms of environmental sustainability education and educational futures.

Learning summary

Environmental social media interest group learning is not positioned as the answer to wicked problems of the 21st century; however, the types of learning and engagement are important examples of how learning is no longer bounded by institutions and offers possibilities to help build a more comprehensive picture of learning within environmental social media interest groups. Specifically, this section has highlighted that video is an important learning medium, commenting is an important aspect of learning within social media, and that interest-driven learners often do not feel that their schools allow them to integrate their passions and interests into formal education classes. This section has also raised concerns over the tendency within social media for like-minded others to affiliate with each other creating networks of individuals with similar attitudes, values, and beliefs.

7.6 Environmental social media activism

Within environmental sustainability education, moving towards a sustainable future requires creative engagement in emergent change, facilitated by new approaches of learning and ways of organizing which contribute to transforming unsustainable systems (Lotz-Sistza, 2004; Lotz-Sisitka, Wals, Kronlid, & McGarry, 2015; Stevenson, 2007; Wals, 2012). Engaging learners in change and transformation requires that learners see themselves as agents acting to address environmental or social inequities within their lives (Freire, 1993; Jensen & Schnack, 2006). Individuals and especially young people are increasingly engaging with politics, civic expression, and activism within social media networks (Lenhart, 2015). Considering this social phenomenon, this study has attempted to explore how youth use social media for environmental activism and has focused on the following questions: “How do youth define and engage in environmental social media activism?” and “In what ways and to what extent do youth view online environmental social media activism as contributing to social and environmental change?” As outlined within Chapter 6, contextual framing was provided to attend to the research questions in regards to: how activism is defined and conceptualized by youth (Section 6.2.1), how youth identify or do not identify as “activists” (Section 6.2.2), practices of posting environmentally-related content by youth in social media (Section 6.2.3 & 6.2.4), differences between online and offline activism (Section 6.2.5). Drawing upon the visual

analytic (Figure 4.10) within this section *substance, dynamics, and culture* are referred to for consideration of the substantive content youth post related to activism, the spectrum of activism engagement within online and offline contexts, and lastly, how social media affords identity exploration for young people who identify as environmental activists. In this section, findings related to these research questions are discussed and considered in terms of relevant literature in the fields of environmental sustainability education, youth activism, and participatory culture.

Definitions of environmental activism as conceptualized by youth

This study has positioned youths' accounts of their understanding of activism as important since they have lived their entire lives with access to the Internet and have come of age at a time of increasing user-engagement on social media platforms. With the understanding that many youth have an "always-on" relationship to social media and that many aspects of social media engagement have become embedded within their everyday life experiences, I have focused on how youth, who are frequent users of social media, conceptualize environmental activism, and whether youths' conceptualization of environmental activism includes social media activism. As reported in Chapter 6, two common themes emerged from youth responses to their definitions of environmental activism: 1) *Education as activism* and 2) *Action as activism* (including activism as community work, government lobbying, and petition sharing through social media).

Some youth participants, whose responses reflected the theme, *Education as activism*, focused on how the act of learning or teaching about environmental sustainability issues is an intervention in and of itself. However, other youth focused on how having an informed understanding of a topic was very important so that others saw her as a credible activist. However, most youth defined environmental activism as taking actions that build towards creating change, *Action as activism*.

These two themes reflect underpinnings of a critical perspective, where individuals learn to think critically about environmental or social justice challenges in their personal lives or facing their community and then take action to address that challenge. Within environmental sustainability education, socially critical approaches to environmental education often focus on engaging students in environmental issues and considering the wider cultural and social features which structure human actions towards the environment (Fien, 1993; Gruenewald, 2003; Robottom, 1987).

Many youth focused on *Action as activism* and discussed the importance of action taking place in their community and with people in a face-to-face context or having a personal connection. Youth responses lean towards developing a sense of action

competence in that many youth described activism as being actively engaged in a project or event in a community and it is this collaboration and attempt to solve issues with other community members which creates a social learning situation. According to Jeffrey (2010), “the ability to be constructive in the change process at a societal level determines an individual’s action competence” (p. 9). However, when youth were asked to define environmental activism, youth responses were specific to an individual’s activism, that is activism specific to an individual trying to raise awareness about an issue and taking action on that issue. Youth did not describe a collective sense of activism or a process of raising awareness of others and then encouraging others to take action on that issue. When youth responses were coded outside of the specific interview question related to definitions of environmental activism, references to individual, relational, and transformative agency emerged (see Section 7.6.4. Social media contributes to social and environmental change), suggesting that their experiences of environmental activism may include working with others towards a collective goal.

Environmental and activist identity exploration

During adolescence, identity development is a foundational task and is shaped and formed by family, at school, with friends, through extra-curricular activities, and in online spaces. As discussed in Chapter 2, the personalized content that individuals share within SNS is a narrativization of identity (Sfard & Prusak, 2005). Personal social network profiles are discursive constructs and in this way, as such, function as stories where identity is constructed by the user who posts content, but also by individuals within the network who respond. In this way, youths’ posts can be understood as a curated presentation of themselves and part of identity work. This is not to assume that youths’ profiles are representative of their identities since they may choose to publish content only to some friends and not others, allowing them to stage different identities to different audiences (Zhao et al., 2008).

Within environmental education, Blanchet-Cohen (2010) argues that environmental activism among children 10-12 years old is an evolving process which involves critical thinking, imagination, and action and that these three dimensions interact and support the development of a child’s sense of agency. According to Blanchet-Cohen (2010), a child’s agency develops from the interplay and complexity of children’s environmental involvement. Building a sense of identity as the child engages, positions him/herself and responds to experiences. Within social media platforms, an individual’s profile, the engagement s/he receives from posts and comments, and the interest groups that s/he joins afford a young person space to explore their environmental identity.

Environmental identity construction has been primarily conceptualized and studied through considering how identity is formed and informed by an individual's relationship to the natural environment (Blatt, 2013; Clayton, 2003; Dresner, Handelman, Braun, & Rollwagen-Bollens, 2014). Some other scholars, however, have focused on the ways which social association informs and shapes environmental identity (Kitchell, Kempton, Holland, & Tesch, 2000; Clayton & Opatow, 2003). A social environmental identity is self-defined and used by people to position themselves in relation to others regarding their environmental views and life-style choices (Kempton & Holland, 2003). Given the affordances of social media to allow for individual curation of a profile, self-expression, and feedback from others, social networking platforms afford spaces for young people to engage in identity work in general and environmental and activist identity work specifically. The rise of personalized politics is most often channelled through social media platforms, where individuals can add their own perspective, narrative, and concerns to their own social networks (Bennet, 2012). The established practice of personalized politics within social media may also influence or model political identity development and expression among young people entering these affinity spaces.

In a recent research study on socio-environmental identity development amongst American teens participating in an international exchange program focused on climate change, Stapleton (2015) found that for many teens participating in the program their narratives and social interactions within the program were catalysts for environmental identity shifts. In this study, Stapleton expands Kempton and Holland's (2003) three stages of identity development:

- 1) Salience, or becoming aware of environmental problems
- 2) Identification with and seeing oneself as an actor in the environmental context; and
- 3) Becoming more knowledgeable about how to engage in environmental practice (as cited by Stapleton, 2015, p.96)

and puts forward five aspects of environmental identity development:

- 1) Is malleable over time
- 2) Is tightly connected to practice
- 3) Is continually informed by and recreated through social interactions
- 4) Simultaneously exists on multiple levels; global/local and micro/macro scales; and
- 5) Can be largely impacted by education and schooling. (p.97)

Stapleton's five aspects of environmental identity development offer a relevant framework for considering socio-environmental identity development in social media. In this research project, youths' responses to interview questions about environmental

identity and their observed online environmental activism practices are considered using Stapleton's socio-environmental identity framework.

First, socio-environmental identity *is malleable over time* was evident in responses by youth regarding whether they identify as environmental activists. A couple of the respondents indicated that they did not currently identify as an environmental activist as they felt they needed to do more. For these two participants, their responses reflected that their identity as an environmental activist is something they will achieve in the future. Additionally, over the 6-month observation period, several of the youths' postings on environmental issues changed over time as interests or events occurred in their lives. Within the social media data capture, it is also evident that posting on environmental issues is only a part of the youths' overall online identity - evident in the percentage of content that youth post related to environmental and social justice issues (see Figure 6.6 in Chapter 6).

Socio-environmental identity *is tightly connected to practice* was evident as a theme in the ways which youth who self-identify as activists explained why they feel that they are activists. As Leago explained, "what i am doing is for saving our common future. it's my duty. yes, you can call me an activist but i think i am just doing what all should do" or as Hussam explained "yes because I am trying to do my best to work on it everyday". The various observed environmental activism practices within this study (*sharing resources of information, sharing digital media and adding personal opinion, petition sharing, sharing content, and inviting others to add their perspectives, creating digital media content, engaging in discussion through comment chains, promoting meetings and events, and sharing inspiration quotes*) are also all examples of youth enacting their environmental activist identities (see Chapter 6, Section 6.6)

Some youth responses also showed how environmental activist identity *is informed by and recreated through social interactions*. Michael explained how there was no extra-curricular environmental program at his school and that he did not feel that his friends had environmental ethics. He felt very uncomfortable situating himself as an activist:

probably not. I am kind of afraid of criticism from my friends. Because I don't have friends that are as strong as I am towards being an environmental activist so I am kind of afraid of going out there and saying what I think for risk of criticism from friends (interview, March 28, 2013)

Other youth who were observed and have a peer-group with stronger activist orientations do not seem to have the same hesitation to engage in environmental activities. Rebecca had adopted a friend's expression, "sharing is caring" for when it comes to posting content on Facebook about controversial issues (interview, November 5, 2013).

