An investigation into the development and transferability of critical thinking skills in students studying Outdoor related degrees

by

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Type of Award **Doctor of Education**

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Abstract

Critical thinking is an integral part of undergraduate programmes; however, it is not always an easy pathway when it comes to applying it to academic work. This piece of research has questioned whether a student who engages in academic study may have developed critical thinking elsewhere, and if so, whether it is possible for them to transfer these skills to their academic work. Based within the context of students studying outdoor related degrees, this practitioner research challenges the underlying assumptions associated with this notion. For example, this research has questioned what critical thinking is, whether a student who takes part in outdoor activities has developed critical thinking skills through their practice, and if so, how a lecturer can help them to develop these skills and consider transferring them to their academic work.

The research took a pragmatist approach, where "pragmatism is seen as the function of reflective thought and relationships to guide action", selecting tools when each research problem/question was determined and closing with a practical and useable solution (McCaslin, 2008, p. 674). There were four distinct phases, with each phase informing the next. Data was collected using a structured analysis of the literature to define critical thinking, questionnaires, interviews, focus groups, and email consultation. Participants in this research included students studying undergraduate and postgraduate outdoor related degrees, technical experts from the outdoor industry, and critical friends.

Through exploring the literature and perceptions of the participants, central to this research has been defining and communicating critical thinking. In addition, the findings of this research suggest that an outdoor practitioner could have developed critical thinking skills through their practice, and that these skills share many of the characteristics of critical thinking as described in academic literature. This research has also found that facilitation plays an important role in critical thinking development, in both contexts, and that an individualised approach is needed to balance the level of facilitator input with student independence. As a professional doctorate, which is directly related to practice in education, the thesis offers approaches to teaching to aid the development of critical thinking, and a conceptual model of critical thinking as a means to communicating and building confidence around the subject.

Contents

List of Figures and Tables

Acknowledgements

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Key to acronyms used within the thesis

Degree courses:

OL BA hons Outdoor Leadership

ASC BA hons Adventure Sports Coaching

OL (B) BA hons Outdoor Leadership (Blended, top up)

National Governing Body Qualifications:

MIA Mountain Instructor Award

ML Mountain Leader (summer)

ML(t) Mountain Leader (training)

WGL Walking Group Leader Award

MLW Mountain Leader Winter

SPA Single Pitch Award

CWA Climbing Wall Award

FSRT Foundation Safety and Rescue Training

1-5* Paddlesport performance awards

Level 1-4 UKCC/British Canoeing coaching awards

Level 1-5 British Canoeing coaching award (previous awards)

Level 1-4 UKCC/British Orienteering coach awards

GNAS Grand National Archery Society

PADI Professional Association of Diving Instructors

MIAS Mountain-Bike Instructors Award Scheme

1 INTRODUCTION: THE CONTEXT OF THE RESEARCH

My research stems from wanting to help people whom I perceive to be like me: people who come from a background in (outdoor) practice but find themselves in an 'academic' situation. Whilst teaching on undergraduate and postgraduate outdoor related programmes I often worked with outdoor practitioners who were active in the outdoor industry, held a range of qualifications in the field, and were returning to education to study their subject at university. I found that several of this group of students asked me for help with their academic studies, and I observed that what they needed to apply to their academic work was, what I perceived to be, critical thinking. Through my own reflections, I questioned why these students appeared unable to apply critical thinking, despite my assumption that they already possessed equivalent skills. As an active practitioner in outdoor activities myself, and with a background in coaching and teaching in several aspects of the outdoor industry[1], I considered whether the students may have already developed what might be termed 'critical thinking skills'. Reflecting on my own experiences in the field, I had observed and personally experienced complex and dynamic environments in which reasoned decisions are applied and reviewed. This process, to my knowledge at the time, seemed like my understanding of critical thinking; therefore, if a student was able to apply this thinking process in the outdoors, why were they not applying it to their academic work?

The underpinning question that informed my inquiry was as follows: Could I help these students to apply the critical thinking skills they had apparently developed in their outdoor practice to their new context of academic work?

This question contains several sub-questions, and these formed the basis of my investigations:

> *How did my own understanding of critical thinking compare with associated literature?*
>
> *How did students perceive the concept of critical thinking?*
>
> *Were there grounds to my hypothesis that these students had developed critical thinking skills through their practice in the outdoor industry*?
>
> *Was it possible to teach the students to apply these skills to their academic work*?

[1] A brief introduction to my outdoor experience: I have led multi-day canoe expeditions, mountaineered, climbed, kayaked and skied around the world. I am a Level 5 Canoe Coach, MIA, WML, Level 3 Orienteering Coach and have been a course provider for the ML, WGL, SPA, CWA, Level 1 Paddle Sport and Level 1 Orienteering. My outdoor work has included cross-curricular teaching with school groups, personal development training, skills coaching and instructor/leader training and assessment.

Within the early stages of my research, I started to investigate these questions. Similar to the process noted by Agee (2009), as my reading around the subject of critical thinking and research methodologies progressed, my final research questions (detailed at the end of chapter 2) were adapted in response to my learning. Also during these earlier stages, and throughout my research, I discussed my work with critical friends. Three critical friends made a particular contribution to my learning. The first, whom I spoke to in the early stages, was an outdoor teacher who also worked in the healthcare profession, thus offering an alternative perspective to my thinking. The second, who was a senior lecturer within a university and held higher-level outdoor qualifications, was a very useful source with whom to discuss my work relative to its context. The third, whom I drew upon mostly in the later stages, was studying a PhD in outdoor learning. This particular critical friend provided contextualised advice on the application of my research into the field of outdoor learning.

Concerning where I 'speak' from, Denzin and Lincoln (2003) suggest that behind terms such as ontology, epistemology, and methodology lies the personal biography of the researcher. The researcher 'speaks' from within a community, starting the research process from within this community. My 'community' for the last twenty-six years has encompassed teachers, coaches, instructors and recreational practitioners from the outdoor activity industry. For the first eighteen of these years, I paddled, climbed, mountaineered etc. and worked in a field where I either coached students to perform these skills, and/or used the activity as a medium for facilitating the learning of other personal and social skills. For the following eight years, I continued to be an active practitioner in these plus additional activities but took my teaching and coaching into a classroom. My practice then, and now, involves understanding a problem, selecting tools to address that problem, and seeking an outcome of practical nature.

Although not initially obvious to me, how I chose to examine the questions above was by using a pragmatist approach to research. I discuss pragmatism in more detail later in this thesis; however, it is of note here that this thesis draws on the following definitions of pragmatist research. According to Shannon-Baker (2016, p. 319) pragmatic research is "characterised by an emphasis on communication and shared meaning-making in order to create practical solutions to social problems". Also, McCaslin (2008, p. 674) notes, "Pragmatism is seen as the function of reflective thought and relationships to guide action". Within my research, tools were not selected until each research problem/question was determined (McCaslin, 2008), and because pragmatic research closes with a practical and useable solution (McCaslin, 2008) this thesis concludes with a practical teaching resource for use in my own, and potentially others' practice. My research also contains elements that are participatory in nature, and some methods used (for example phase 4) were informed by action research methodology. In action research; there is a problem to solve (Vivekananda-Schmidt, 2011; Melrose, 2001), and the researcher conducts

research ‘in action’ with problems being identified and acted on (Coughlan and Coughlan, 2002). At the beginning of this introduction, I identified a ‘problem’ that I wanted to solve, and in phase 4, I used an intervention to trial a possible solution to ease this problem.

Reflecting now, it is notable that during the initial stages of my research I had not acknowledged how much the early part of my outdoor practice would influence my research practice. Now, acknowledging this larger community, and realising its influence on me, has meant that where I ‘speak’ from is much clearer. Coaching/teaching/research questions are central to my approach in which the problem is tackled directly, and a solution or intervention is sought (McCaslin, 2008).

Subsequently, the aims of my research were:

1. To explore the notion of critical thinking in outdoor practitioners;
2. To question the transferability of critical thinking skills;
3. To produce an outcome of benefit to both lecturers and outdoor instructors.

It is of note here, that although defining critical thinking is discussed in chapter 2 of this thesis, I have referred to critical thinking as a set of skills: ‘critical thinking skills’. This is similar to the work of others, such as Cottrell (2005) and Ruggiero (2012), where critical thinking is thought to be a combination of skills.

1.1 Structure of the thesis

The structure of this thesis is as follows: first, there is an introduction to the terms used within this thesis, each discussed and summarised as to their use here. Chapter 3 discusses the methodology and explains the methods used, and includes an overview of the ethical considerations, data analysis tools employed, and rigour within this thesis. The findings of each of the four phases of research are in chapter 4, and chapter 5 offers a discussion as to the implications of the findings. Chapter 6 concludes the thesis, with suggestions for further research. Therefore, this thesis does not follow the chronological order in which the research took place, but rather reports the aspects of each phase together. In practice, phase 1 preceded phase 2, which was followed by phase 3 and then phase 4.

Literature is threaded throughout the thesis, rather than residing in a chapter entitled ‘Literature Review’. In chapter 2, there is a particular focus on literature surrounding definitions of critical thinking, literature relating to methodology is in chapter 3, and literature regarding development and transferability of critical thinking is introduced in chapter 5.

2 TERMS USED WITHIN THIS THESIS

This chapter discusses several terms used within this thesis (outdoor activities; complex and dynamic environments; problem solving; decision-making; transfer and critical thinking), offering a definition for each, which are then used as the basis for this thesis. At the end of this chapter, the reader will find the resulting research questions.

2.1 Outdoor activities and dynamic/complex environments

This thesis discusses the notion of dynamic and complex environments and asserts that outdoor practitioners operate in dynamic and complex environments. The term outdoor practitioner itself refers to people who take part, recreationally and professionally (coaches/teachers/instructors etc.) in outdoor activities such as mountaineering, rock climbing, paddle sports, wind sports, mountain biking, winter sports etc. The list of acronyms at the beginning of this thesis demonstrates the range of activities included, these acronyms referring to the associated governing body awards for these sports/activities, the commonality between them being that they take place in environments that regularly change, and include an element of risk (physical, mental and emotional). This is like other definitions of outdoor activities, though a degree of flexibility is seen in the terms used to describe such activities. For example, Pomfret (2006) uses these activities as examples of activities that adventure tourists take part in, and Collins and Collins (2012) use the term adventure sports to describe similar activities to the ones listed here and note that adventure sports mean those activities that take place in a dynamic environment (2012; 2013).

The term ‘dynamic’ is often associated with outdoor activities. For example, in a paper prepared for the Welsh Assembly Government by Learning through Landscapes Cymru, they refer to the dynamic environment in which outdoor activities take place due to changes in seasons and weather. In Berry, Lomax and Hodgson’s (2015) book, they stress that adventure sports take place in dynamic environments, which can change repeatedly in one day. The term ‘complex’ (for example used by Collins and Collins, 2013) also offers a description of the environment in which outdoor activities take place, the complexity depending on the nature of the environment with some environments being more complex than others. According to the Oxford Dictionary (2019), something that is complex has many different and connecting parts to it and is difficult to understand. Within outdoor activities, these different parts may include variables such as the weather, the terrain, the people you are with, as well as other factors. In my experience in the outdoor industry, these different parts are often difficult to understand, particularly in view of their interconnectedness. These parts, which are often dynamic and thereby ever changing,

contribute to the complexities of the environment. Krein (2007, p. 88) notes that there is an "obvious feature that adventure sports have in common with each other". This feature is that unlike many other sports, that take place in standardised and controlled environments, outdoor activities, often referred to as adventure sports, take place in environments that change (Krein, 2007). Krein gives the examples of ice climbing routes that change from day to day, and surfing, where the environment changes from moment to moment.

Although other terms for these activities exist, such as adventure sports, extreme sports, nature sports, action sports etc. for this thesis the term 'outdoor activities' or 'outdoor practice' is used, the latter term also encompassing the employment associated with outdoor activities such as guiding, coaching, teaching and instructing. This is in part due to the contextualised nature of this research, that participants were engaged in 'outdoor' related degrees[2]; also, it is not for this thesis to debate the possible differences between such terms as adventure/outdoor/extreme activities. Students on the undergraduate and postgraduate programmes I teach on take part in many of the activities listed above recreationally (see table 3), and for some, as part of their programme. Additionally, many of the students work within the outdoor industry. It is also of note that this list is not exhaustive, it merely offers examples, and that other sports/activities are included in what is meant here by 'outdoor activities' and 'outdoor practice'.

In summary, within this thesis, the term outdoor practitioner describes someone who takes part in outdoor activities (including recreationally), these taking place in environments that are (to varying degrees) dynamic and complex, for example kayaking and rock climbing.

2.2 Transfer

As discussed in the introduction, I embarked on this research process with the presumption, based on my experience, that outdoor practitioners could have developed critical thinking skills through their practice in the outdoors, and I questioned whether these skills were transferable. The following discussion serves as an outline as to what 'transfer' means, concluding with a definition of transfer that is used throughout this thesis.

Transferability of learning is a questionable area in the outdoors in general, with Brown (2010) suggesting that it is the "Achilles heel" of the industry. One area of literature that is useful in understanding transfer is 'transfer of training'. Cheng and Ho (2001) carried out a review of

[2] BA Hons Outdoor Leadership; BA Hons Outdoor (Leadership) (blended, part time, top up course); BA Hons Adventure Sports Coaching; BA Hons Outdoor Adventure Leadership; MA Outdoor Practice.

studies (from 1989 to 1998) on transfer of training. Within their review, they define transfer of training as the application of skills learnt from training on the job, and the subsequent maintenance of these skills. They suggest that this definition goes beyond some of the earlier definitions that only acknowledged the skills learnt and not application and maintenance. More recently, Grohmann, Beller and Kauffeld (2014) define transfer of training as a change in behaviour in the job or the workplace, because of attending a training course. Coates (2007) also suggested a similar definition, proposing that transfer of training should result in a change of behaviour in the workplace. Essentially these definitions mean that on-the-job behaviour changed because of the training. The Kirkpatrick model, developed in the 1950's, is a widely used model in evaluating the effectiveness of training (Reio Jr, Rocco, Smith, and Chang, 2017). In this model, the suggestion is that a participant's behaviour in the workplace changes if they have transferred their learning from the intervention to their workplace. Within the context of this thesis, this would mean that a student's behaviour in their academic work would change, if they had successfully transferred critical thinking skills from their practice to this new domain.

Regarding the context of my research, the outdoors, Bobilya, Kalisch, Daniel & Coulson (2015) discuss some of the literature on transfer of learning in this field. They summarise transfer of learning to be "the process by which a person uses what is learned in one setting or situation in subsequent situations" (Bobilya et al., 2015, p. 95). In their research, conducted with Outward Bound students, they found that the students transferred learning from the outdoor experience to the student's own life, two years after the Outward Bound course. A piece of research conducted by Gustafsson, Szczepanski, Nelson and Gustafsson (2011) appears to apply a similar definition of transfer. They investigated whether an outdoor education intervention with schoolchildren improved their mental health, essentially that skills and lessons learnt from the intervention were then applied after the intervention (there was a small but non-significant improvement on their mental health). Ewert and Yoshino's (2011) work, which also uses a similar definition, investigated whether adventure education enhanced levels of personal resistance (their work concluded that it "might"). In each of these three pieces of research, like the definition used in transfer of training, it was a change in behaviour that was measured post intervention that was used as the basis determining transferability. With regards to the context of an undergraduate, Scharff et al. (2017) define learning transfer as the ability to apply skills learnt in one domain, into another, and suggest that transfer of learning lies 'at the heart' of lifelong learning and employability of university students. Although this thesis does not specifically consider transfer of critical thinking skills to outside of university, the notion here is similar, the transfer being specifically from experience in outdoor activities to classroom work.

Although some researchers suggest that transferability is arguable (for example Seymour, Kinn, and Sutherland, 2013), and this is discussed later, at this point in my thesis it is important to

define what I mean by transfer. **Therefore, for the purpose and context of this thesis, transfer means the application of critical thinking skills in the classroom/academic domain that were learnt elsewhere, specifically outdoor practice.**

2.3 Critical thinking

Initially, I engaged with literature around the topic of critical thinking itself: what it is; and its relevance within the context of my research. The notion of critical thinking dates to the discussions of Greek philosophers, notably Socrates, Plato and Aristotle (for example see Florence, 2014), and it is suggested by Fisher (2001) that there is a resemblance between what is thought of as critical thinking now, and the approach to learning suggested over 2000 years ago by Socrates. Halford (2005), however, suggests alternative contributors to our understanding of critical thinking, proposing that the single most influential is Piaget, and then in addition, Vygotsky. Whichever the roots, there is a plethora of research and literature about critical thinking, demonstrating its significance not only within university education but also within all education and general life. Examples include Eggen and Kauchak (2001), who suggest simple application within shopping habits, as well as within situations that are more complex, and Gambrill (1990) who notes the importance and relevance of critical thinking in clinical practice.

It is worth noting at this point, though, that other terms are associated with critical thinking, and therefore clarity is required. For example, critical thinking is often associated with the notion of 'problem solving'. Wall (2015) suggests that critical thinking is used when problem solving, thereby suggesting a separation between the two terms, and Ampuero, Miranda, Delgado, Goyen, and Weaver (2015), whilst discussing the role of critical thinking in outdoor learning, suggest that it is applied in environmental problem solving with primary school children, thereby implying the same distinction between the two terms. This thesis is also based on a similar premise, that critical thinking is used when problem solving, rather than the two being the same. Also for consideration, De Bono (1998) suggests that critical thinking is only part of what good thinking involves. De Bono (1998) notes that the term 'critical' derives from the Greek work *kritikos*, which means to judge, and goes on to say that judgement alone is not enough and that other aspects contribute to 'good' thinking, such as creativity and design and construction. In addition, Ritchhart and Perkins (2005) draw attention to the notion that critical thinking is higher order thinking, perhaps separating it from thinking in general. Nevertheless, as the following discussion demonstrates, the term critical thinking is associated with education, and as this was the context of my research, I chose to explore this term.

Over the past twenty-five years there have been many references to the importance of critical thinking and its development within higher education in the UK (for example see: Oliver, 2001; Holmwood and McGettigan, 2011; RIBA, 2011). In addition, around the world, Kurfiss (1988) noted a growing movement of emphasis on critical thinking development through higher education in America, and, more recently, Robinson (2011) noted an increase on the emphasis of the teaching of critical thinking within universities in America and Australia. The inclusion of critical thinking as an outcome of undertaking undergraduate studies is traceable in part to the early work of Newman (1852). Newman suggested that the idea of a university was to produce a person of 'broad knowledge and critical intelligence'. More recently, Barnett (1990; 1992) suggests that criticism is a key concept of higher education and later, puts forward the notion of a 'critical being' (Barnett, 1997), suggesting that critical thinking is needed in professional education.

My work as a lecturer is influenced by UK policy and there are several important documents that include discussions on critical thinking. The Robbins Report commissioned by the British Government, outlined the role of a university (Robbins 1963). Although the term critical thinking is not explicitly used, the report does suggest that universities should promote the general powers of the mind. More recently, and perhaps the most referred to, is the Dearing report (1997). Within the Dearing report, recommendation 21 was that programme specifications should include the intended outcome of "ability in critical analysis", and it was a finding of the report that employers want graduates to be able to think critically. Although the Dearing report is over twenty years old, and not without its criticism (for example see Bill (1998), who suggests that there is not enough emphasis on critical thinking development), it is seen as a major contribution to higher education policy, and notably it suggests that critical thinking development is a key goal of higher education. However, a more recent white paper, published by the Department for Business, Innovation and Skills (BIS): "Students at the heart of the system" (BIS, 2011), does not explicitly mention the idea that the role of university is to develop critical thinking. There has been criticism regarding this, the Royal Institute of British Architects (RIBA, 2011), for example, suggested that education might now focus on investment in employability, rather than developing critical thinking and fostering learning, though arguably, one is not possible without the other. In addition, Holmwood and McGettigan (2011) noted that the 2011 white paper "distorts the broader, more fundamental aim of university which is to foster critical thinking, learning and understanding of the individual". The white paper published in May 2016 (BIS, 2016), does however include the historical notion that the role of universities is to develop students' critical thinking skills, as well as employability skills. Also, of influence on my practice, is the guidance from the Quality Assurance Agency for Higher Education (QAA). Within the expectations outlined by the QAA, under the 'teaching and

learning' section, it states that higher education providers should enable students to enhance their critical and creative thinking (QAA, 2012). In addition, within the UK guide to quality in higher education, the expectation is that a person graduating with an honours degree is able to "critically evaluate arguments, assumptions, abstract concepts and data" (QAA, 2014).

Overall, my preliminary literature review thus far suggested that critical thinking development is an important and relevant aspect of being a university student. It is noted however that recently there have been discussions challenging this. For example, in the Times Higher Education (2017), Matthews highlights changing attitudes towards the notion that the benefit of higher education is the development of critical thinking, suggesting that it is questioned. These discussions are ongoing, and as critical analysis is required in Level 6 and Level 7 work, I concluded that in my role I have a responsibility to develop students' critical thinking, as this is key not only to their success in their degree, but also their employability post university. I also concluded at this stage that, with reference to my motivation for this research, there was good justification in questioning whether the students I worked with could have already developed some of these skills through their outdoor practice, and if so whether they were transferable to their academic work, thereby enabling their development overall.

However, what was not clear was exactly what critical thinking was. During these initial literature searches, as well as during my own experience in teaching, I had discovered many definitions of critical thinking, and this alongside notions such as critical thinking being an 'art' (Paul and Elder, 2006), or a 'skilful activity' (Fisher, 2001) added questions to my understanding of what critical thinking was, as these descriptions are quite ambiguous. However, I did recognise some of the skills involved in critical thinking as being applicable when studying for a degree or practicing in the outdoors. For example, Bowell and Kemp (2002) suggest that critical thinking is used when we are being persuaded, and I have observed this in others during a discussion in class, and with peers wishing to take a more challenging route in the mountains. Also, Brookfield (1987) suggests that critical thinkers call into question their own assumptions, and I have observed this in students when reading an article that challenges their thinking and working with individuals whilst coaching climbing. However, an overarching definition of critical thinking, which could be used in both domains of my research, was hard to find. I concluded that if I was not able to define it, I would not be able to fulfil my responsibility in developing it in others or begin to consider whether it was transferable. It appeared that the most difficult question surrounding the topic of critical thinking was what it was.

Difficulties in defining critical thinking

Other writers also suggest that critical thinking is difficult to define. For example, during the early 1990s, Siegel (1990) suggested that there was no clear agreement on a definition, and Garrison (1991) noted that there was confusion and vagueness around the subject. During this time, there were attempts made to assimilate the discussions around critical thinking, bringing the notions together to form a new definition, and 1990 saw the publication of the Delphi report (Facione, 1990). This paper was the consensus of a group of experts in critical thinking that resulted in a statement defining critical thinking. More recently though, Abrami, Bernard, Borokhovski, Wade, Tamin and Zhang (2008) discussed critical thinking definitions and note that critical thinking is a complex and controversial notion, this being a problem that researchers and practitioners face. Also, in 2008, Cambridge Assessment undertook a process to define critical thinking and produce an associated taxonomy (Black, 2008). More recently again, in 2011, Krupat et al. undertook some research during which they asked ninety-seven medical educators what they thought the definition of critical thinking was. In their conclusions, they note the importance of reconciling the way in which we define critical thinking, if we are trying to educate others to think critically. Krupat et al.'s work does however demonstrate that, although there may be many differences in the way that critical thinking is considered, there are identifiable similarities between them. Similarly, Bissel and Lemons (2006), although a little earlier, do also suggest that although there is perhaps difficulty in defining critical thinking, there are commonalities between the definitions that exist. However, despite the research mentioned above, which spans almost 30 years, writing in 2018, Forbes suggests that a universal definition is still elusive.

One option for my research was to adopt a definition, like Park et al. (2013), and Bissel and Lemons (2006) do in their research. Park et al. use one from their subject area (namely that of Martin's (2002), from the field of nursing), however I was unable to find an established definition in the field of outdoor education/learning. Although within outdoor learning literature there are references to the notion that critical thinking is a skill used in outdoor activities, perhaps implying that it is a desired outcome of engaging in such a program (for example see the work of Gregg, 2009; Smith, Strand and Bunting, 2002), I could not find a definition that was explicitly offered. Also, in my experience, 'critical thinking' is not commonly discussed, as it is not a term that is regularly used. Therefore, if I was to adopt a definition, because I was interested in the transferability of critical thinking skills between two potentially contrasting domains (outdoor practice and academic studies), I felt that I required a definition that was communicated in a manner that meant that it could be used in both of these environments. Another option for my research was to adopt a well-established and popular definition, for example, some studies adopt the Delphi report definition (see Giancarlo and Facione, 2001;

Goodstone et al., 2013). Although this clearly has advantages, again the potential issue of context remained.