Youth exploring their environmental and activist identities are also experiencing social pressures and peer affiliation that comes with adolescence. Perceived group identity of individuals and groups also affects individual youth's affiliation with particular groups/identities. In Stapleton's (2015) research, a young person reflected on how environmental identities can be constraining:

In terms of identity, I think that there's a pressure that you feel as... a young adult to find an identity which is very cookie-cutter. I definitely feel that ... you identify certain people who share the same music interests, then there's a hippie identity, and I think there is an environmentally friendly identity which people can adopt if they consider themselves environmentalists, and I actually think that kind of identity is constraining. (p.111)

The identity distinction between a "hippie" or an "environmentally friendly" person is not explicit in the text; however, it does raise the question of the importance of perceived group identity and how individuals decide whether to adopt self-identifying labels, as well as processes involved in joining groups based on perceived group identity. Within environmental identity studies, research has shown that an individual member's definition of "what it is to be an environmentalist" is often consistent with the group's identity, and with the environmental actions taken by the group (Kitchell et al., 2000). This is an area of future research when considering how online interactions within social media interest groups may influence actions that individuals may take based on group identity of the online group. Currently, there is no research in the field of environmental education that addresses this area.

Returning to Stapleton's five stages, within social media, identity *simultaneously exists on multiple levels* because of the inherent design affordances within social media that allow for individuals to connect with others across time and geography. In this study, several of the social media interest group networks (Chapter 4, Section 4.4) had national to international membership and some coordinated events in various locations. Interestingly, research shows that the majority of social network connections an individual has are of close tie (often face-to-face and quotidian) relationships (Perrin, 2015).

This research also showed that youths' socio-environmental identities are also *impacted by education and schooling*. For the youth who were participating in an environmental social media interest group that was connected to an extra-curricular environment club or a school program in this study, these youth referred to their teachers as inspirational and supportive of them taking active roles in managing the group (See Chapter 5, Section 5.8)

Distinguishing between online and offline contexts

From the beginning of this project, a consistent thread has been to consider online learning and activism from the perspectives' of 16 - 18 year-olds who have lived their entire lives with the internet and come of age at the peak of Web 2.0. Maintaining a focus on how youth perceive online social media activism, rather than observing and evaluating their online and offline participation, has been an important methodological consideration because focusing on the youths' perspective offers qualitative insights (springboards) for further detailed empirical study in this under-researched area.

Research suggests that the majority of young people understand traditional politics as inauthentic and disconnected from their political affiliations or experiences (Coleman, 2008; Earl, 2008). Descriptions of an apathetic youth group, however, have been exaggerated and misleading (Dalton, 2008; Norris, 2002; Zukin et al., 2006). In contrast, research has shown an emergence of a new paradigm of citizenship called *actualizing citizens* who are generally young and characterized as having a weak sense of duty to participate in government; focusing on lifestyle politics; having a mistrust of media and politicians; and joining loose networks for social action (Bennet, Wells & Freelon, 2009, p.107). While broad sweeping generational categorizations are problematic for essentializing a generation into one group, the categorization is helpful in broadly describing civic and political shifts among young people. While this disconnection has manifested as a social anxiety that youth have become apathetic and disaffected about civic participation (Loader, 2007), following the Civic Learning Online Project, some researchers argue that young people's civic participation has changed forms, rather than gone away (Evans, Stoker, & Halupka, 2014). For example, when activities such as joining advocacy groups, engaging with campaigns or issues online are included in measurements of civic engagement, then research conducted in Australia shows that young Australians are more politically engaged than older Australians (Evans et al., 2014). Defining what constitutes online civic or political engagement and how to measure these acts is an ongoing debate within the literature (Theocharis & Quintelier, 2014).

Gladwell (2010) took a very strongly dismissive view of social media activism and argued that "no real change" has occurred in a New Yorker essay entitled "Small Change: Why the revolution won't be tweeted?" He contrasted the "real" activism of the 1960s civil rights movement with the "weak" activism coordinated through social media today and claimed that social media activism is ineffective because it is based on weak ties to a cause:

Facebook activism succeeds not by motivating people to make a real sacrifice but by motivating them to do the things that people do when they are not motivated enough to make a real sacrifice. We are a long way from the lunch counters of Greensboro (2010, para 17).

Gladwell's essay recapitulates the commonly-used term "slacktivism", (a blend of the words "slacker" and "activism"), often used pejoratively to describe activities such as 'liking', 'sharing' or 'tweeting' about issues of environmental, social, or political importance within social media platforms. Considering the youth demographic from various cultures within this study, and the stereotypes around "Generation Y & Z" and "slacktivism," I was very interested in investigating if youth differentiated between online and offline activism and, if they did, how so?

As discussed in Chapter 6, most youth in this study do differentiate between online and offline activism and these youth engage in activism in both contexts. The only youth in the study who only engaged in online activism did so because there were no face-to-face groups in her local area she was aware of with which she could engage. The rest of the participants indicated that they engaged in activism in both contexts. Another youth indicated how online activism was more convenient because he didn't have to travel to meet people, whereas most other youth were very clear that engaging in activities with community members through offline activities was "more productive" or "meaningful". One youth explained that activism falls along a spectrum of engagement since he meets many young people online and they will first discuss and organize online, meanwhile, if there is interest, they will meet up to discuss ideas and activities further. From the interviews, most of the youth were aware of the limitations of solely engaging in online contexts and also seemed to privilege and focus on face-to-face events in their communities (See Chapter 6, Section 6.7).

In response to Gladwell's (2010) claim that the revolution will not be tweeted, Mirani (2010), a writer for the Guardian, argued that Gladwell's premise may be accurate if activism is defined only as sit-ins, taking direct action, or protests; however "if [social media] activism extends to changing the minds of people, to making populations aware of what their governments are doing in their name, to influencing opinions across the world, then the revolution will be tweeted". Research has shown that activities such as posting, commenting, joining and creating groups, tweeting in support of issues, self-organizing protest events, participating in flash mobs, and engaging in online discussions with peers, when considered forms of civic expression, can lead to further engagement with social and political issues offline and online (Smith, 2013).

It is not actually that Gladwell and Mirani are directly opposed in argument, rather, they are entering the debate from different levels of evaluation. On the one hand, Gladwell (2010) is focused on the resulting outcomes of social media activism: "[social media] makes it easier for activists to express themselves, and harder for that expression to have

impact” (p. 9) and Mirani (2010) is focused on the power of social media to rapidly spread information; share alternative perspectives on issues, and the educational and dialogic aspects of discussing issues in a decentralized network.

Tufekçi, who has attended and observed many of the significant social movement uprisings in the last 10 years such as Tahrir Square (Egyptian Revolution in 2011); The Occupy Movement (throughout the US in 2011 & 2012); Gezi Park Protest (Istanbul in 2013); and Ferguson (Ferguson, Missouri in 2014), argues that more recent social movements have scaled quickly due to the amplification affordances of social media, but with the fast rate of scaling up, the benefits of slower social movement organizing of the 1960s is lost (2015). Tufekçi asks: “As digital technology makes things easier for movements, why haven’t successful outcomes become more likely as well?” (TEDx transcript, para 6)

Tufekçi (2015) claims that part of the issue with online activism is that social media has allowed organizers to take the faster routes without replacing the benefits of slower organizing:

Because, you see, the kind of work that went into organizing all those daunting, tedious logistical tasks [1960’s civil rights organizing] did not just take care of those tasks, they also created the kind of organization that could think together collectively and make hard decisions together, create consensus and innovate, and maybe even more crucially, keep going together through differences. So when you see this March on Washington in 1963, when you look at that picture, where this is the march where Martin Luther King gave his famous “I have a dream” speech, 1963, you don’t just see a march and you don’t just hear a powerful speech, you also see the painstaking, long-term work that can put on that march. Today’s movements scale up very quickly without the organizational base that can see them through the challenges. They feel a little like startups that got very big without knowing what to do next, and they rarely manage to shift tactically because they don’t have the depth of capacity to weather such transitions (TEDx transcript, para 9).

The networks within this study are not of the scale of those to which Tufekçi refers; however, interestingly, from youth responses there is a focus on privileging face-to-face offline organizing. If youth who have grown up their entire lives with the internet and web 2.0 affordances privilege face-to-face engagement for taking action on environmental issues, then perhaps Gladwell’s (2010) essay is best understood as a moral panic about technology and youth today. Youth’s online environmental activism practices and offline environmental activism practices should not be seen as disconnected or isolated but as practices that influence each other and that travel across both contexts (Lankshear, Leander, & Knobel, 2011).

Social media contributes to social and environmental change

Within the debates around whether social media activism enacts change, this research offers youths' perspectives on this debate. As indicated in Chapter 6, Section 6.2.6, all youth indicated that social media is a powerful medium for raising awareness about issues, increasing group membership, and promoting meetings, and events. Almost all youth expressed that social media activism is only one aspect of activism and, while it is important, it is often viewed as a primary step of movement along a continuum of activist engagement. Several youth indicated that social media's contribution to change is dependent on a longer spectrum of engagement that occurs in both online and offline contexts around the specific issue. Overall, youths' responses align with Mirani's (2010) argument that participating in social media activism can be powerful in its ability to raise awareness, create dialogue, and increase engagement around civic and political issues.

Within environmental sustainability education, many argue that addressing environmental sustainability issues requires learners engaging in change processes, facilitated by new approaches to and ways of organising learning (Lotz-Sistza, 2004; Lotz-Sisitka, Wals, Kronlid, McGarry, 2015; Stevenson, 2007; Wals, 2012). Engaging learners in change and transformation, however, requires that learners see themselves as agents who can act to address environmental or social inequities within their lives (Freire, 1993; Jensen & Schnack, 2006) and this revolutionary approach to education contrasts with the traditional purposes of schooling, which are to foster and perpetuate social stability (Durkheim, 1956). The inherent tensions between environmental sustainability education approaches and environmental social media activism and traditional approaches to schooling are discussed in Chapter 8, Section 8.4.

Before addressing these larger tensions, learner agency within social media needs to be expanded upon and unpacked. Contemporary discourses within environmental sustainability education advocate for positioning learners as active agents rather than passive recipients of environmental learning (Rickinson, Lundholm & Hopwood, 2009). Recognizing child and youth learners as agents necessitates paying attention to their abilities and power (or lack thereof) to raise awareness, organize events and engage with the social structures within which they are embedded (Mayall, 2000). Within North America and Europe over the last hundred years or so, children and young people have been increasingly segregated from participating in informal activities with adults in their communities because of various social changes (schooling, dual working parents, creation of after-school care, and recreation programs), and alongside decreasing access to public spaces and the retreat of children and youth into private spaces of their homes (Hart, 2008). Children and youth may often be segregated for much of the time with children of

their age group and have limited opportunity to learn informally from older children and youth or adult-carers (Hart, 2008).

Blanchett-Cohen (2010) advocates that children and youth need opportunities to participate in real-world problem solving to help them develop “a sense of identity, providing children with a sense of accomplishment, allowing them to go deeper or move on to something else. The result of this process is an increase in children’s self-efficacy, in believing in their capabilities” to alter their communities for the better (p.52).

Learner agency has multiple meanings that are informed by the discipline that an individual is working within and are expanded upon in Chapter 2. Stevenson with Stirling (2010) suggest that within the various meanings of agency, reflexive, relational and transformative agency have particular relevance to environmental learning.

Stevenson with Stirling draw upon Bourdieu’s description to analyse reflexive agency as “the capacities of socially and culturally situated agents to reflect upon their social conditions, criticize them, and articulate new interpretations of them” (Bohman, 1999, p. 145, as cited by Stevenson with Stirling, 2010). This description aligns with critical reflexivity and Sterling’s 1st, 2nd and 3rd order of transformative learning (2010) considered in relation to youths’ reflections on their engagement in discussions through responding to “negative comments” on Facebook (Section 7.5.3). As part of reflexive agency, envisioning an alternative future to current conditions is imperative, in this sense, hope for an alternative to the current environmental or social conditions is an ‘ontological’ need (Hendricks, 1994). Within the observed environmental activism Facebook practices of this study, the hopeful messages that youth would post to their profiles are examples of this aspect of developing reflexive agency.

Within environmental initiatives in schools, there is often a focus on reflexive agency as it pertains to individual and private actions, like turning off the lights, water conservation, waste reduction, or setting-up a backyard composter (Chawla & Cushing, 2007). An analysis of the most challenging environmental issues suggests that private actions are limited unless these actions are orchestrated in conjunction with collective policy change (Chawla & Cushing, 2007; Fien & Trainer, 1993; Robottom & Hart, 1995).

Relational agency is described by Edwards as “a capacity to align one’s thoughts and actions with those of others in order to interpret problems of practice and to respond to those interpretations” (as cited by Stevenson with Stirling, 2010, p. 231). Relational agency represents a shift from an individual’s sense of agency to a collective sense of agency, which translates in school environmental initiatives to a shift in focus from taking responsibility of private actions to addressing collective actions and collective policy change. Within this concept is the understanding that another person may be helpful in

overcoming an issue, but there is a negotiation in deciding how to address working together towards a joint action.

The affordances of social media platforms to facilitate relationships where individuals can join groups to address environmental or social issues they are facing in their lives is unparalleled in the day-to-day experience of a young person. Within reported youth perspectives on social media contributing to change, Michael's interest in joining the AYCC is a strong example of how social media can facilitate relational agency:

I hope to get a job maybe in engineering. Possibly looking at research into new sustainable resources for energy and developing projects and designing new technology that can help towards the future of renewable energy. So I hope that in being a part of AYCC [Australian Youth Climate Coalition] I can get background information and get to know the people that share the same ideas that I do. I can feel more comfortable and confident. It helps me to understand what I want because there are people out there that feel the same way (interview, March 28, 2013).

Transformative agency is described as "collective responsibility for transforming social practices and conditions and involves both reflection on and transformation of such practices" (Stevenson with Stirling, 2010, p.232). This type of agency is dependent on developing the capacity for relational agency and is also the type of agency that many scholars and practitioners within environmental sustainability education argue is required to engage learners in change processes that have the potential ability to transform current social and environmental conditions (Blanchett-Cohen, 2008, 2010; Chawla & Cushing, 2007).

Youth responses to whether social media contributes to environmental and social change indicated that it is not the social media platform in and of itself which facilitates change, as Kayla explains:

You really went all out to make that difference [pre-social media] and while I think it's a good idea that corporations and individuals have come out with these online facebook liking campaigns or you can type your email to sign a petition. I think it's good but it shouldn't be that environmentalists are like, okay, we don't have to go out anymore. We can just sit at home and click away (interview, August 26, 2013).

However, it is how social media engagement, along with a longer spectrum of engagement within both offline and online contexts can foster transformative agency. Leago explained how his group Generation Earth is enacting change through the events the group runs in both offline and online contexts:

In terms of us creating change, when people actually come and learn about the issues that we are faced with, more and more people are responding towards the environment and the changes within the community in which they live, so Generation Earth creates the change and then we encourage them to implement a change within their respective communities (interview, November 11, 2013).

The affordances of social media which allow for young people to engage in aspects of transformative learning and activism highlights the importance of affinity spaces, like interest-driven environmental social media groups, to strengthen young people's sense of agency to enact change within their local communities.

Activism summary

This research has shown that Generation Z youth, who have lived their entire lives with access to the internet and come of age in the height of user-engagement on social media platforms, do not privilege online social media activism over face-to-face experiences with others in local communities. Social media as a platform affords youth opportunities to connect with like-minded others, explore environmental and activist identities, and a platform to discuss, organize, and take action on environmental and social justice issues that are occurring in their local communities. Social media as a platform does not create activist engagement, but allows for individuals to give voice to and express their ideas, values, and beliefs. While the limits of social media to facilitate spontaneous transformative sustainability education were discussed in Section 7.5 on "Participating in commenting is an important aspect of learning in social media", social media remains an important space for youth to explore and expand their environmental identities and activist identities. Engaging learners in change and transformation necessitates that learners see themselves as agents who can act to address environmental and social inequities within their lives and as such social media can help young people foster a positive sense of agency to enact change in their local communities.

In the next chapter implications for environmental interest driven learning and activism are discussed in relation to environmental sustainability education and educational futures.

Chapter 8 Conclusion

8.1 Chapter overview

This chapter gives an overview of the main findings from this research study (Section 8.2) and is followed by a consideration of the limitations of the study, which also includes recommendations for future research (Section 8.3). Implications of the study's findings are then discussed in terms of environmental sustainability education and educational futures (Section 8.4).

8.2 Summary of main findings

This research project aimed to explore how youth in varying geographic locations around the world use social media platforms to engage with their peers in environmental learning and environmental activism. The project has resulted in a detailed documentation of how youth engage in informal, interest-driven learning and activism within environmental Facebook interest groups. The results of this multiple case study comprise multiple perspectives from youth from eight different countries, map characteristics of youth-focused social media networks, and explore how these affinity spaces foster learning and activism. In this regard, this project provides a typology of youth social media usage for learning about and engaging in activism on environmental sustainability issues. This typology responds to the overarching research question of the study: "How are youth using social media sites for learning about and engaging in activism on environmental sustainability issues?"

Within participatory culture literature, there are some research studies that have qualitatively mapped interest-driven learning among youth (boyd, 2008; Ito et al, 2009; Jenkins et al., 2006); however, this study differed in that it also included network mapping and visualizations in the methods and results. This mapping attempted to answer the sub-research question: "What are some prevalent structural characteristics of youth-created environmental social media interest groups?" The network communication visualizations, which show the size of the interest group, engagement of participants in terms of tagging, commenting, and posting, and the relationships within the network, are evidence of how these "quasi-public" spaces afford youth spaces to connect with like-minded others, take leadership roles, express their ideas and values, and explore environmental identities at a time when youth's access to public space is on a decline. Beyond access to public spaces for youth being on the decline, there are also few private or public spaces where youth can actively connect with others who share their interests with the ease that online networking affords.

Within the intersection of environmental sustainability education and participatory cultures (specifically social media learning), there are limited studies exploring types and processes of learning and engagement within these networked spaces. One of the few studies (Robelia et al, 2011) that has been conducted on how participating in a Facebook application changed participants environmental knowledge and environmental behaviours, collected all data within a rewards-based model for engagement (offered a trip to the Artic and a laptop as rewards), therefore the observed engagement within the study does not reflect authentic interest-driven engagement within social media. The data collected within this research project was collected with consent from participants but without offering a reward for engagement or participation and therefore resembles a more accurate depiction of authentic interest-driven environmental learning and activism. Another study in this area of research has shown how environmental learning and action taking within a face-to-face and school-based program can be transferred and reinforced through social media engagement (Warner et al., 2014). This dissertation study has not solely focused on programs with face-to-face programming, school-based programming, or NGO programming and has included groups and networks that are informal in structure (see various group structures in Chapter 4, Table 7.1). The inclusion of these groups has resulted in mapping learning and activism across various levels of organizational structure and has not relied on how learning and action transfers from programming philosophy or learning outcomes to social media engagement. A very recent study (Andersson & Öhman, 2016) presents research which supports that young people discuss and learn about environmental sustainability issues, especially political and moral dimensions of issues, through social media. Andersson & Öhman (2016) suggest that understanding how young people construct knowledge about environmental and sustainability issues from their social media experiences could help teachers to engage in pluralistic and participatory approaches to classroom discussion. The knowledge contribution of the results is generic and qualitatively constructed from an online conversation with youth about their social media practices rather than observed over a period of time, as this research dissertation has provided.