One question regarding critical thinking that was notable very early on in my investigations was whether critical thinking is a subject specific skill and therefore it would not be possible to transfer critical thinking skills learnt in one subject to a different subject, or whether it was a generic skill and therefore with potential for transferability. Abrami et al. (2008) discuss these two common views of critical thinking, firstly, the specifist view of McPeck (1981), that critical thinking is subject specific, and therefore not transferable, this view is also supported by Soden and Halliday (2000), and Hyland and Johnson (1998), and secondly, the generalist view of Siegel (1990) in which critical thinking could be transferred. Halpern (1998) supports this latter view, as does Hanscombe (2007) and more recently Wall (2015), that critical thinking is transferable across domains. In addition, recently, Davies (2013) debated the idea that critical thinking is subject specific, concluding that it should be considered a generic skill, and taught and approached as such. Housen (2002, p. 101) makes an interesting point: "On the one hand, critical thinking cannot be developed in a vacuum and needs a subject matter as a medium for its exercise and development. On the other hand, critical thinking transcends the subject matter in which it initially develops." This appears to leave the question unresolved, however, as I wanted a definition that was at least created with academic and practical learning in mind it therefore needed to be generic and communicated in a way that was accessible to outdoor students who move between both learning environments.

I considered this question specifically, asking whether there were any similarities between definitions I read, and what I thought was the thinking process of an outdoor practitioner. As noted in my introduction, my experience led me to think that there were similarities; however, this needed investigating more systematically. Many authors speak of a 'judgement' as an outcome of critical thinking (Mogenson and Mayer, 2005; Facione and Facione, 2007), or as Moon (2005) describes, a judgement in context. In my experience, making judgements is a key aspect of being an outdoor practitioner, and I considered any parallels between the two. A mountain leader is relied upon for their judgement skills (Long, 2003), and as Hampton (2002) suggests, a paddle sport coach gathers information, evaluates the situation and applies judgement, this process happening multiple times throughout the day. Therefore, if critical thinking, as defined in an academic context, is used to arrive at a judgement, an outdoor practitioner could have used a similar process to arrive at their judgement. Literature definitions, which are based in an academic context, also suggest that critical thinking is used whilst making decisions (Halpern, 1998; Helsdingen, van Gog, and van Merrienboer, 2011), and outdoor practitioners regularly make decisions. Decision-making is a key skill when leading people in mountain terrain (Langmuir, 1995), whilst sea kayaking (Hutchinson, 2003), for the rock

climber (Fyffe and Peter, 1990) and within the complex context of avalanche terrain (Barton and Wright, 2000). Therefore, if critical thinking is used when decision-making, and outdoor practitioners regularly make decisions, they could use the same critical thinking process as articulated in the literature.

As suggested earlier, critical thinking, in my experience, is not a regularly used term in outdoor practice. However, Allison (2003), writing in the Journal of Adventure Education and Outdoor Leadership, proposes that Brookfield's (1986) suggestion that a critical thinker can identify and challenge assumptions, and can explore and imagine alternative ways to think and learn, resonates with the "claimed benefits and aims of education out-of-doors" (Allison, 2003, p. 115), thereby suggesting a similarity between the two. However, in my experience, outdoor practitioners more regularly discuss the skill of decision-making, and although critical thinking is used whilst making decisions, some similarities between what outdoor practitioners describe as decision-making, and literature definitions of critical thinking can be observed. Hampton's (2002) work, which is set within the context of paddle sport coaches, offers an articulation of the dynamic management process the leader employs when operating in that environment and Graham (1997) articulates a similar process within a chapter about "good decision-making" for an outdoor leader. Both of these processes resonate with the critical thinking process as articulated by Cottrell (2005) for a student. Cottrell (2005) defines critical thinking as "a complex process of deliberation which involves a wide range of skills and attitudes" (2005, p. 2). These skills and attitudes include: identifying other people's positions; evaluating the evidence; weighing up opposing arguments; being able to read between the lines; recognising techniques such as false logic; reflecting on issues; drawing conclusions and presenting a point of view (Cottrell, 2005). Because some of these elements can be observed in the work of Graham (1997) and Hampton (2002) this suggests that there are similarities between the critical thinking skills employed by the student in college/university, and the skills employed by an outdoor practitioner. If critical thinking is not a regularly used term in outdoor practice, it may be that the term decision-making is used instead, but with the intention of having a similar meaning.

There are, however, examples in the literature of critical thinking being developable through outdoor activities, and it could therefore be assumed that if a set of skills is developable through an activity, then to some extent they must be employed during that activity. Both Gregg (2009) and Smith et al. (2002) suggest that outdoor activities provide an opportunity to develop critical thinking skills. In Gregg's research, it is the use of reflective journals in outdoor practice, and in Smith et al.'s research, through outdoor challenge programmes. These pieces of research imply that critical thinking is used in the context of the outdoors. In Mitten's (2007) research, which explores decision-making in outdoor leaders, this is more explicit. Mitten suggests that outdoor

leaders use critical thinking skills, and that leading others in the outdoors provides the opportunity to practice critical thinking.

Overall, at this stage, my investigations suggested that there were potentially parallels between the thinking process of an outdoor practitioner, and some of the definitions of critical thinking cited in the literature. However, this was inconclusive at this stage, and as none of the definitions so far appeared to have both the academic and practical domains of outdoor students in mind, I considered alternative options. As I continued to read around the subject, ambiguity regarding a definition of critical thinking became more apparent, and I adapted my research to include this as a research question, thereby enabling me to create my own definition. Eggen and Kauchak (1996) provide their own definition of critical thinking in their research, justifying their decision on the point that the notion of critical thinking is complex and so they provide a simple definition that they claim to be of benefit to learners. Although this was partially what I was striving for, my justification for constructing my own definition was more in line with Garrison (1991) who aimed to provide an 'integrated view' of the process by theming current definitions and discussions. Garrison (1991) does however note that thinking is a very private process (I considered this when choosing research methods to use), and we often only see the results of the process, rather than the process itself, this perhaps contributing to the difficulties in defining critical thinking. Although it would have been possible to adopt a definition, the hard work having been already done, I was concerned that none of those offered were within my context. I felt that it was important to utilise an integrated approach, which incorporated my own context, and this turned out to be imperative when the discussion I had with two technical experts[3] was also considered.

In summary, despite being regularly cited as an intended outcome of university, critical thinking is difficult to define. Subsequently, my initial lines of enquiry led me to consider this, before proceeding further. Therefore, my resulting research questions are outlined next.

[3] I have used the term technical expert throughout this thesis to refer to two outdoor instructors with whom I consulted at various stages during my research. Both technical experts worked in the outdoor industry (permission was sought from the Head of Centre), held high-level qualifications and trained and assessed other outdoor instructors. The term technical expert is associated with similar roles such as this in the outdoor industry, that of giving advice and perspective. In my research, this term helps to differentiate between these participants and the critical friends with whom I also discussed my research (although they too were outdoor practitioners). When discussing with technical experts, I took notes during discussions, this being different to the interactions I had with critical friends that were on a more informal basis (often whilst taking part in outdoor activities), and I noted any reflections afterwards in my learning diary.

2.4 Resulting research questions

The intention of my research was to investigate the development and transferability of critical thinking, with outdoor students who may have already developed critical thinking in their outdoor practice (see definitions outlined previously in this thesis of transfer and outdoor activities). As noted earlier though, this posed many questions, and several premises that needed to be challenged first. Because of questions arising from my initial literature review, an initial research question was needed, before embarking upon the main aim of the research. Therefore, the resulting research questions that framed my research were:

1. **How can critical thinking be defined?**
2. **Can critical thinking be developed through participation in outdoor activities?**
3. **Are critical thinking skills transferable from outdoor activities to classroom/academic settings?**

I used these research questions as a guide to design a general plan for the research, with each question being the basis for a distinct phase of the research. However, what I found was that additional questions arose, and these questions are detailed within the next chapter.

3 METHODOLOGY AND METHODS

This chapter discusses the methodology used within this research, the resulting ethical considerations, rigour and trustworthiness and an overview of the data analysis tools used. This is followed by a summary of the specific methods and tools used in each of the four phases of research.

3.1 Methodology

This is practitioner research, which takes a pragmatist approach, contains elements that were participatory in nature and it was informed by action research methodology. Writers such as Mentor, Elliot, Hulme, Lewin, and Lowden (2011), Burton and Bartlett (2005) and Shaw (2005) describe the characteristics of practitioner research, suggesting that it is systematic enquiry within an educational setting (Mentor et al., 2011), that it is a study of one's own practice (Burton and Bartlett, 2005), and that there are intended practical benefits (Shaw, 2005). Here, I have conducted research with students I teach, in my own field of work. My inquiry stemmed from observations I made during interactions I had with students, and I questioned whether there were potential teaching strategies that I could utilise to help students in their academic studies. Although as a reflective coach/teacher this is a regular occurrence, here I have explored the notion more systematically, the findings being of benefit not only to my practice, but also potentially to a wider audience of teachers.

Pragmatism, a philosophical movement that gained more recognition in the 1970's, stems from philosophies and ideas discussed by Pierce (1839-1914), James (1842-1910) and Dewey (1859-1952) (Williams and May, 1996; Greenwood and Levin, 2003; Gray, 2014). This philosophical movement included "those who claim that an ideology or proposition is true if it works satisfactorily" and that the meaning of a proposition "is to be found in the practical consequences of accepting it, and that unpractical ideas are to be rejected" (McDermid, 2019). A pragmatic approach to research is described by Greenwood and Levin (2005) as contextualised action and experimentation which has a participatory nature to it, this leading to the generation of knowledge. In pragmatic research the researcher uses "whatever philosophical or methodological approach works best for the particular research problem at issue" (Robson, 2011, p. 26), and it is "characterised by an emphasis on communication and shared meaning-making in order to create practical solutions to social problems" (Shannon-Baker, 2016, p. 319). Frost's (2011) definition of a pragmatist approach particularly summarises my approach; that a pragmatic researcher sets out to use whichever methods are appropriate to answer the research question, the research question being central to the process. Although this could be interpreted

that a researcher may be limited in their approach, using whichever methods are available, and potentially discounting more appropriate ones, what this means in my research is that I used several methods, selecting and deselecting methods based on the research questions, because these questions were central to the choices I made.

Many authors outline benefits to pragmatist research. For example, this approach has the potential benefit of considering data in different ways (Johnson and Onwuegbuzie, 2004; Hoque, Colvaleski and Gooneratne, 2013) and of drawing from many different theoretical frameworks (Jones and Kennedy, 2011). This style of research, which uses a range of methods during the process, is supported and defended by Johnson and Onwuegbuzie (2004) who suggest that this is a paradigm whose 'time has come' and Gray (2014) comments that pragmatism is a relatively old philosophy that more recently has become more popular. Korte and Mercurio (2017) argue that pragmatism focuses on practical consequences: "It is about making tangible improvements in the everyday lives of people in the world" (p. 60). An ongoing theme within my research has been to seek practical consequences for my practice, which in turn I hope will help the students that I work with. Pragmatism, however, is not without its problems, and the following discussion outlines potential challenges of a pragmatist approach, and my management of these challenges.

Some authors appear to use the terms pragmatism/pluralism/mixed method/multi-methodology interchangeably, and there is perhaps some debate as to the similarities/differences between them. Morgan (2014) argues that pragmatism is usually associated with mixed methods research, though argues that all approaches could be pragmatic. I have used a mix of methods (questionnaires, individual interviews, group interviews, focus groups and a teaching session with questionnaire feedback), though they are all largely qualitative based. Bazeley (2004) raises many issues regarding a mixed methods approach, suggesting that often the reason for choosing mixed methods is not clearly articulated by the researcher (this was also found by Ostlund, Kidd, Wengstrom, and Rowa-Dear, 2011, who reviewed 168 mixed method studies). Also, that perhaps each method sits within its own paradigm therefore the research is multiple pieces of research about the same subject, and that mixed methods are as a result neither more nor less valid than research which takes a singular approach. However, if the underlying paradigm in my research is pragmatism, this lessens this criticism, if it is taken as criticism, because in pragmatist research, the researcher chooses the method based on the question being asked.

Clarke and Visser (2018) discuss some of the potential benefits and difficulties with using a pragmatic approach as a doctoral student, and although they outline many benefits, they allude to the challenge of having less structure to guide the process. This was a potential challenge in my research, particularly when it is argued that a pragmatist approach could lack clarity in the

route being taken (Bazeley, 2004; Ostlund et al., 2011). Although frameworks are sometimes advised for pragmatic research (for example see Chenail, 2011) my research did not follow a pre-set framework and was thereby less structured. However, as Chenail suggests, it is important for the researcher to defend their position and their choices. During the research process, rather than adhering to a fixed plan as to how the research would take place, I adapted and shaped the research as it proceeded, responding to the learning points gained from each phase. Essentially, each phase was built on what had been learnt before, thereby using a multi-layered approach to the research process.

An advantage of a pragmatist approach is that the researcher constructs their own way through the process (Frost, 2011), and this, alongside the other arguments for a pragmatist approach to research, I believe outweigh the associated disadvantages just discussed. During my research, I selected and deselected methods based on my judgement of the situation and context at the time. After reading about research methods, discussing my research plans with supervisors and critical friends, I selected what I considered to be the most effective and appropriate tool at each stage of the research process. As an outdoor practitioner, I must make a judgement based on the situation that I am in and apply that judgement within that context. Throughout my research, I have made a judgement based on my knowledge of the research topic, my knowledge of research methods, and my knowledge of the participants involved. The context of my research, the subsequent research questions, and my own background led me to using a pragmatist approach, as this was the most suitable given these factors. Of importance to me was the notion of ensuring that the methodology and subsequent methods employed, sat within the overall ethos (pragmatist) of the research (a notion supported by Melia, 1997; Clarke et al., 2015); to produce an outcome useful to practice, and this is demonstrated throughout the following chapters.

My research also contains elements that are participatory in nature. As noted earlier, Greenwood and Levin (2005) argue that a pragmatic approach often has a participatory element to it. Robson (2011) discusses the branch of action research referred to as participatory action research (PAR), and although only some elements of my research are similar to an action research methodology, overall it does share some of the participatory characteristics associated with PAR. Robson (2011) suggests that PAR is an active and involved approach that can facilitate the emancipatory role of research. I informed students about what I was doing, why I was doing it and what I was learning on the way, and I hope this means that all involved learn because of being part of the research. For example, if I made changes to my questions, or changes within a focus group, I shared the decisions with the participants at the time, taking an active and involved approach (Robson, 2011). In the introduction of Reason and Bradbury's (2006) work, they outline what they mean by a participatory worldview, and their descriptions

of participatory research resonate with elements of my own approach. Essentially, they suggest that this viewpoint places humans and communities as part of the researcher's world, and that we are all part of co-creating the world. Although what I have conducted is not co-created and therefore not a collaborative piece of work, the students I work with were the inspiration for this research, and the participants: students, lecturers, technical experts, critical friends and all their associated communities were part of my world as a researcher. Reason and Riley (2008) describe participatory research as an approach that aims to address localised considerations that are based on the experiences of those engaged in the enquiry, and this is synonymous with the context and rationale of my research. I hope that my research is of benefit to a wider community, though it was primarily designed to consider a localised question, albeit with the potential for the findings presented here to be the basis of a much wider application.

Phase 4 of my research was informed by action research methodology. As noted in the introduction to this thesis, in action research there is a problem to solve (Vivekananda-Schmidt, 2011; Melrose, 2001), and I perceived the problem to be that some of the students that I worked with were finding it difficult to apply critical thinking skills, that I thought they may already have, to their academic work. Phases 1 to 3 considered and explored this problem, and in phase 4, an intervention was used to 'test' a teaching resource that may help students. Essentially, like action research, a problem was identified and acted on (Coughlan and Coughlan, 2002). Greenwood and Levin (2003) state that action research aims to solve real-life problems in context and in phase 4 I aimed to contribute to helping to solve the problem that I perceived the students to have. Having identified a problem, and planned an intervention, in phase 4 I implemented the intervention and reviewed it afterwards. This is very similar to the action research process outlined by Cohen, Manion, and Morrison (2000).

In summary, my research is practitioner research, which takes a pragmatist approach, contains elements of action research methodology, and elements that are participatory in nature. There are, however, ethical considerations associated with this approach, and I discuss these next.

3.2 Overview of ethical considerations associated with this research

My research straddled three key influencing domains: the students I teach, my practice (within higher education and as an outdoor practitioner), and the associated literature. My position is central to these three key domains, with each domain contributing to my findings. The following diagram demonstrates the connection between these three domains:

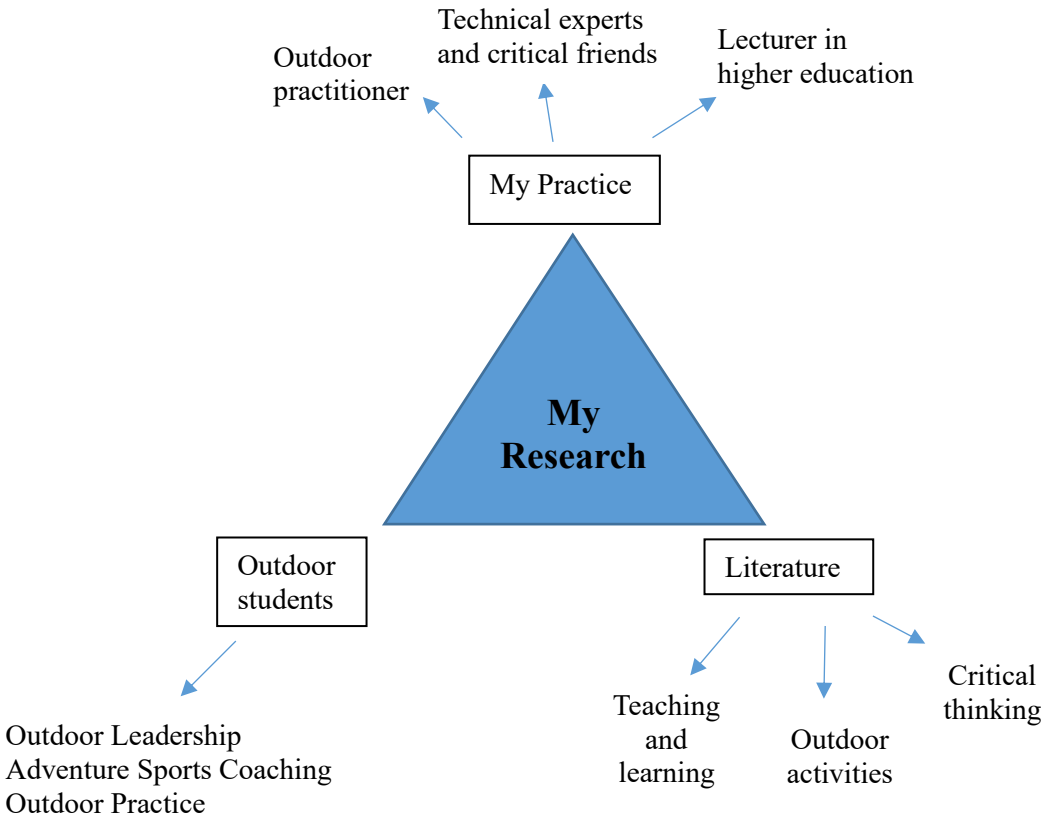

Figure 1: Positioning myself within the research

I conducted practitioner research, and because the participants involved were either students that I taught, or colleagues, and or friends, several ethical issues arose. I conducted what Mercer (2007) refers to as insider research, and this can result in ethical dilemmas. I outline some of these issues here; others, that were specific to a certain method used, are discussed in the methods chapter of this thesis. Prior to embarking on the research, ethical clearance was sought, and granted by the University of Central Lancashire.

My main concern was regarding my relationship with the students I taught, how I would interact with them about the research in general, and with those that participated. As a lecturer, I teach and mark students' work, therefore my relationship with the students had the potential to be compromised if it was not considered carefully. Like Coy's (2006) experiences, I found myself holding dual roles: acting as a researcher and, in my case, a teacher, with the same students, in

the same day. I was concerned that the professional relationship between students and myself may be affected; for example, the combination of research and teaching may have impinged on my objective marking of students' work. My response to this ethical dilemma was to rely on my professionalism, and to adhere to normal academic practice of internal moderation. In practice, this meant making a judgement about how to interact with participants, ensuring that I only spoke about the research with them if they started the conversation, and ensuring that I did not give any preferential treatment to those who had participated. Concerning marking, in phase 2, perhaps when I was less confident as a researcher, I ensured that all the university assessments submitted by participants were double marked or moderated. In phases 3 and 4, confident that I had not compromised my academic judgement, I relied on normal academic practices for moderation of work.

To help participants (technical experts, colleagues, students and lecturers) make an informed decision as to whether to take part, I tried to provide them with enough information, through several mediums, and maintain an atmosphere between myself and the students that meant that there was no obligation to participate, or not, in the research. I shared aspects of the research with the participants, though I balanced this with the notion of anonymity. Piper and Simons (2005) note that when conducting participatory research you cannot always ensure anonymity, as in doing this you are not acknowledging that the participants have helped with the generation of knowledge. However, as my research contains only elements that are participatory in nature, I chose not to disclose the names of participants in any phases of this research. Nevertheless, those that came to a focus group or group interview would have known the others that were also in that group. Overall, I found that an open approach to my research, sharing some of my learning as the process unfolded, was a positive way to interact with participants.

On reflection, I did find that my relationship with the students who participated changed, but these changes were not I believe detrimental to either their work or my own; on the contrary, I found the changes beneficial. Conneeley (2002) describes how her relationship with her clients (the context was occupational therapy) changed. Conneeley raises a point about power, and in particular regarding participation in the research. For me, this issue was most prevalent when it came to the marking of work, but also, as Conneeley notes, the notion of power may manifest when students decide whether to take part or not, as they may perceive there to be benefits or disadvantages that may not actually be the case. Overall, I found that I built relationships that were more positive with these students, and for me this positive effect is still prevalent now. This is perhaps one of the potential benefits of practitioner research, and one that is often unpredicted and underreported.

3.3 Rigour and trustworthiness

The term rigour is commonly used when discussing and justifying research, however other terms have also been used. Morrow (2005) discusses "quality" and "trustworthiness" in qualitative research, and although Morrow mentions many other terms including "goodness", her most commonly used term is trustworthiness. The two terms, rigour and trustworthiness, are debated by Cypress (2017), with Cypress arguing that the term rigour should be used in preference. Whichever term is used, the following discussion reviews the common elements of these terms, demonstrating how they were addressed within my research.

In Glogowska's (2011) work, issues of validity, reliability and generalisability in mixed methods research are discussed, but as Glogowska points out, these terms are now often dismissed in qualitative research, and terms such as credibility, dependability, transparency and transferability are more appropriate. It is notable that I have often found that there is confusion regarding the meaning of such terms, a notion supported by Reason and Bradbury (2006) who suggest that there are difficulties is establishing meanings that suit all. For example, Lincoln (2005) uses terms such as repeatability and replicability to establish rigour, thereby implying that the terms are not interchangeable with each other, and that one may lead to another. Concerning the repeatability and replicability of my research, the term replicability, where the research can be repeated in other circumstances, is perhaps least appropriate, replicability usually being associated with quantitative research (Golafshani, 2003). Within qualitative research, and in the case within my thesis, it may be impossible to replicate the research, as the interpretive nature of the research means that other researchers may make different interpretations. My research is, however, repeatable. I outline the methods used clearly in the next chapter and it is therefore possible to conduct a similar piece of research, which might result in similar findings. However, of note is that my research captures a certain point in time, and participants' thoughts at that time, therefore if a repeated piece of research was conducted with the same participants, they may not give the same answers. This does not make the findings of this thesis of less value, instead the findings and recommendations should be treated as they are - recommendations based on a small but carefully managed and structured piece of research.

It is often argued that one of the key components of rigour in research is validity (for example Long and Johnson, 2000 and Cypress, 2017). However, the term validity, as Silverman (1993) suggests, is perhaps more appropriate in quantitative, rather than qualitative research, because some of the more common strategies associated with ensuring validity, such as triangulation, are inappropriate. Silverman suggests methods that he considers more appropriate, such as the constant comparative method and deviant-case analysis, both of which I used at numerous

points within my research. The constant comparative method is often associated with Grounded Theory approaches, as a process of formulating a provisional hypothesis and during the later stages of analysis comparing data to this hypothesis. Within my research, this meant comparing my findings across a single phase as well as across the previous phases (Charmaz, 2006; Lichtman, 2006). Deviant-case analysis, also referred to as negative case analysis, involves actively seeking out examples that do not fit the emerging themes (Charmaz, 2006; Lichtman, 2006). Both methods when used together mean repeated reviewing of the data across all phases of the research, thereby, Silverman argues, contributing to the validity of the research. Other components of rigour include a reliance on the researcher demonstrating integrity and competence in the study (Fereday and Muir-Cochrane, 2006), this perhaps also echoing expectations regarding a trustworthy piece of research. As Frost (2011a) argues, the researcher should make it clear how they see the world, as they are interpreting the data, and the reader needs to understand the researcher's background and context to judge their influence on the data. Earlier in this thesis, and in subsequent chapters I outline the pragmatist approach that I have taken, this being influenced by my background and context as an outdoor practitioner and coach/teacher.