This research project has revealed how youth participation in an environmental social media interest group can result in increased environmental understandings and learning about civic processes. This research outcome, alongside similar findings from Robelia et al, (2011) and Andersson and Öhman (2016) represent early studies in environmental sustainability education that attempt to map learning and engagement within social media spaces. This research project has also shown that youth attribute learning more 21st Century Learning themes and skills from their participation in an

environmental social media interest group than from their classes at high school. Of the themes and skills, Global Awareness was the most referenced, and youth reported developing many ICT associated skills through their participation in an environmental social media interest group versus via their high school education. These findings help to respond to the sub-research question: “What types of learning do youth attribute to their engagement in youth-created environmental social media interest groups?”

In this research project, all youth participants had a strong environmental ethic and all youth (except for one) were part of an environmental social media interest group comprised of other youth with a shared interest about a specific environmental issue, who most likely held similar and shared perspectives. This tendency within social media for “birds of a feather to flock together” suggests that environmental learning within social media interest groups is best suited for developing and deepening environmental understandings for those who already have an affective disposition (Schultz, 2003) towards environmental sustainability issues.

Although social media is embedded within youths’ everyday life experiences, almost all youth prioritized being involved in actions taking place in their local communities and with people in face-to-face contexts. Youth responses leaned towards developing a sense of action competence in that many youth described activism as being actively engaged in a project or event in a community. Most youth differentiated between online and offline activism and engaged in activism in both contexts, although they privileged and focused on face-to-face actions and events.

One of the significant findings from this research project is youths’ perceptions of both positive and negative comments on social media content they posted. As previously discussed, several youth reported that receiving a negative comment did not affect their motivation or willingness to post similar environmentally-related content and some youth indicated that they considered receiving a critical comment as a positive comment because it showed “friends” were interested in discussing the issue. While some youth explained how engaging with others who posted negative comments can be a rewarding and positive experience because the debate offers them an opportunity to consider issues from different perspectives, the level of critical reflection and affordances for third order transformative learning is limited overall within social media. In Chapter 7, I argue that one of the challenges for fostering transformative learning within social media is overcoming the balkanization of representation of issues and culture within SNS platforms. One of the possible ways to overcome the tendency of “birds of a feather to flock together” (see Section 7.5.4) within SNS is to foster groups that focus on deliberative discussions on environmental sustainability or other pressing issues. This kind of

engagement would need to have a commitment to diversity among participants' perspectives and it would need to be moderated in order for it to be inclusive. Within such a space, there would also need to be a manifesto or terms of engagement to not only create an inclusive and fair participatory space but to foster a sense of social cohesion. The development of a focused group would not only require activities to help foster social cohesion but also to focus the discussion at set times, since engagement around specific posts has short life spans.

This study also focused on how a social media profile is a discursive construct, which affords identity exploration. Stapleton's (2015) aspects of socio-environmental identity formation were applied to data collected to highlight how social media affords environmental and activist identity construction. From observations in this research project it was apparent that for youth participants being affiliated with an environmental group of "like-minded others" helped them feel confident in exploring their environmental identities and activist identities within social media. Youth participants explored their own interests and values and positioned themselves in relation to others regarding their environmental views and life style choices. While finding "like-minded others" to explore environmental or activist identities may be positioned as a positive affordance of youth identity exploration within SNS, it is at the same time limiting if these youth are only engaging with "like-minded others" within specific interest groups and not experiencing pluralistic perspectives on issues. If environmental interest group is substituted for radical terrorist interest group, then the concerns for representation of multiple perspectives become poignantly highlighted. This example also raises the caveat that because of the social and technical affordances of SNS, these spaces can affect identity and influence or reshape how an individual views him/herself in both positive and negative ways (i.e. it is not assumed that only positive identity construction and exploration occurs on SNS).

I also considered how youth perceive whether social media activism contributes to social and environmental change by considering various forms of agency: reflective, relational, and transformative. While there was evidence of all three forms, youth responses indicated that it is not the social media platform in and of itself which facilitates change but how social media engagement, along with a longer spectrum of engagement within both offline and online contexts, can foster change in a local community.

Overall, the affordances of social media that allow for young people to engage in environmental learning and activism highlight the importance of affinity spaces, like interest-driven environmental social media groups, to strengthen young people's sense of agency to enact change within their local communities.

8.3 Limitations and recommendations for future research

Because of the few previous research studies and the interdisciplinary nature of this project, there was no template for the research design. The project required considering many methodological and analytical implications for collecting data within social media, mapping structural characteristics with social network analysis, and integrating youth qualitative data from interviews. The project in this regard is an exploratory starting point for many future research projects to further investigate and map environmental learning and activism practiced by youth or others within social media. As such, this project has provided an overall typology of how youth perceive learning and activism within social media and in so doing has addressed, with varying levels of detail, the research questions which frame the project. For all of the research questions, there are multiple additional studies that could be considered to further explore each question.

In this study, youth perspectives from the questionnaire (63 participants from 19 different countries) and from the case studies (11 participants from 8 different countries) are not representative of a global youth perspective or of a wider population of youth in general. In addition, youth perspectives in this study (both the questionnaire and case studies) are not representative of the diversity of student areas of interest (i.e. other than environmental sustainability issues) in a typical high school classroom of learners. All youth in this study self-identify as youth who use social media to communicate about environmental and social justice issues in their local communities. In addition, a further limitation is that the work was limited to youth who are capable of participating in the English language. Research which is able to observe and analyse in several languages would also add to international knowledge of youth participation, learning, and activism in social media spaces.

Another limitation of this study is that the selected environmental social media interest groups vary in geographic reach and size (a group of 30 members to a page with 5,976 likes). Through conducting the cross-case analysis, the groups were categorized according to their stage of development (informal groups, youth-created NGOs, and school environmental clubs, and one integrated high school program) and as the analysis unfolded, additional differences emerged considering each group not only had varying geographic reach and size, but differences in leadership roles and in the role of adult facilitators. All of the social media interest groups had the commonality of operating in Facebook (similar affordances); however, because of the differences in the groups, it became difficult to compare networks when taking into account the different cultures, dynamics, structures, and substance of each group. This is not just an issue of this particular study, but one that will repetitively occur when considering network

engagement. The tension between the individual identity of actors within the group and the entire network, and the resulting influences of the individual identities on the group processes, activities, and outcomes is difficult to distill. This result reflects the actual messiness that is typical of most social networks and engagement (Lievrouw et al., 1987).

Methodologically, an area for further refinement is the integration of quantitative social network analysis with qualitative analysis of participants' experiences to provide rich and meaningful analysis of learning and engagement across online and offline spaces. In this study, the network visualizations were interpreted qualitatively as visual narratives and descriptive statistics; however, there is the potential for this quantitative data to be integrated into a mixed methods approach within the appropriate research design. Currently, social network analysis programs, such as Gephi, NodeXL, and Pajek, are designed with a current predominant focus on quantitative social network analysis that focuses on measuring networking structure, as well as subjecting relational data to other statistical procedures (Edwards, 2010). This makes using these programs for qualitative social network analysis challenging. Some studies have focused on mixed qualitative and quantitative social network analysis at both the data collection and analysis levels (Dolcini et al., 2005; Lubbers et al., 2009; Neagus et al., 1994; Martinez et al., 2003). These studies seem to employ data collection methods and analytical approaches based on what is the best approach for the respective research question.

Within environmental sustainability education, further research into how youth engage and learn with digital media production, especially video, is an area for further exploration given how youth reported it as an important medium for their informal learning. Investigations which consider how media productions can be engaged as "intersubjective pedagogical experiences that enable student learning in relation to the social and ecological" (McKenzie et al., 2010, p. 147) and that represent embedded experience and cultural formation is an important area for environmental educators to consider as media content, especially video, is increasingly easier for individuals to access, produce, and share.

Another aspect of social media that this research has raised questions about is how online interactions within social media interest groups may influence actions that individuals take based on online group identity. Research that considers socio-environmental identity formation and how groups influence and form identity is an area with few studies (Stapleton, 2015; Kitchell et al., 2000), but warrants research investigation especially in terms of online social media interest groups.

Another area for future research is to further investigate how activism and learning, that occurs in online social media interest groups, may facilitate changes to

lifestyle, agency, and structures in offline contexts - specifically, in what situations this occurs, and what types of concrete socio-ecological changes result.

Youth in this study are categorized as Generation Z - that is they were born between 1995 and 2012 and are coming of age between 2013 and 2020. While it is acknowledged that generational stereotypes are problematic as they are broad sweeping generalizations about a cohort, understanding some of the tendencies of the cohort can be helpful for considering their behaviours and choices. Research has suggested that Generation Z is different from Generation Y youth as they are less focused on growing their social status and their likes on social media. In addition, Generation Z is more concerned about the economy and world ecology than Generation Y. From this stand point and with taking into consideration that youth in this study seemed to respond positively to critical comments on environmental content that they posted, this is an area for further research and investigation.

With the continued growth of social media usage, an area to experiment and document for research purposes is around how to develop group social cohesion within social media spaces. As discussed, one of the challenges of fostering transformative learning within social media requires overcoming the balkanization of representation of issues and culture in order to create a deliberative space that can facilitate processes that imbue social cohesion. Experimenting with social media spaces that focus on deep engagement with diverse perspectives over a sustained and reoccurring period time with the same actors is a potential starting point.

Lastly, a consideration of how teachers and adult facilitators/educators can support youth-led interest-driven learning and activism in both online and offline contexts also warrants further investigation. There is much research already focused on how teachers and adult facilitators can afford or enable children and youth to participate in environmental activities in general (see many chapters within Reid, Jensen, Nikel & Simvoska, 2008). One research study conducted by Warner et al (2014) explores how social media interactions between an adult environmental educator and primary school classes can reinforce learning and action after a face-to-face field trip. However, given the increased access and usage of social media by young people, further investigations of how teachers and adult facilitators/can support environmental youth learning and action through social media platforms is required. This is especially true in light of organizations like Plant for the Planet that have a child and youth governance structure and have organized children to plant trees in over 93 countries.

8.4 Implications for environmental sustainability education and educational futures

The findings from this research in terms of learning, activism, and the social media spaces which afford youth opportunities to engage in developing identities around their interests, values, and beliefs reinforce several tensions within current educational policy discourse. This section puts forward what the implications of these findings (summarized above in Section 8.2) mean in relation to formal education, ESE, and educational futures. The focus of this section is to highlight how schools within formal education can better “connect” with interest-driven online learning, create spaces for authentic learning in local communities, and envisage educational futures that are process-driven and responsive to the needs and challenges arising in known and unknown future contexts.

This research project has provided some evidence of how social media and other web technologies can afford important spaces and opportunities for learners to engage with and to organize to take action for transforming issues and challenges that affect them. Throughout this project I have struggled with what this type of learning means for formal education: Should education institutions appropriate this type of learning within classroom settings? Do educational institutions have the automatic right to colonize social media tools for formal education purposes (Facer & Selwyn, 2010)? How can educators respond to and support changes in learning that are happening outside the institutional walls of formal education? How can schools better connect interest-driven (endogenous) learning with externally-created learning outcomes? Moreover, how can the specific issues and challenges that communities are facing be integrated into curriculum?

In Chapter 2, it is argued that within some educational policy and ESD policy discourses there is a concerning type of instrumentalism that positions education as a vehicle to steer society towards knowable and predictable futures. As an alternative, the implications of this research are positioned with an understanding that the future is not predictable or certain, and a hope that education policy is positioned as process-oriented in order for schools to foster capacities for children, youth, and communities to address local challenges and respond to uncertain futures (Facer, 2011). As discussed in Chapter 2, forecasting what the educational needs of students will be in future societies and contexts is complicated and always subject to change. While educational institutions have not drastically changed since Henry Ford went to school, this does not mean that what counts as “school,” a “teacher,” and a “curriculum” may not have unsettled meanings as new socio-technological practices emerge. The lack of meaningful changes in schools since Ford’s time and the numerous attempted waves of school reform point out a strong resistance of schools to change, and also indicate the scope of the challenge.

Research focused on young people's abilities with digital technologies raises questions about how and whether there should be firm boundaries between formal education and informal education (Ito et al., 2013). Findings from this research project in terms of youth attributing more 21st Century Learning skills to environmental social media interest groups than to their high schools further highlights the disconnect many learners experience between their everyday 'life worlds' outside of school and the emphases of many educational systems (Buckingham, 2007). Moreover, several youth shared that they did not feel supported by their teachers or their school to engage in environmental sustainability issues that were affecting their communities. Loosening the boundaries between formal and informal learning and adopting a process-oriented approach that focuses on flexibility, adaptability, and openness to change may appear as the required approach for educational policy and practice. However, Facer argues that a retreat into flexibility is politically inadequate "if we wish to avoid the worst excesses of economic polarization and social and environmental breakdown promised in some trajectories" (p.104). She continues to argue that without a vision of a better alternative future school provides "no basis for optimism, no resources for the imagination, and no impetus for change" (p.104).

Therefore, there is a need to articulate a vision of what schools can be in order to prepare students for uncertain futures within a narrative that is not deprived of hope. The findings from this study and literature from participatory culture, environmental sustainability education, and youth activism demonstrate interest-driven environmental learning and activism can be supported in formal education. Conversely formal education can support interest-driven learning with two broad shifts: 1) *adopting community as curriculum into schools* (Cormier, 2010; Facer, 2011); 2) *adopting connected learning approaches* (Ito et al., 2013). These are overall recommended shifts; they are interrelated; and in some schools they are already being practiced (see Ito et al., 2013 for several case studies). However, these schools are exceptions rather than the norm.

Adopting community as curriculum

The first shift, *adopting community as curriculum into schools*, focuses on knowledge production becoming a participatory process that is practiced with community members trying to solve problems (Cormier, 2010). Within this shift schools become public spaces central to the community. The school focuses on partnerships with community businesses, local council, and organizations to discuss current pressing challenges and possible alternative futures for students and communities. From these discussions strategic plans are created to map and prioritize actions and policies that address current challenges and

align decisions towards future directions. This shift would require schools develop new governance structures that focus on community issues, processes, and development. Facer (2011) argues that this shift within schools would foster the conditions for “slow citizenship that allow dialogue across difference and that build relationships across generations, the future building school sets up new governance arrangements that allow communities to participate in a sustained conversation about the relationship between education and community” (p.105).

The idea of a school as the central heart of the community is not a new idea, in fact, Henry Morris proposed the village college in the 1920’s for rural communities in England. He claimed that the village college:

would take all the various vital but isolated activities in village life - the School, the Village Hall and Reading Room, the Evening Classes, the Agricultural Educational Courses, the Women’s Institute, the British Legion, Boy Scouts and Girl Guides, the recreation ground, the branch of the County Rural Library, the Athletic and Recreation Clubs - and bringing them together into relation to create a new institution for the English countryside. It would create out of discrete elements an organic whole; the vitality of the constituent elements would be preserved, and not destroyed, but the unity they would form would be a new thing (para 3).

The difference between Morris’ articulation of the village college and approaching *community as curriculum* in schools is that in this proposed shift, the reason for bringing together community groups is to foster deliberate communication, planning, and actions that address current environmental, social, and economic challenges within the community. In a possible future trajectory of this idea, the local council and the public school might share the same physical space. In some areas, school boards and schools have positioned themselves in the heart of community, but more often than not this means that the school’s facilities are used by various community groups which results in many positive social benefits but it does not mean that the school is the centre of community discussions about current challenges and hoped for futures.

This shift would provide avenues for children and young people to learn authentically about the challenges their community faces and create opportunity for children and youth to challenge, consider, or shape their own futures, which current dominant contemporary education policy discourse fails to offer. There is rarely consideration of voice or agency given to children and young people who will bear the economic and environmental realities of climate change over the next 50 and 100 years and who will have full rights in the not-so-distant future. This shift requires that schools and the wider community are given some authority to create spaces for local and relevant learning opportunities, which in many countries means a negotiation from the responsibility of curriculum design being nationally coordinated to also include some local

responsibility and autonomy. This shift would require meaningful assessment and evaluation that is not solely based on comparative test scores across regions, states, and countries. With improvements in learning analytics and the ability to share artefacts that arise from knowledge production processes (documents, video, photo, audio, websites), assessment and evaluation can focus on observation and feedback more readily than high skills testing. This would move toward an alignment between schools and environmental education that have traditionally had contradictions in purpose and practice (Stevenson, 1987) by providing an avenue for addressing environmental and social injustices through democratic processes that focus on collective responsibility rather than individual practices.

An example of this is the Lowline Project on the Lower East Side of Manhattan (the world's first underground park) where primary students from a nearby school review the history of the area including social groups. This may include both face-to-face and online research. The students go through a series of workshops to imagine and discuss their design ideas for how the park can be used, taking into account social considerations. The students then present their vision of what they would like to see in the park to their teachers, parents, and other community groups involved in the development of the park and create a 3D scale model to represent their vision (see Lower East Side History Project for more information).

Adopting a connected learning approach

'Connected learning' is an educational approach that has emerged from research that considers interest-driven learning, changing social, economic, technological and cultural contexts, and affordances of the digital age (Ito et al., 2013). It focuses on harnessing the advances of innovations of the digital age with an equity agenda to enable youth who otherwise lack access to opportunity:

It is not simply a 'technique' for improving individual educational outcomes, but rather seeks to build communities and collective capacities for learning and opportunity. Without this focus on equity and collective outcomes, any educational approach or technical capacity risks becoming yet another way to reinforce the advantage that privileged individuals already have (Ito et al., 2013, p. 8).

Through *adopting a connected learning approach* the boundaries between learning that occurs in school and outside of school becomes blurred and educators working within the formal education system encourage children and youth to focus their learning on their interests and the issues that are in their communities. (Cantrill, et al, 2014). This approach takes a networked approach to educational reform, which is different than previous attempts at technological deployment or centralized institutional reform. With a

networked approach, shifts occur across different sites of learning where like-minded reform efforts align across sectors and can achieve “network effects” (Liebowitz and Margolis, 1994). Digital technologies afford unique opportunities for networks to develop and can complement institutionally driven change.

In this approach, a young person is able to pursue a personal interest with the support of friends, adult mentors, and to connect this interest-driven learning to academic requirements, career pathways, and civic engagement. Connected learning can take many forms; one example, to illustrate this approach, is a 14 year old student in the Quest to Learn school in New York City named Charles Raben. Charles was introduced to a game designer and part-time photographer through the school’s Mission Lab program. Charles decided in his independent study class to focus on photography and asked to be mentored by the game designer and photographer he had met earlier. Charles worked with his mentor to produce a set of online tools, which help him differentiate between a good photograph and a bad photograph. On his way to school, Charles stopped by the local newsstand and he was engaged in a conversation with the owner of the newsstand, who was going to have to close the stand because of a new licence technicality - even though the owner had operated the store for the past 25 years. Charles took a series of portraits of the owner and went home and created an online petition. Charles said, “I wanted to have that experience of creating change myself,” and soon after this instance, his teachers noticed that he became even more engaged in school and in his academic work. He was able to see that he could make a difference as a student and that he didn’t have to wait until he was an adult.

These shifts will create educational institutions that are adaptive and responsive to the challenges and needs of local communities within the 21st Century where information is abundant, and environmental, social, and economic systems are in flux. These shifts provide pathways for what environmental sustainability education calls for in order for creative engagement in emergent change, facilitated by new approaches of learning and ways of organizing, which contribute to transforming unsustainable systems. Formal education systems can play incredibly important roles in adapting to and transitioning towards unknown futures, it is matter of whether formal education institutions adapt to the needs of the 21st Century:

Rather than working to simply service this impoverished future narrative, we need education institutions that can help us to work out what intelligence and wisdom mean in an age of digital and cognitive augmentation. We need education institutions that can teach us how to create, draw upon and steward collective knowledge resources. We need educational institutions that can build intergenerational solidarity in a time of unsettled relationship between generations. We need educational institutions that are capable of nurturing the

capacity for democracy and debate that will allow us to ensure that social and political justice are at the heart of the socio-technical futures we are building. (Facer, 2011, pg. 103).