An essential component of both rigorous and trustworthy research is that the researcher is reflexive (Darawsheh, 2014). Although Darawsheh (2014) suggests that reflexivity is still a contested notion, Lichtman (2006) suggests that reflexivity is about self-examination, and this is what reflexivity is taken to mean in this thesis. A reflexive researcher will continuously examine and explain how they, as the researcher, may have influenced the project (Dowling, 2008). Because data interpretation is a reflexive exercise (Mauthner and Doucet, 2003) the next section explains an overview of the data analysis process used within my research, and within subsequent discussions, I outline when I may have influenced the project, and how I managed this. As Morrow (2005) suggests, engagement in reflexivity is an essential contribution to ensuring trustworthiness in research, a notion echoed by Frost (2011a).

During my research, the work of Williams and May (1996) was informative, as they suggest that listening to conversation, descriptions, and trying to understand behaviour, require the researcher to be reflexive. The interviews and focus groups that I conducted required me to listen and understand what the participant was telling me. I kept notes during each phase of the research, writing up the process, and noting any issues for further consideration. An example of this process is in appendix 1, regarding the interviews conducted in phase 2. Many, although described in many forms, advocate this technique, for example, Charmaz (2006) suggests using the technique in grounded theory, while Lichtman (2006) and Larrivee (2000) suggest the use of a diary. Reflective practice and reflexivity are an encompassing part of my work, both in the past, and now as a lecturer and researcher.

In summary, throughout this thesis, I have been explicit about what I have done, thereby demonstrating integrity, reliability and reflexivity, as well as enabling repeatability. I employed techniques such as constant comparison and negative case analysis during the process, to ensure validity, and these techniques, and the use of critical friends and technical experts contributes to the rigour and trustworthiness of this research.

3.4 Overview of data analysis tools used in this research

This section offers an overview of data analysis tools used in this research. I discuss this here to give the reader an insight into the approaches taken and the considerations that went with these approaches. Specific examples of how I used the techniques can be found in chapter 3.5.

The data analysis process is where, as Cohen et al. (2000) suggest, invalidity can creep in through poor coding, subjective interpretation and selective use of data, therefore, in this section I am explicit about the tools I have used, a notion supported by Nolas (2011). It is argued that the process of data analysis starts before data is collected, continuing through data collection, and afterwards (Ryan and Bernard, 2003; Cohen et al., 2000). This is what I have done within this research; data analysis has been a constant process throughout. This raises the question though as to whether I was clouded by my own judgements and tried to 'fit' the data into the emerging theories. As Mercer (2007) suggests, insider research may be compromised during the data analysis stages. To try to ensure against this I was constantly aware of this potential issue, in particular during phase 4, and I employed methods to compensate. For example, I had discussions with critical friends and consultation with technical experts and, as Dingwall (1997) suggests, tried to keep the big picture in mind.

I did not plan my data analysis before I conducted it; instead, I took the same pragmatist approach that I had done throughout my research, which meant selecting and deselecting data analysis tools as the process progressed. Planning is often recommended (for example see Lichtman, 2006; Cohen et al., 2000), however alternative arguments are also offered. For example, Lichtman (2006) suggests that the plan should be a general guide, and Cohen et al. (2000) describe a style of research that they term "naturalistic", this being when the researcher and participants shape the work as it progresses. This latter style is more in keeping with the methodology and aims of this research, and as Schilling (2006) argues, qualitative research cannot be "pressed" into a clear-cut model that has distinctive phases, though Schilling does suggest that guiding principles should be used. Although there is often little guidance on how to analyse data (Mauthner and Doucet, 2003), and it is frequently the least understood and most complex part of qualitative research (Lichtman, 2006), I referred to the surrounding literature to inform my research.

When analysing data, I used a combination of inductive, deductive and abductive techniques, this being common in pragmatist research (Mitchell, 2018; Eaves and Walton, 2013). If using deductive techniques, the theorising often comes before the data (May, 2001), for example a general hypothesis might be considered and from that, a more specific prediction may evolve that can be tested (Gravetter and Forzano, 2009). I had initially considered the wider context of critical thinking development, but was specifically interested in development through outdoor activities, and came with the notion that this was possible. Therefore, when analysing the data, to some extent I was specifically testing this. In inductive reasoning, the researcher examines a particular area of social life (May, 2001) and derives theories which are applicable in a wider setting (Gravetter and Forzano, 2009). This approach was also taken in my research, as other themes emerged from which I was able to generalise to form conclusions that could have wider application. In Sandström, Willman, Svensson, and Gunilla's (2015) research, regarding national standards in mental health care, they initially use a deductive framework, followed by inductive techniques to provide a deeper understanding. Although in my work I employed both techniques, it was not as structured as this. This was because my research evolved as the process unfolded, with each phase informing the next. My pragmatist approach meant that at each stage of the research I selected and deselected analysis tools based on the data, the context and the research question that I was addressing.

The most common data analysis technique that I selected was abductive reasoning. Abductive reasoning is more commonly known as "inference to the best explanation" (Stanford Encyclopaedia of Philosophy, 2017). According to Mitchell (2018) abduction "follows a pragmatist perspective, taking incomplete (or 'messy') observations from experience and reality that may then lead to a best prediction of the truth, and perhaps even to a new theory" (Mitchell, 2018, p. 105). Although often considered 'everyday reasoning', abductive reasoning has its origin in the work of Pierce, who also proposed the notion of pragmatism (Stanford Encyclopaedia of Philosophy, 2017). Using a mix of methods, and a pragmatist approach, I analysed students' observations and accounts of their experiences, which led to the best explanation I could find. For example, in phase 2 it was difficult to tease some themes apart, as often the account that a student gave would be 'incomplete' or 'messy'. This meant that I either explored it further at the time of the interview, and/or during post interview analysis, I kept referring to the original recordings and listened to them again, balancing my interpretations with those from other interviews. Drawing it all together and then building on my findings in the next phase of the research led me to the best explanations that I could find.

In the main, I used the method of thematic analysis: "identifying, analyzing, and reporting patterns (themes) within data" (Braun and Clarke, 2006, p. 79). Thematic analysis is a fluid process, without distinct phases and not always in a set order (Clarke and Braun, 2013). In

addition, in thematic analysis, rather than counting the number of times a code appears in the data, the researcher is looking for themes before, during and after the data collection (Ryan and Bernard, 2003). For example, during phase 2, I asked how students thought that they had developed critical thinking skills, and this data was analysed using a more fluid approach; themes emerged during collection, transcription and after all interviews had been conducted. There were times when I used a process that was more formulaic, therefore more akin to content analysis, though as Vaismoradi, Turunen and Bondas (2013) suggest, there is much confusion between the two terms, and content and thematic analysis are often used interchangeably. Content analysis is a formulaic approach to gathering, coding, hypothesising, organising and reporting data (Cohen et al., 2000; Vaismoradi et al., 2013; Hsieh and Shannon, 2005) and in phase 2, I employed a method described by Hsieh and Shannon (2005) as directed content analysis, utilising targeted questions (Can critical thinking be developed through outdoor activities?) to gather specific data.

At some point during all four phases of my research, I employed the technique of coding and categorising emerging themes. This involved noting down ideas that came up, applying a colour, letter or number to each, counting the frequency of each and regrouping as appropriate. On occasion, I found I needed to divide the codes up, as further analysis revealed subsections within one code. For example, the notion of 'facilitation' became too complex and required further examination. During phase 1, the codes generated were not predetermined, they were generated from the data itself, although it is worth noting that Charmaz (2006) and Burton and Bartlett (2005) warn that the researcher may develop codes from the hypothesis or interpret and attribute meaning where it is not the case. During phase 2, I cross-referenced to the data from phase 1, therefore there were some predetermined codes and I balanced this with 'letting the data speak for itself'. Some researchers argue that the coding is the data analysis (for example Ryan and Bernard, 2003), and my own experience here is like this. The codes I applied determined how the subsequent analysis came together, and to try to ensure that I did not overlook something important, I went back to the raw data many times before drawing conclusions.

Many versions of this analysis process can be identified in the literature, for example, Cohen et al. (2000) articulate it as grouping codes to form clusters, and Lichtman (2006) describes it as the three C's: coding, categorising and concepts. I have chosen to articulate the process that I have used in my research, using a blend of the terms used in the literature, this resulting in the

following data analysis process:

Figure 2: Data analysis process taken in this research

In my research, and within my thesis, the term 'codes' refers to specific codes either generated from the data, or predetermined, that I used during the initial stages of data analysis (this included post data collection, whilst transcribing and with the transcripts). 'Themes' refers to the groups of codes that I themed together, and I have used the term 'learning points' to describe the learning outcomes generated from these themes that are relevant to my research and my practice. Within chapter 4, I report my findings in a manner to demonstrate the thematic analysis process articulated here.

In summary, outlined in this section was an overview of the generic data analysis tools that I used. Examples of specific tools are in the following section.

3.5 Methods

I designed each phase of the research process when conclusions and resulting questions had emerged from the preceding phase. Overall, my research contained four distinct phases: an analysis of twenty literature definitions of critical thinking; interviews with students, with the purpose of exploring development of critical thinking; a series of focus groups followed by emails to check interpretations and to clarify questions raised; and a teaching session, which 'tested' one of my research outcomes. During the research process, I consulted with two technical experts, had discussions with critical friends, and presented my findings at two conferences and a research seminar. The following diagram of my research journey demonstrates how the whole process fits together:

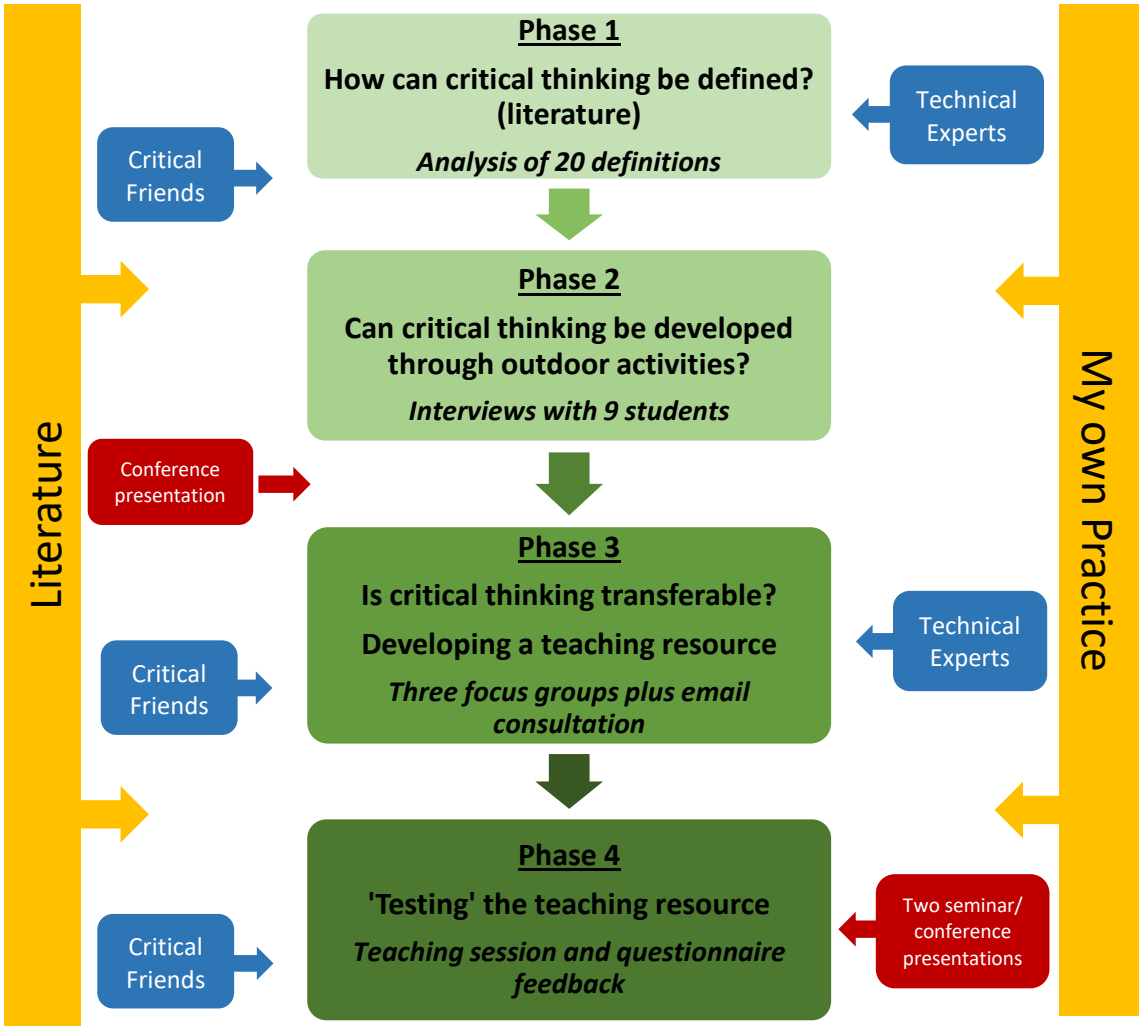

Figure 3: Overview of research process

3.5.1 Phase 1: How can critical thinking be defined?

As was discussed earlier in this thesis, before embarking on research that questions the development and transferability of critical thinking, a definition of critical thinking was required. I argued in chapter 2, that this proved to be challenging and that I had chosen to research this first. I therefore designed phase 1 to address research question one: **How can critical thinking be defined?**