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Appendices

Appendix A. Example invitation to participate in online questionnaire sent to various international and national environmental and youth-focused organizations

Hi,

My name is Ellen Field and I am conducting research on young people, social media, and environmentalism. I am looking for young people between 16 - 18 to complete a survey. From the survey, 30 youth will be selected to participate in a 6 month ethnography study focusing on how they use social media to communicate about environmental and social justice issues that matter most to them.

Please circulate this to any networks you have, that are relevant.

All of this information is also available on my website: <http://ellenfield.info/current-research/>

If you have a newsletter, I can put together a tailored invitation. Don't hesitate to get in touch and ask any questions.

Thank you for your support,

Ellen

twitter description (132 characters):

Are you between 16 - 18 actively using social media for an environmental cause? Include your voice in research: <http://bit.ly/Vpn5XF>

longer description:

Are you a young person between the ages of 16 - 18 who is actively using social media to teach and communicate with others about environmental issues you are passionate about?

If yes, then please consider [filling out this survey](#):

<https://www.surveymonkey.com/s/youngenvironmentalactivists>

This survey is being used to help identify 30 young environmental activists from around the world who will be asked to participate in a 6 month ethnographic study focused on how they use social media to communicate about the environmental and social justice issues that matter most to them. It will profile the visibility of young people as actors in new and growing environmental and social movements.

The study is being conducted by [me](#), Ellen Field, a PhD student at [James Cook University](#), is funded by the [Social Sciences and Humanities Research Council of Canada](#) and is in collaboration with [Taking IT Global](#). The [survey](#) will take 20 minutes to complete.

If you know of others between 16 & 18 years old who might be interested in this study, can you please pass on this [survey](#) to them.

Appendix B. Dispatch newsletter from Taking IT Global

TakingITGlobal | Home | Community | Newsletters

TakingITGlobal Newsletters

Welcome to the TIG Newsletter's archive! Using the tabs below, you can browse archived issues of the TIG Dispatch, TIG Update, and TIG Link Newsletters.

Latest Newsletters

- TIG Dispatch
- TIG Updates
- TIGed News
- TIG Link
- View E-mail**

Calling all Young Environmentalists!

Are you a young person between the ages of 15 - 18 who is actively using social media to teach and communicate with others about the environmental issues you are passionate about?

If so, then please consider filling out [this survey](#).

Collected information will be used to identify 10 young environmental activists to participate in a 6 month ethnographic study focused on how they use social media to communicate about the environmental and social justice issues that matter most to them. It will profile the visibility of young people as actors in new and growing environmental and social movements.

[Read more](#)

Help Put Youth Skills to Work

Youth around the world are facing new challenges, with over 200 million young people between the ages of 15-24 lacking the skills to find decent work. **UNESCO** is calling on YOU to lend your voice and gather content to create an online multi-media magazine on this issue.

You can contribute by:

1. Adding a picture or film to TIG's [Youth Skills Work global gallery content](#)
2. Sending a text to +441546 484 253 with your name, age, country and the job you would do if you had the right skills.
3. Signing the [Youth Skills Work Pledge](#) that calls on governments to put education to work!

Get more information about the campaign [here](#).

[Read more](#)

Be a Part of a Defining Moment!

Defining Moments invites you to participate in **National Projections**, an evening of interactive and engaging Canadians from coast to coast to coast. Tread your defining moments in 3D moments and see it appear on an interactive digital art projection across the country! On January 31st you can join us virtually, or in person at House of Metacore in Toronto, Canada.

The evening will consist of an exhibit, panel discussion, interactive "Tree of Griefs" projection designed by artist Pascal Amzot and a competitive art making session by Art Kettle.

We are also seeking artists to feature as part of our exhibit! Submit artwork reflecting your Canadian identity [here](#) and RSVP via [Eventbrite](#) or for more information contact amk@takingitglobal.org - see you there!

[Read more](#)

Newsletter Subscription

Want to subscribe to TakingITGlobal's Dispatch, Update, or Education Newsletter?

Just sign up for a free TakingITGlobal account and you'll be brought right back here to choose which ones to receive. Already a member? Just log in and you'll see the options here!

Your interest, support and involvement with TakingITGlobal helps our community grow and encourages those around you to become involved, informed and inspired.

Research Background

Are you a young person between the ages of 16 - 18 who is actively using social media to teach others and to communicate about environmental issues you are passionate about. If yes, then please consider filling out this survey.

This survey is being used to help identify 30 young environmental activists from around the world who will be asked to participate in a 6 month ethnographic study focused on how they use social media to communicate about the issues that matter most to them.

Taking part in this study is completely voluntary and you can stop taking part in the study at any time without explanation or prejudice. You may also withdraw any unprocessed data from the study. Your responses will be kept confidential and identifying information such as your name, email address, or IP address are not collected unless you would like to leave your email address and name for the principal researcher to contact you if you are interested in participating in further research on this topic. All data is stored in a password protected electronic format. The study is being conducted by Ellen Field and will contribute to her PhD thesis in Education at James Cook University. The questionnaire will take 20 minutes to complete.

If you know of others between 16 & 18 years old who might be interested in this study, can you please pass on this survey to them.

Your responses and contact details will be strictly confidential. The data from the study will be used in research publications. You will not be identified in any way in these publications unless you give approval.

If you have any questions about the study, please contact Ellen Field, principal investigator, or Professor Bob Stevenson, Supervisor.

Principal Investigator:
Ellen Field
School of Education and Cairns Institute
James Cook University
Phone: +61 (07) 4042 1730
Email: ellen.field@my.jcu.edu.au

Supervisor:
Professor Bob Stevenson
School of Education and Cairns Institute
James Cook University
Phone: +61 (07) 4042 1704
Email: bob.stevenson@jcu.edu.au



Consent

I understand the aim of this research is to find out how young people use social media networks to share environmentally-focused media, content, and communication.

I have read and understand the information above.

I understand that in order to participate in this research study, if I am under 18 years of age and over 16 years of age, I need to be mature enough to understand and consent to participate in this study without warranting additional consent from a parent or guardian.

I understand that my participation will involve completing an online questionnaire which will take 20 minutes.

I agree that the researcher may use the results from the study in research publications and that I will not be identified in any way in these publications without my approval.

I acknowledge that:

- taking part in this study is voluntary and I am aware that I can stop taking part in it at any time without explanation or prejudice and to withdraw any unprocessed data I have provided
- that any information I give will be kept strictly confidential and that no names will be used to identify me with this study without my approval.

***1. Please select your consent choice below:**

Clicking on the “agree” button below indicates that:

- **You have read the above information**
- **You voluntarily agree to participate**
- **You are over 16 years of age and mature enough to participate in this research.**

If you do not wish to participate in this research study, please decline participation by clicking on the “disagree” button.

AGREE

DISAGREE

Contact information

2. If you would like to be contacted to participate in further research, please leave your contact information here.

Demographics***3. How old are you?*****4. With which of the following do you identify?**

- Male
 Female
 LGBTQ
 Prefer not to answer

5. What country do you live in?**6. Is the environmental work you are involved in located in your home community?**

- Yes
 No

Other (please specify)

7. If your environmental work is not located in your home community, please list where it occurs and the size of the community.

City or Region

Size of community

***8. How would you describe where you live?**

- rural
 suburban
 urban

Other (please specify)

Involvement***12. What are the environmental, political, or social justice challenges that you find the most concerning?**

The challenge I am most concerned about is...

The challenge I am second most concerned about is...

The challenge I am third most concerned about is...

Involvement cont.

***13. Below is a list of community challenges other young people have mentioned.**

Thinking about each challenge individually, how concerned about each one are you?

	I don't know	Not at all	To a small extent	To a moderate extent	To a large extent	To a very large extent
Environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional governance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economics and Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peace and conflict	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health and wellness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning and education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Media and identity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human rights and equity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. What school groups or local community groups, if any, are you involved with that address the challenges you named in Question # 12 above? Please list any groups.

15. Are you involved in any online projects that address these issues? Please list any groups or forums and any details.

16. If you do participate in online groups, what are the 3 most important skills for your participation in these groups? For example, you could respond: instant messaging or video conferencing

The most important skill for my online participation in groups is:

The second most important skill for my online participation in groups is:

The third most important skill for my online participation in groups is:

17. Are any of the groups you belong to youth-led or youth-serving? If yes, which ones? Please indicate whether you engage in them online or during face-to-face meetings.

Online Participation & Social Media Usage

***22. How often do you use the following technologies to access the internet?**

	usage
desktop computer	<input type="text"/>
laptop computer	<input type="text"/>
tablet computer (e.g. iPad)	<input type="text"/>
smart phone (e.g. Android, iPhone)	<input type="text"/>
standard mobile phone	<input type="text"/>
Other (please specify)	<input type="text"/>

***23. Which of the following platforms do you use to communicate with your peers about the issues you are passionate about? And where do you mainly access these platforms?**

	usage	location
email	<input type="text"/>	<input type="text"/>
Facebook	<input type="text"/>	<input type="text"/>
MySpace	<input type="text"/>	<input type="text"/>
Twitter	<input type="text"/>	<input type="text"/>
Google+	<input type="text"/>	<input type="text"/>
LinkedIn	<input type="text"/>	<input type="text"/>
Blogs (e.g. WordPress, Tumblr)	<input type="text"/>	<input type="text"/>
Skype	<input type="text"/>	<input type="text"/>
Online Community Sites (e.g. Ning)	<input type="text"/>	<input type="text"/>
Taking IT Global	<input type="text"/>	<input type="text"/>
Other (please specify)	<input type="text"/>	

24. If you do not use any of the above platforms or social media sites, please explain why.

***25. On social networking sites, how much of the content that you post to friends is focused on the environmental or social justice challenges you are most concerned about?**

- all or almost all of it
- most
- some
- just a little
- none at all
- I don't use

***26. When you yourself have posted something environmental or political on a social networking site, have you ever gotten a strong negative reaction from a friend or someone who follows you - or has this never happened?**

- Yes, I have gotten a strong negative reaction
- No, has never happened
- Don't know

***27. Do you regularly use the internet for any of the following activities? Please select all that apply.**

- socializing with people I know offline
- socializing with people I only know online
- seeking information
- discussing issues I am passionate about with people I know offline
- discussing issues I am passionate about with people I only know online
- building communities around interests or issues

Other (please specify)

Thank You!