I considered a wide range of definitions of critical thinking that spanned eighty years of literature, and from this reading, I selected twenty definitions to analyse, based on the following criteria: relevancy in terms of context, approximate number of times cited, and/or independency. The list of texts used and a short justification for each is in chapter 4. The analysis process of the twenty definitions took the shape as discussed in the previous chapter, essentially using codes that I generated from the data, grouping these into themes, which led to learning points,

and finally allowed me to create a definition of critical thinking for use in my research. During the analysis process, I took an inductive approach. I did not come with a hypothesis that I was testing; instead, I was seeking to theme commonalities in the definitions to result in one definition of critical thinking that was applicable to the context of my research. The twenty definitions that I selected were a representation of the literature I had consulted, and to try to mitigate any bias resulting from selecting my own sample, during later phases of my research I consulted other literature and used constant comparison, and negative case analysis (Charmaz, 2006; Lichtman, 2006), which enabled me to cross-reference my findings. It was not possible, however, to consult all definitions of critical thinking, and therefore I have considered this when drawing any conclusions.

Following the analysis process of the twenty definitions, I consulted two technical experts from the outdoor industry. The aim of this was in part to alleviate any bias that I had inadvertently applied to the process, and to cross-reference my findings with the context of the outdoors, this being important when considering the aims of this research. The critical thinking literature that I had consulted was, in the main, from academic texts, set within an academic learning context. Consulting with two technical experts from the outdoors allowed me to test the language that I was using, to see if it was applicable within the outdoor context as well as the academic context, and to explore whether I had missed anything. This consultation proved imperative, for example, the discussions brought to light a key characteristic that is prevalent in critical thinking within the context of the outdoor practitioner but had not emerged from the literature: employing appropriate 'timing'. This learning point had not emerged from my analysis of the definitions, and it was only when we applied the resulting definition firmly within the context of outdoor and adventure sport that this emerged.

3.5.2 Phase 2: Can critical thinking be developed through participation in outdoor activities?

I designed phase 2 to consider research question two: **Can critical thinking be developed through participation in outdoor activities**? However, based on conclusions drawn in phase 1, I added two additional elements that I could explore in phase 2: **What do outdoor students consider critical thinking to be**? And: **Do outdoor practitioners use a similar thinking process to critical thinking as defined in academic literature**?

The resulting plan for phase 2 was to interview students from across the undergraduate degree programmes I taught on, asking primarily how they had developed their own critical thinking, to enable me to learn whether participation in outdoor activities may have been a contributing

factor. In addition, I asked the first four students what they thought critical thinking was, and their contribution helped to confirm the applicability of the definition I had created, but also, along with the contribution of the other participants, helped build a deeper understanding of critical thinking in general. Forbes (2018) highlights that there has been little research into students' perspectives of critical thinking and that their perspective is very relevant. In my research the students' perspectives as to what critical thinking is, are of significance, as development or transferability may need to be built on what they perceive critical thinking to be already.

All students from across three outdoor undergraduate degree programmes[4] were invited (by email, and face to face) to participate. The resulting sample group was nine students, which was approximately 3-10% of each year group. This sample is therefore relatively small, however Gorard (2001) suggests that representation is important, and although this sample group was opportunistic, there were representations from all courses and all year groups. Females and males took part in the research; ethnicity data was not gathered. Prior to interviews taking place, in response to emails from students offering to be involved in the research, I sent them the information sheet, a consent form, and a simple questionnaire that included some information about their outdoor activities (see appendices 2 and 3). I asked participants about their outdoor activity experience: how many years they had been taking part, what they considered their main activities to be, and whether they held any outdoor qualifications. As Cohen et al. (2000) suggest, questionnaires offer the researcher the opportunity to collect numerical data, and here I used a questionnaire to gather information that at the time I hoped would be useful when it came to analysis of data. I did not want to assume that because the students were studying an outdoor related degree that they took part in outdoor activities in their own time, and this data I hoped would help to ascertain this. If a student only took part in practical outdoor activities as part of their degree, then their responses would be based on this alone. I was also interested in previous/other outdoor experience, because if a student comes to me at the beginning of their course, I was interested to know whether I could consider that they may have developed critical thinking skills in their own practice.

I refer to participants in this thesis using pseudonyms, and direct quotes from transcripts are presented in *italics*. Of consideration, is the notion of deductive disclosure, and I considered this in detail. For example, because of the information I have provided, someone with additional information (not included within this thesis) may be able to deduce who the participants were. However, this additional information is only available to a handful of professionals, within a

[4] BA Hons Outdoor Leadership; BA Hons Outdoor (Leadership) Blended Top up; BA Hons Adventure Sports Coaching.

small community of lecturers, and as such, I do not consider it a risk here. In addition, because the sample size was quite small, deduction would be quite difficult.

My decision to use the research tool of interviewing was due largely to the context of my research, my own background and the research question. Because my research contains elements that are participatory in nature, the notion that interviewers and interviewees between them discuss interpretations of the subject (Cohen et al., 2000) appears appropriate. In addition, interviews offer the opportunity to get a rich insight into the participants' opinions, experiences and feelings (May, 2001), therefore, they were appropriate here in my research. The interviews for phase 2 took place either face to face on campus, or via the internet using Skype or Adobe Connect. I recorded the interviews using a Dictaphone, including the two conducted via the internet. Of note is that of the nine students interviewed, three came to one group interview. When I initially invited students to participate, I offered the opportunity to do so either individually, or in small groups. I chose to do this because my experience with the students showed them to have these preferences. When conducting the interviews, I found there were advantages and disadvantages to each format. For example, in the group interview, the students discussed the questions between themselves and this allowed for further development of the issues; however, I did find it harder to make notes, keep to the interview questions and listen, all at the same time. When transcribing the group interview, I was able to distinguish between the participants' voices, which meant that I could allocate codes for analysis individually.

The interviews lasted between 30 and 50 minutes, and were conducted in a semi-structured way, in the sense that there were some focussed questions (see below), but other questions that evolved during the course of the discussion (May, 2001). Because I was concerned about blurring roles, being a lecturer and researcher, I employed strategies to try to establish a research atmosphere, rather than that of lecturer/student. For example, we used a neutral 'research' room, and I tried to ensure that we only talked about the research and not about any pending academic assignments. I had a list of questions that I could refer to if I felt that the discussions were coming to a halt, or were going too off track, though in the main I let the discussions develop naturally. In general, the questions I asked were:

1. What is your understanding of critical thinking? (this question was only presented to Hazel, Joe, Mark and Dave, the first four participants to be interviewed)
2. What are your thoughts about the definition presented here?
3. How have you developed your critical thinking?
4. To what extent have you developed your critical thinking through outdoor activity participation?
5. What has helped your development? (this question evolved after my reflections on the first interview)

During the first four interviews, I asked question one before introducing my own definition of critical thinking (that resulted from phase 1). After conducting the first four interviews, I reconsidered whether this was the best use of the interview time that I had, and through consultation with my supervisor, made the decision to introduce my definition from the outset. I was conducting data analysis throughout the process, and through a combination of negative case analysis and constant comparison, I found that the definition I had developed in phase 1 was sufficient for use as a basis for discussing the other questions. Consequently, I introduced the definition from the outset in the latter interviews. Overall, the interview questions acted as a guide, however in reality I asked slightly different questions in each interview. Gravetter and Forzano (2009) discuss the notion of interviewer bias, suggesting that if a participant does not understand the question, the researcher's only option to guard against bias, is to repeat the question. However, individualising the questions to the student(s) allowed me to phrase the questions as I saw to be appropriate for each participant, though care was required to try to ensure that any rephrasing of a question did not influence the answer given. In addition, because I was learning throughout the process, I became more efficient in the latter interviews, and subsequently the wording of the questions evolved to reflect this.

I made some notes during each interview, though I found it difficult to comprehensively listen to what each person was saying and make appropriate notes. I was also concerned that because I knew the students, and we already had an established student/teacher relationship, if I made notes, they might think I was testing them. The resulting notes were more scribblings than transcriptions, though did prove to be useful, as they contributed to the way I asked the questions with the next participant; essentially, I was learning as the process unfolded. When I was analysing the data, I referred to these original notes and was able to bring together the process in a conceptual picture: "The journey of the interviews" (appendix 1), which helped me to make sense of the complex picture that was emerging.

Data analysis during phase 2 started as soon as the interviews started and continued through the transcription process, after which I used a more formal process, using colour and letter coding when I had copies of the transcriptions in front of me. I allocated codes (these were formed initially from the notes taken during the interviews, which led to 'post it' notes whilst transcribing), which led to themes and resulting learning points. Some of the initial codes came from the literature, for example, as highlighted in chapter 2, studying as an undergraduate at university contributes to the development of critical thinking; therefore, this formed the basis of some codes. Also, my 'hypothesis' that outdoor activity contributes to critical thinking development meant that to some extent I was looking for this within the data. As with previous data analysis, care was required to ensure that I did not simply find what I was looking for, and that instead the data was 'speaking for itself'. Other codes within this part of the data analysis

derived from the data itself. For example, many participants thought that their paid and volunteer work had been a contributing factor in their development of critical thinking, and this became an important theme.

When I summarised the data, I found I had to go back and listen again to the interviews, to try to gain an understanding of the amount of importance the participants attributed to each of the factors that had helped to develop their critical thinking. Counting the number of mentions of "work", "university", "outdoor activities" etc. resulted in conclusions that did not appear to reflect overall what a participant was saying. Instead, I employed some of the techniques associated with conversational analysis, such as listening to the tone of voice, inflections, and any emphasis or pauses (Cohen et al., 2000) to enable an interpretation that reflected what I believed the student was telling me.

After analysing the data from phase 2, I considered using the technique of member checking with participants, essentially sending the participants my findings to check to see whether I had interpreted them appropriately. Birt, Scott, Cavers, Campbell, and Walter (2016) outline some of the methods that can be used to member check, such as sending participants verbatim transcripts through to using focus groups to 'check' the researcher's interpretations. Birt et al. also discuss some of the ethical issues involved; for example, causing discomfort to the participants by sending them their transcripts, although they do also note that the process can be therapeutic to a participant. Koelsch (2013) also outlines come of the advantages and disadvantages, such as the interviewee feeling as though they are now an analyst, rather than a provider of information, or that the interviewee often does not like hearing their own hesitations within their transcripts. Although member checking does encourage participation in research, and my research is participatory in nature, I decided not to employ this tool at this stage. I felt that I had made fair interpretations of the data and acknowledged that the data was a 'capture' of what students thought at that moment in time. The transcripts themselves contained many hesitations therefore I did not consider this to be an appropriate method, and due to the timing of my data analysis, follow up interviews or focus groups were not a practical option. In phase 3 however, having reviewed the method again, I employed a method of member checking to take account of these ethical and practical considerations, which was appropriate to the context of that set of data. At the end of the phase, due to the evolving nature of the focus groups, I asked all participants from across all three focus groups for additional feedback on the conceptual model of critical thinking that I was developing. At this stage, I had refined the drafts, and I sent the most current version, plus previous versions, to the participants for comments. Employing this method also meant that participants of one particular focus group, who had not seen the refined version, were able to engage in the process further if they wished to.