28. Thank you for taking the time to fill out this survey. If you are interested in being selected to participate in a 6 month ethnographic study focused on how young environmental activists use social media to communicate about the issues they are most passionate about, please leave your contact information below. If you are selected, Ellen Field will contact you and discuss the next steps!

Thank you so much and keep up your inspiring work!

Appendix D. Informed Consent Forms

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Appendix E. Semi-structured interview 1 protocol

Interview 1 questions

Establishing environmental activism

- 1) Can you tell me about the environmental activism you are involved in?
- 2) Can you tell me what you think environmental activism is? What kind of activities are a part of environmental activism? Would you describe your work as environmental activism?
- 3) Do you identify as an environmental activist?
- 4) What is the underlying motivation for your environmental activism? Is your activism related to ethics you have? Does your activism relate to a spiritual or religious perspective? Can you describe any important life experiences that formed these values?
- 5) Do you think groups you are currently involved in are environmental activist groups? If yes, how so?

Network Structure

- 6) Where is the environmental activism, you are involved in, located? (SQ6)
 - a. b) If the environmental activism is not located in your home community, please explain where it occurs? (SQ7)
 - b. c) Is this activism occurring through online or face-to-face groups or both? (Can you put an estimated percentage to online and face-to-face interaction?).
- 7) Which ones are youth-led or youth-serving? Do you meet online or face-to-face? (SQ17)
- 8) In the online survey, you indicated that you are a..... (leader/organizer, heavily involved, moderately involved, not very involved). Can you tell me more about your role in the group? (SQ19)
- 9) Is your involvement (from previous question) related to whether the group meets face-to-face or online? (SQ20)
- 10) Pick one of the online groups that you are involved with to respond to the rest of the questions, how many members are in the group?
- 11) How involved are the members? Can you give me an estimated percentage of how each member at each level is involved?(heavily involved, moderately involved, not very involved)
- 12) Are there formal positions within group? How are individuals selected for these positions?
- 13) What are the core leaders ages?
- 14) Are there adults facilitating the group? If yes, what kind of role do they take?
- 15) How does the group manage transient members?
- 16) Do people join the group? Probe: do individual members join in because of shared-interests? Or do they join because of already existing friendships?
- 17) Are there group meetings? If yes, how frequently? Can you describe a meeting? If no, how is work organized/coordinated?
- 18) How did your group form?
- 19) Does the group store documents related to the group's initiatives? If yes, where?

P2P Learning

Content

- 20) In the survey you listed these three environmental challenges (insert youth responses) as the ones you find the most concerning? Is this still true? Can you describe to me why these challenges are the ones you are the most concerned about?
- 21) You mentioned as one of the challenges you are concerned about, how has your understanding of changed as a result of your participation in this online network?
- 22) You mentioned as one of the challenges you are concerned about, how has your understanding ofchanged as a result of your participation in this online network?
- 23) You mentionedas one of the challenges you are concerned about, how has your understanding ofchanged as a result of your participation in this online network?
- 24) In terms of, what content or communication within the online network has influenced you the most personally?
- 25) In terms of, what content or communication within the online network has influenced you the most personally?
- 26) In terms ofenvironmental challenge, what content or communication within the online network has influenced you the most personally?
- 27) Is there any specific content that you have posted that has been particularly influential to others? How did you know it was influential to others?
- 28) Overall, what kind of information is shared in the online network?

Teachers & Adult mentors

- 29) Do you have or have you had any teachers that support your learning around your environmental project? If yes, how do they support you?
- 30) Are there other adults who have been influential?

Appendix F. Semi-structured interview 2 protocol

Process-based P2P

- 31) Repeated question from first interview: Does the group do activist work/organizing?
- 32) How do different members of the network distribute the activist work or organizing?
- 33) As an organizer, how do you feel other members respond to you?
- 34) What do other members of the network contribute?
- 35) Have their ideas influenced your views on environmental challenges or approaches to environmental challenges?
- 36) Repeated question from first interview: Is there any specific content that you have posted that has been particularly influential to others? How did you know it was influential to others?
- 37) Do individuals in your network participate in other networks focused on similar issues? And do they share their resources/skills/knowledge from network to network?
- 38) What types of learning do you think happens through social media about environmental issues?
- 39) Can you explain in more detailthis kind of learning?
- 40) Let's take(environmental issue focused on) what motivates you to learn about this. What kinds of activities do you do to learn about this issue? Can you compare the amount of time or energy you put into learning about this issue compared to the amount of time or energy you put into learning about a topic in school?
- 41) Because of your posting about (issue x) has this caused increased participation? If yes, how so? If so with whom?

Skill Development for the 21st century

- 42) In the survey, you indicated that you use the following technologies..... to access the internet (desktop, laptop, tablet, smart phone, standard mobile phone), has this changed? (SQ22)
- 43) In the survey, you indicated that you use the following platforms..... to communicate with your peers about an issue? And where do you mainly access these platforms, has this changed? (SQ23)
- 44) In the survey, you indicated that these..... are the most important skills for your participation in online groups. Do you still agree? (SQ16)
- 45) Where did you learn these skills (on your own, in school, from seeing others do them online)?
- 46) Has your participation in online groups, helped you with your networking/communication skills? Do you have the opportunity to practice these skills in school?
- 47) In your opinion what are the most important skills for your future career?
- 48) Where do you get to learn/practice these skills? (school, online groups, afterschool programs)
- 49) Have you learned all/some or any of the 21st century skills from your peers? If yes, which ones and how so?
- 50) Looking at this list of 21st century skills - please explain if you practice/learn this skill at school, or out-of-school, or both.
- 51) Do you feel that you are competent in the 21st century skills?

More empowered sense of citizenship (both individual and reflections on group)

- 52) Do you believe that your online actions in the network change people's attitudes about this issue? If yes, how so?
- 53) Do you believe that your online actions in the network create change in terms of the specific issue? If yes, how so?
- 54) Have you ever posted environmental or political content on a social networking site and gotten a negative reaction or comments? If yes, what happened? How did you respond? How did it make you feel?
- 55) Have you ever posted environmental or political content on a social networking site and gotten a positive reaction or comments? If yes, what happened? How did you respond? How did it make you feel?

Future

- 56) How do you see yourself participating in this group in the future? When you leave high school or in 5 years time?
- 57) Do you plan to participate in other activist groups?
- 58) If FB was gone, how would this group organize?

Appendix G. Data Collection Summary including interview schedule

Respondent	Country	Survey Questions	Interview 1		Transcribed	Interview 2		Transcribed	Social Media Pulled		Data reviewed
			Date	Length		Date	Length		Organization	Individual Profile	
	India	Yes	August 14 th - September 11 th , 2013	Asynchronous Facebook messenger	Yes	January, 2013	Asynchronous Facebook messenger	Yes	Plant for the Planet & Saviours of the Environment	Yes	
	Nepal	Yes	March 25 th , 2013	52:48	Yes	Oct. 25 th , 2013	55:35	Yes	MECT /Peepal	Yes	Y
	Jordan	Yes	May 22 nd , 2013	50:53	Yes	Nov. 14 th , 2013	48:29	Yes	Young Jordanians	Yes	
	Guelph, Ontario	Yes	August 26 th , 2013	48:25	Yes	Dec. 1 st , 2013	50:50	Yes	Terra - closed FB group	Yes	Y
	Halifax, Canada	Yes	Nov. 5 th , 2013	50:57	Yes	Dec. 17 th , 2013	1:01:79	Yes	No	Yes	
	South Africa	Yes	May 26 th , 2013	48:58	Yes	Nov. 11 th , 2013	42:22	Yes	Generation Earth	Yes	Y
	Papua New Guinea	Yes	September 9 th - November 7 th , 2013	Asynchronous Facebook messenger	Yes	Dec. 16 th , 2013	49:05	Yes	Make a Change! Be Environmentally Friendly	Yes	Y
	Australia	Yes	March 28 th , 2013	1:02:46	Yes	Dec. 2 nd , 2013	38:24	Yes	AYCC	Yes	Y
	Jordan	Yes	May 20 th , 2013	51:50	Yes	No		No	No	Yes	
	Fonthill, Canada	Yes	May 30 th , 2013	56:31	Yes	Nov. 5 th , 2013	48:63	Yes	Anti-Fur Group	Yes	
	Nepal/Sweden	Yes	August 13 th , 2013	1:02:76	Yes	Dec. 3 rd , 2013	49:39	Yes	Sanosansar	Yes	Y
	Indonesia	Yes	August 7 th , 2013	Asynchronous Skype message	Yes	No	N/A	No	No	Yes	

Appendix H. Gephi visualization protocol



Tutorial
Quick Start

- * Introduction
- * ,PSRUW ÀOH
- * Visualization
- * Layout
- * Ranking (color)
- * Metrics
- * Ranking (size)
- * Layout again
- * Show labels
- * Community-detection
- * Partition
- * Filter
- * Preview
- * Export
- * Save
- * Conclusion

Gephi Tutorial Quick Start

Welcome to this introduction tutorial. It will guide you to the basic steps of network visualization and manipulation in Gephi.

Gephi version 0.7alpha2 was used to do this tutorial.

 [Get Gephi](#)

Last updated March 05th, 2010

Appendix I. Cross-case analysis rating

	Multi-case questions	Case A	Case B	Case C	Case D	Case E	Case F	Case G	Case H	Case I	Case J	Case K
RQ 1	Q 1: What is the range of scale of these networks?	L	M	L	M	L	H	M	L	L	H	H
	Q 2: What is the range of size of membership?	L	M	L	M	L	H	H	L	L	H	/
	Q 3: What role does youth leadership play in group formation?	H	L	/	H	H	H	H	L	H	H	/
	Q 4: Formal positions within group and processes for selection.	H	M	L	L	L	H	L	H	L	H	/
	Q 5: How are adult facilitators involved in the group?	M	M	H	H	L	L	H	L	L	H	/
	Q 6: What is the format and communication tools used for group meetings?	M	H	L	H	M	H	L	H	L	H	/
RQ 2	Q 7: What types of learning do youth think happens through social media about environmental issues? Can you explain in more detail this kind of learning?	/	M	/	L	H	L	H	M	L	H	/
	Q 8: What are significant environmental challenges according to youth?	M	H	L	H	H	L	M	M	L	H	L

Q 9: What environmental & sustainability topic knowledge do these youth have about these issues?	M	H	L	L	H	/	M	M	L	H	L
Q 10: How have youth's understanding of sustainability topic knowledge based on participation in network?	M	H	H	L	L	L	H	H	L	H	/
Q 11: How have other group members influenced individual's view about issue?	/	H	/	H	H	L	/	H	L	H	/
Q 12: How has content influenced individual personally?	/	H	H	M	H	L	H	H	L	L	/
Q 13: How has content that individual has posted influenced others in group and how have they known?	/	L/M	M	/	H	L	H	L	/	M	/
Q 14: What 21st century skills do they attribute to learning from their online network?	/	L	/	L/H	H	M	/	H	H	H	/
Q 15: What 21st century skills do they attribute to learning from high school?	M	L/M	/	H	H	M	L	H	H	H	/
Q 16: Individual learning processes: What motivates to learn about issue x. What kinds of activities do you do to learn about this issue?		M/H	/	/	H	/	L	/	/	/	M

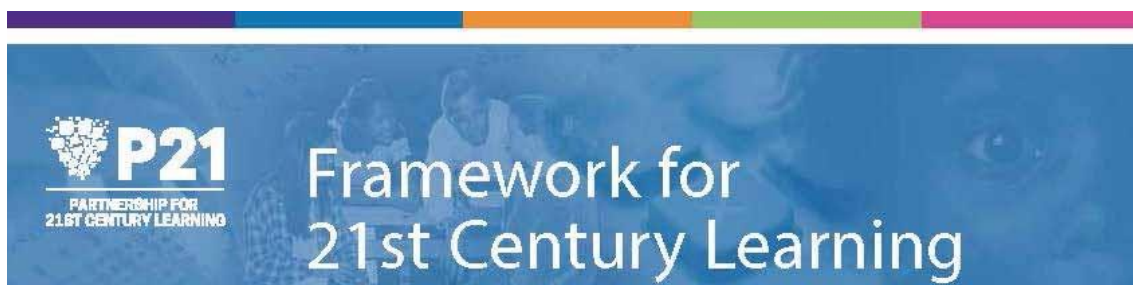
	Q 17: How do individuals respond to positive and negative comments?	/	M	/	H	/	H	H	L	H	/	/
RQ 3	Q 18: How much content that youth posts is related to environmental or social justice issues?	H	/	L/M	L	L	M	H	H	H	H	/
	Q 19: From youth's perspective, what is environmental activism?	H	M	L	M	H	M	L	M	M	H	/
	Q 20: From youth's perspective, what activities are considered environmental activist activities?	M	L	L	/	H	M	L	L	H	H	H
	Q 21: Youth identity as environmental activist "uncertain, hesitant, identify"	M	M	M	L	H	H	M	H	H	H	H
	Q 22: Youth reflections on social media activism	/	L	/	H	H	M	H	M	H	H	H
	Q 23: Distnction between online/offline activism	/	M	M	/	H	/	L	M	/	/	/
	Q 24: Observed Environmental activism practices	H	/	L	L	L	L	H	L	/	H	/

Additional Subresearch Qs	Q 25: What motivations and unique perspectives do identified environmental activists report as catalysts for their interest-driven learning and action?	M	M	M	H	L	L	H	M	H	M	L
	Q 26: How do youth perceive their participation in youth interest-driven environmental networks as empowering? (Empowerment scale)	/	M	M	H	/	M	H	H	L	H	L

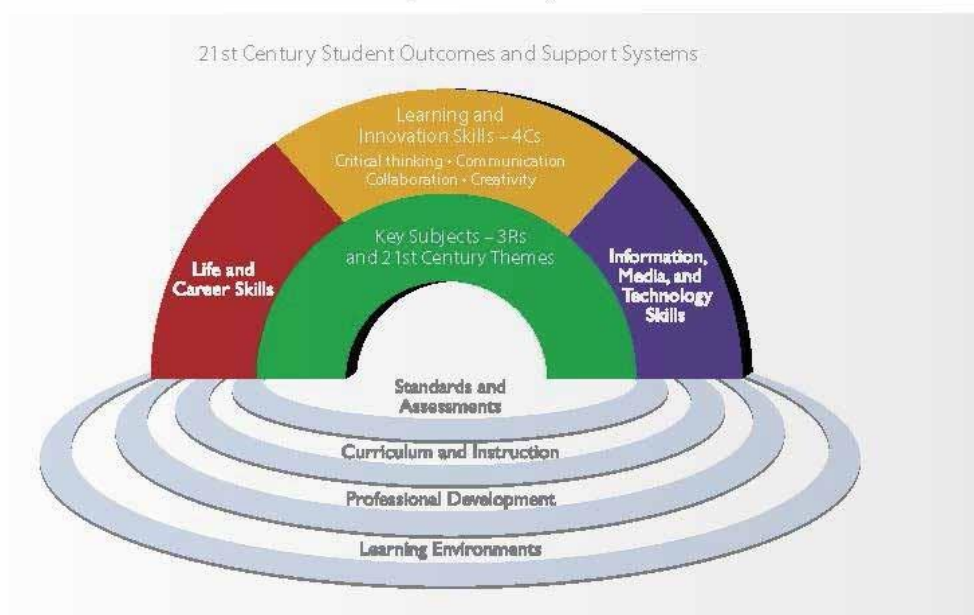
Appendix J. Ethics Approval from James Cook University

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Appendix K. Framework for 21st Century Learning



The Partnership for 21st Century Learning (P21) has developed a vision for student success in the new global economy.



21ST CENTURY STUDENT OUTCOMES

To help practitioners integrate skills into the teaching of core academic subjects, P21 has developed a unified, collective vision for learning known as the Framework for 21st Century Learning. This Framework describes the skills, knowledge and expertise students must master to succeed in work and life; it is a blend of content knowledge, specific skills, expertise and literacies.

Every 21st century skills implementation requires the development of core academic subject knowledge and understanding among all students. Those who can think critically and communicate effectively must build on a base of core academic subject knowledge.

Within the context of content knowledge instruction, students must also learn the essential skills for success in today's world, such as critical thinking, problem solving, communication and collaboration.

When a school or district builds on this foundation, combining the entire Framework with the necessary support systems—standards, assessments, curriculum and instruction, professional development and learning environments—students are more engaged in the learning process and graduate better prepared to thrive in today's global economy.

Publication date: 05/15

Key Subjects and 21st Century Themes

Mastery of key subjects and 21st century themes is essential to student success. Key subjects include English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government and civics.

In addition, schools must promote an understanding of academic content at much higher levels by weaving 21st century interdisciplinary themes into core subjects:

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Environmental Literacy

Learning and Innovation Skills

Learning and innovation skills are what separate students who are prepared for increasingly complex life and work environments in today's world and those who are not. They include:

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration

Information, Media and Technology Skills

Today, we live in a technology and media-driven environment, marked by access to an abundance of information, rapid changes in technology tools and the ability to collaborate and make individual contributions on an unprecedented scale. Effective citizens and workers must be able to exhibit a range of functional and critical thinking skills, such as:

- Information Literacy
- Media Literacy
- ICT (Information, Communications and Technology) Literacy

Life and Career Skills

Today's life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills, such as:

- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills
- Productivity and Accountability
- Leadership and Responsibility

21ST CENTURY SUPPORT SYSTEMS

Developing a comprehensive framework for 21st century learning requires more than identifying specific skills, content knowledge, expertise and literacies. An innovative support system must be created to help students master the multi-dimensional abilities that will be required of them. The Partnership has identified five critical support systems to ensure student mastery of 21st century skills:

- 21st Century Standards
- Assessments of 21st Century Skills
- 21st Century Curriculum and Instruction
- 21st Century Professional Development
- 21st Century Learning Environments

For more information, visit P21's website at www.P21.org.



Member

Organizations

- AFT
- American Camp Association
- Apple Inc.
- Asia Society
- Baboeshir K-12 Schools
- Cable Impacts Foundation
- The College Board
- Common Sense Media
- Crayola
- Destination Imagination
- Duck Learning
- EdLeader21
- EF Education First
- ENA
- Fisher-Price
- Ford Motor Company Fund
- Future Problem Solving Program International
- Gale Cengage Learning
- The Goddard School
- Intel Corporation
- Learning.com
- LEGO Education
- National Board for Professional Teaching Standards
- National Education Association
- PBS
- Pearson
- Project Management Institute Educational Foundation
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- VIF International Education
- The Walt Disney Company