3.5.3 Phase 3: Are critical thinking skills transferable from outdoor activities to classroom/academic settings

I designed the third phase of my research to address research question three: **Are critical thinking skills transferable from outdoor activities to classroom/academic settings?** In addition, towards the end of phase 2, I had started to develop a teaching resource (a conceptual model of critical thinking); therefore, in this phase I also asked the question: **Can critical thinking be communicated using a conceptual model, and if so is the model of benefit to learners?**

I conducted three focus groups. All participants were either studying, or in the case of one participant, lecturing, outdoor related degrees. Focus group 1 comprised of students plus their lecturer, from a blended (part time, top up) cohort (n=8); focus group 2, a group of third year students (n=5); and thirdly a small focus group of second year students (n=2). Only one of the participants within the focus groups had taken part in phase 2 (the focus groups took place in the academic year following phase 2). Focus groups 1 and 2 lasted approximately one hour, and focus group 3, approximately 45 minutes. Authors Then, Rankin and Ali (2014) discuss focus group research, suggesting that ultimately the research question drives the methods used, and this was the case here because I wanted to explore the use of a possible teaching tool, as well as discuss the complex notion of transferability, both of which I thought would be more effective in a focus group. In addition, Cohen et al. (2000) suggest that focus groups are useful when trying to gain feedback from previous studies, their role here in phase 3, in part being to gain feedback on my initial version of a model of critical thinking. Focus groups can also be used to help triangulate a piece of research (Cohen et al., 2000), and although as noted earlier, triangulation is not always considered to be appropriate in qualitative research, using constant comparison and negative case analysis, and thereby to some extent triangulating my findings, I hoped to build the overall picture that was emerging.

The focus group questions centred on transferability, development of critical thinking, and the conceptual model of critical thinking I had devised:

1. Is critical thinking transferable?
2. How have you developed critical thinking?
3. What improvements could be made to the model(s), and would it be of use to you?

Between the first and second focus groups, I started to adjust the model, based on the feedback received, and consequently focus groups 2 and 3 were presented with additional versions of the model for consideration.

I took notes during each of the focus groups, and again transcribed the recordings myself. During transcription I found it was possible to distinguish between each of the participants, therefore I could follow the thread of each person and their expressed thoughts when analysing the data. The data was analysed in a similar way to the other phases; utilising codes which led to themes, which led to learning points. Towards the end of the analysis, I found that the conceptual model of critical thinking was becoming central to my overall findings, and I continued to adjust and develop the model of critical thinking. After completing my analysis at this stage, I decided to use an additional data gathering method and email all the participants from phase 3. As discussed previously I had chosen not to use member checking as a validation tool in earlier stages of my research, however, I had subsequently learnt more about it, and here, at the end of phase 3 a version of member checking seemed appropriate. Bloor (1997) suggests that member validation cannot be used as a method for testing research findings, however here I saw it as an opportunity to gain more feedback and allow all phase 3 participants to contribute to my research in an individual way, when they perhaps had not had the opportunity whilst taking part in a focus group. Also, focus group 1 had not seen the later versions of the model, and as they were a group of outdoor practitioners as well as students (many worked full time as outdoor instructors), I was keen for their valuable input on the later versions. Consequently, I emailed each participant individually, asking for feedback on the three versions of the model, and out of the 15 participants, I received 5 responses.

During this phase of my research, I also consulted with the two technical experts I had spoken to during phase 1. Their perspective was invaluable concerning my findings and their relation to outdoor practice, particularly in terms of the language used in the critical thinking model that I was developing. In addition, I discussed my research with the lecturer who had been involved in focus group 1, and I had discussions with critical friends who I had consulted throughout the research journey. These critical friends ranged in their background and experience, from adventure sport coaches, researchers in the field of the outdoors, and outdoor education teachers.

3.5.4 Phase 4: ‘Testing’ the conceptual model as a teaching resource

The aim of phase 4 was to ‘test’ the conceptual model of critical thinking that I had developed. At the end of phase 3, having analysed all the data from the focus groups, email consultation, and discussions with critical friends, I formulated a final version of conceptual model. To ‘test’ this model, as an effective teaching resource, informed by action research methodology, I facilitated a teaching session with a group of postgraduate students from a taught Masters course (MA Outdoor Practice), plus their lecturer (n=7).

Within the teaching session, which was 20 minutes long, I introduced the model using both a projection of it on the board, and a colour cut out version of each element. The elements were introduced with examples given from both the academic and the practical domains and the model was 'built' on the table and discussed with the participants. Prior to the session I asked each participant to fill out the first part of a questionnaire, which was framed with the following statement: These questions (both pre and post session) relate to the topic area of the "outdoors".

The first part of the questionnaire asked:

> What understanding do you have of 'critical thinking'?
>
> In academic work: None, poor, reasonable, good, very good, excellent
>
> In practical work: None, poor, reasonable, good, very good, excellent

Participants were asked to rate their level of understanding based on the scale given. After the session, I asked participants the same question again, and questions about the session itself, with the intention of gaining feedback on the session and the conceptual model of critical thinking. A full list of the questions is in appendix 6. Data was analysed using a similar process to previous phases, rather than employing statistical analysis. It is of note that this phase of my research was not without ethical considerations and dilemmas. As noted earlier in this thesis, I was conducting insider research, and the ethical considerations relating to this were particularly prevalent in this phase. I conducted the teaching session with students that I also taught, and as a result, they may have responded more favourably to the session. This was taken into account during the analysis stage, and within conclusions drawn.

In summary, each phase of my research was informed by the previous phase, thereby adding layers to the research findings. The four phases of my research were:

1. **How can critical thinking be defined?**
2. **Can critical thinking be developed through outdoor activities?**
3. **Are critical thinking skills transferable from outdoor activities to classroom/academic settings?**
4. **'Testing' the conceptual model as a teaching resource**

My findings are in the next chapter, using the same headings as above.

4 FINDINGS

This chapter is divided into five sub-chapters, one for each phase of the research, which are reported in chronological order, and the fifth sub-chapter provides an overview of all four phases. The findings from each phase informed the next; therefore, the additional research questions are reported in their associated phase.

4.1 Phase 1: How can critical thinking be defined?

This phase of my research was a thematic analysis of 20 definitions from literature of critical thinking; the methods used were explained on page 27. The following table lists the 20 definitions used. Each includes a brief rationale for its inclusion.

Table 1: Definitions of critical thinking used in phase 1

	Author(s)	**Rationale for inclusion**
1	Cottrell (2005)	Cited often within other research, potentially a key text for the context of undergraduate studies.
2	Helsdingen et al. (2010)	The context of the research is applicable to adventure sports: decision-making.
3	Kincheloe (2000)	Discussed and cited by many, including later work by Brookfield.
4	Moon (2005)	Moon's work (2005) is on the reading list of the undergraduate programmes on which I teach.
5	Bartels (2013)	Advocates teaching critical thinking outside of the classroom therefore is relevant to the context of my research.
6	Mogenson and Mayer (2005)	The research is set within the subject area of Eco-schools, this being a topic area discussed on the degree programmes I work on.
7	Brookfield (1987)	Relevancy for adult learners.
8	Halpern (1998)	Often cited, there is also an associated critical thinking test.
9	Ennis (1985)	Work often cited.
10	Eggen and Kauchak (1996)	The researchers offer their own definition, arguing that the notion of critical thinking is complex, and they wanted to simplify it for their learners.
11	Facione (1990)	Usually referred to as the "Delphi report", this consensus of expert's opinions of critical thinking was arguably a cornerstone piece of work.
12	Giancarlo and Facione (2001)	A piece of research that adopted the Delphi report definition, therefore offering an insight into the application of the definition.
13	Ruggiero (2012)	Textbook for students, offering training in critical thinking.
14	Paul and Elder (2006)	Well-cited work, available at seemingly popular website: www.criticalthinking.org
15	Facione and Facione (2007)	This later work by Facione was written in a potentially accessible way, for a magazine rather than journal article.
16	Siegel (1990)	Key writer, raising the point that there is no clear definition of critical thinking.
17	Garrison (1991)	Offers a conceptual model of critical thinking, aimed at adult education.
18	Kurfiss (1988)	Kurfiss offers her own definition, written at a time when critical thinking was high on the HE agenda in America.
19	Dewey (1933)	Dewey's work on experiential learning is regularly discussed on our degree programmes; therefore, the context of his work is relevant here.
20	Facione (2015)	At the time of phase 1 of my research, this was most recent work offered by Facione.

Within the selected definitions, I found that some authors provided a list of clear characteristics of critical thinking (for example Paul and Elder, 2006; Brookfield, 1987; Facione, 1990 (referred to within this thesis as the Delphi report); Cottrell, 2005), though others were more descriptive, leaving the reader to make some interpretations. For example, Ruggiero (2012) suggests that critical thinking is a combination of the reflective, creative and critical dimensions; also, Kincheloe (2000) suggests that it is the ability to disengage from tacit assumptions and as a result be able to have more control over our everyday lives. Both open other questions and rely on some interpretation and an understanding of terms such as tacit. I found that the vaguer definitions were too open to interpretation, and the more clearly articulated ones provided no opportunity for interpretation, therefore possibly limiting the number of contexts within which they were applicable.

Faced with the wide range of explanations as to what critical thinking was I considered the summary offered by Brookfield (1987), whose work is relevant to this context: adult learning. Brookfield (1987) argues that critical thinking is a process, and using this as a starting point, as my own experience in adventure sports suggested that this is the case; I investigated, interpreted and evaluated other literature, now taking a more deductive approach, to ascertain whether this was a common description of critical thinking, or simply the interpretation of Brookfield. Although I found many authors who were explicit about the notion of critical thinking being a process (for example; Paul and Elder, 2006; Helsdingen et al., 2011; Kurfiss, 1988; Dewey, 1933; Facione, 2015), others were not. I interpreted the meaning of these other definitions, though caution was required, as now I had formulated an idea and it would have been easy to 'fit' my interpretations into my hypothesis. However, it was possible to tie some of the discussions together, as critical thinking has been described as thoughtful problem solving (Facione and Facione, 2007) and an investigation (Kurfiss, 1988) both of which could be interpreted as processes.

The following two pages summarise how I allocated my interpretations of the elements within the twenty definitions, these being themed into: critical thinking as a process, what the process entails, and elements of the process. The sample of definitions seen above are numbered 1-20, thereby allowing the reader to ascertain the source of the interpretation (indicated below in brackets).

Critical Thinking as a Process:

- Inference (12)
- Non Linear (12)
- Recursive process (12)
- Process not an outcome (7)
- Productive and positive activity (7)
- Used in formulating inferences (8)
- Thoughtful problem solving (15)
- Used in making decisions (8)
- Used in problem solving (8)
- Use in calculating likelihoods (8)
- An investigation (18)
- Encompassing process (17)
- Courageous truth seeking (15)

What the critical thinking process entails:

- Gathers and assesses and interprets information (14)
- Collect and evaluate available evidence (2)
- Explore situation, arrive at conclusion that integrates all information and is therefore justifiable (18)
- Suggestions; intellectualisation; collection of facts; mental elaboration; testing of hypothesis (19)
- Triggering event; appraisal of situation; explore to explain anomalies; develop alternative perspectives; integration of alternatives (7)
- Triggered by external and internal events (7)
- 1. Interpretation Categorization, (Decoding Significance, Clarifying Meaning) 2. Analysis Examining Ideas (Identifying Arguments, Analysing Arguments) 3. Evaluation (Assessing Claims, Assessing Arguments) 4. Inference (Querying Evidence, Conjecturing Alternatives, Drawing Conclusions) 5. Explanation 6. Self-Regulation (Stating Results, Justifying procedures, Presenting Arguments, Self-examination, Self-correction) (20)

The component parts of the process:

Gathering information	Evaluating/Analysing Information	Making a judgement/conclusion/decision
• Gather evidence (10) • Well informed (11) • Integrates all available information (18) • Collection of facts (19)	• Evaluate the evidence (1) • Evaluation of ideas (13) • Evaluation (12) • Sorts out ideas (13) • Analysis (12) • Interpretation (12) • Weighs up opposing arguments (1)	• Draw conclusions (1) • Judgement as an ultimate objective (6) • Deciding what to do or believe (9) • Make conclusions (10) • Maturity of judgement (15) • Think and act differently as a result (7) • Drawing conclusions (20)

At this stage of my analysis, I started to draw together my findings, and this culminated in the following interpretation of the critical thinking process:

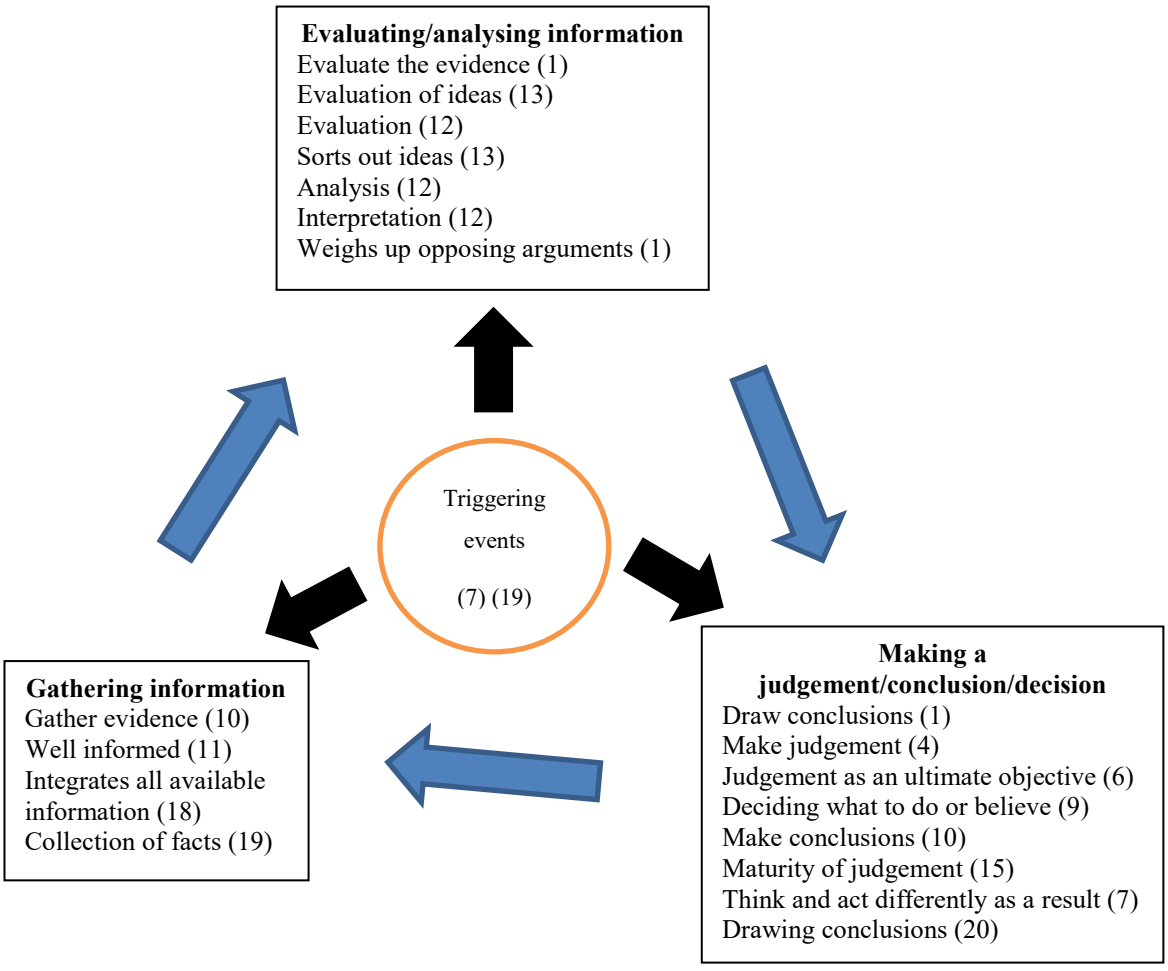

Figure 4: Critical thinking: an example of one of the outcomes of my data analysis

Also emerging from my analysis were several key traits that were associated with critical thinking. Despite there being many interpretations of the concept of critical thinking, some with explicit lists of characteristics, and others without, Bissel and Lemon's (2006) notion that there are commonalities between them, was evident during my analysis. I found that the traits could be grouped together, the result being that I identified nine common traits that a critical thinker uses at some point during the process, to a lesser or greater extent depending on the stage of the process, the context and perhaps the person themselves. The table below indicates the identified traits (in red), and the additional codes from which these traits were themed.

Table 2: Examples from thematic analysis: traits of critical thinking

Open Minded (11) (15) Holistic approach (17)	***Apply purpose (12) (8)***	***Apply Honesty (11) Integrity (15)***	***Ask Questions***	***Reasoned (8) (6)***
Flexible (11) Can identify other people's positions (1) Disengage from tacit assumptions (3) Recognise techniques used to make certain positions more appealing (1)	Focussed in enquiry (11) Orderly in complex matters (11) Self-regulatory (12) Clear about issues (11) Narrows down focus (13) Persistent (11)	Fair-minded in evaluation (11) Diligent in seeking relevant information (11) Self-examination (20)	Reads between the lines (1) Questions assumptions (7) Raises vital question (14) Asks questions (5) Inquisitive (11) Questioning process (17)	Trustful of reason (11) Reasonable thinking (9) Well-reasoned conclusions (14) Confidence in reasoned decision-making (15) Reasonable in selection of criteria (11) Identifies most reasoned ideas (13) Guided and shaped by reason (17)
Consider the context	***Can explain/ articulate/ justify decision***	***Reflective***	***Willingness to engage/disposition***	
Varies according to context (7) Judgement in context (12) Persistent in getting precise results for given context (11) Make judgement based on evidence and context (4)	Communicate effectively (14) Present a point of view (1) Explanation (12) Explain own interpretation (12) Justifiable (18)	Reflect on issues (1) Evaluate own interpretation (12) Reflective thinking (9) Reflective decision-making (15) Self-correction (20) Self-examination (20)	Critical spirit (16) Critical attitude (16) Willing to consider other opinions Willing to reconsider (11) Critical disposition (6)	

Some of the terms in the table above require clarification, to indicate how they were coded and subsequently themed together. For example, the term 'holistic' (coded with 'open minded') refers to an approach taken which considers the whole picture and the interconnections within it (Oxford Dictionaries, 2019), and 'open minded' means to have a willingness to consider other perspectives (Oxford Dictionaries, 2019), thereby the bigger picture. The terms 'willingness' and 'disposition' are themed together, as within this thesis they refer to similar outcomes.

Willingness is being prepared to do something (Oxford Dictionaries, 2019), and disposition is an inclination or tendency towards something (Oxford Dictionaries, 2019). In the case of my research, this means a willingness or inclination to engage in critical thinking.

My findings thus far were only from literature, none of which was specific to outdoor practice. Although I was able to draw some parallels between the process of critical thinking, good decision-making in the outdoors, and making a judgement in outdoor practice (see chapter 2), I was relying on my own judgement and experience to translate my findings into an outdoor context. This could raise questions as to the trustworthiness of my arguments. I had tried to ensure that I was objective in my analysis; however, it would be advantageous to interpret data (consciously or unconsciously) in a way that reflected well on the definition being applicable in the outdoor context. To consider the outdoor practice element of my research triangle more fully, and to alleviate any bias that I may have imposed on the process, I consulted two technical experts.

As described previously, these participants were from my practice, and were technical experts in their field (highly qualified and operating as senior instructors, training and assessing other outdoor instructors). The discussions were enlightening, and although they corroborated my findings, their perceptions of critical thinking in the outdoors being like my own interpretations, they exposed an additional trait. To a certain extent, I was disappointed that I had not noticed this myself, as I consider myself to be an experienced practitioner in the outdoors, however I took this to mean that I had at least taken a reasonably objective stance during the data analysis. The additional trait was that of ***applying appropriate timing***. The technical experts pointed out that in the outdoors, when operating in a dynamic environment there is a need to apply appropriate timing to the stages of the process. For example, there is a need to choose how long to spend on each stage, also a need to choose whether you have time to utilise all the traits. In an outdoor context, this could be in an emergency, or when in a highly complex environment such as winter mountaineering or white-water paddling. There is not always time to question all eventualities or question each person in the group to gather more information, though this did not mean that critical thinking was not employed. The technical experts thought that appropriate timing was important in outdoor practice, and I considered whether the same applied in an academic context, drawing the conclusion that it was. A student needs to decide how long to spend gathering information for an assignment, prioritise their time, but ensure that they spend sufficient time to draw reasoned conclusions. Therefore, I added this trait to my emerging definition of critical thinking.

4.1.1 Summary of findings from Phase 1

At the end of phase 1, through an analysis of twenty definitions and consultation with two technical experts from the field of outdoor activities, I formulated the following definition of critical thinking:

> *Critical thinking is a cyclical process of gathering, interpreting and evaluating information, then applying, testing and reflecting on decisions and judgements, which in turn leads back to gathering, interpreting and evaluating information. The critical thinker will have a willingness to take an open minded and holistic approach, yet be purposeful when necessary, ask questions when appropriate, and consider the context that they are in. With integrity, and engagement in reflective practices, they will reach reasoned decisions and judgements that can be explained and justified.*

I used this definition in phase 2, to communicate critical thinking with students. However, as this definition had derived in the main from academic literature, the next phase of my research also explored the perceptions of students.

4.2 Phase 2: Can critical thinking be developed through participation in outdoor activities?

This section includes findings from the additional research questions added to this phase: **What do outdoor students consider critical thinking to be?** and **Do outdoor practitioners use a similar thinking process to critical thinking as defined in academic literature?** These questions being imperative before considering whether critical thinking can be developed through outdoor activity participation.

The following table represents the data from the questionnaire given to participants (n=9), prior to the interviews taking place (see appendix 3 for full list of questions). This data offers an overview of the participants in phase 2, and their experience in the outdoors. The data was collected to help to ascertain whether the outdoor students were outdoor practitioners in their own time (and to what extent), rather than to assume that because they were studying an outdoor related degree, that this would be the case. Each of the students reported that they had been participating in outdoor activities for a longer period than the degree course, and many reported that they took part in activities that were not offered during the degree programmes. This meant that I expected to receive responses regarding their critical thinking development outside of the university programme, as well as within it, as they were taking part in outdoor activities recreationally. As indicated earlier in this thesis, pseudonyms are used, and the list of acronyms used in the table below can be found on page viii. Direct quotes from the data are in *italics*.

Table 3: Phase 2 participants

Participant	Year group	Age Sex	Reported experience in outdoor activities Number of years of experience; ***Main outdoor activities***; Outdoor qualifications
Hazel	OL Year 3	18-25 Female	12 years *Mountaineering and Sea Kayaking, previously climbing and sailing* (including overseas expeditions and winter climbing) ML; CWA; Level 1; 3* Sea; Dinghy Instructor; Start Windsurfing
Joe	OL Year 1	18-25 Male	2 years *Hill walking, climbing, scuba diving* PADI open water diver
Mark	OL(B) Year 3	35-45 Male	20 years *Mountaineering, rock climbing, winter mountaineering* (plus overseas/altitude) ML; WML (t); SPA; Alpine Leader (Ski); PADI rescue diver
Dave	ASC Year 2	18-25 Male	7 years *Ski, Paddle, Climb* (including off piste skiing) ML(t); 3* Kayak
John	OL(B) Year 3	35-45 Male	20 years *Mountain biking, kayaking, open canoe, rock climbing, skiing (Alpine, Nordic and ski touring, back country), mountaineering* ML; SPA; Level 2; 4* Canoe; 5* (t) Kayak; Dingy Level 2; Local Cave Leader; BASI Level 2; BASI Level 4 (t); MIAS Level 5; British Cycling Tutor (t)
Suzy	ASC Year 2	18-25 Female	*"since I could walk"* (implying that she had taken part for many years) *Mountaineering* (plus climbing and paddling) ML(t); 2*; FSRT
Ann	ASC Year 2	18-25 Female	6 years *Canoeing, climbing and teach a variety* [of outdoor activities] 3*; GNAS Instructor; Bell boat helm
Beth	ASC Year 2	25-35 Female	4 years *Kayaking and climbing* ML(t); Level 1
Ian	OL Year 2	18-25 Male	15 years *Mountaineering, paddling* (including winter mountaineering) ML(t); 3* Kayak; FSRT

Additional data from the questionnaires indicated whether the outdoor activities were instructor led, or student led, however this is not included in the table above. The data was collected because I expected it to contribute to the overall impression that each participant gave of their level of experience in outdoor activities. It is a common method used by Mountain Training and British Canoeing to indicate a person's level of experience in an activity, however, the number of qualifications that each participant held, approximately reflects this data. This is because, to hold a coaching/teaching qualification in one of the disciplines, a specific level of experience and performance is required. Each of the outdoor activity qualifications have a set of criteria (see each National Governing Body), and these criteria are usually a combination of performance, assessment in the field of the activity, and an associated level of experience. In general, the higher the qualification level, the more complex the environment in which that instructor is qualified to operate.

The following examples offer an overview of some of the qualifications and demonstrate the level of experience required for the qualifications, thereby indicating the level of experience of the participants in this phase of the research. In mountaineering, to have completed the 6-day Mountain Leader training course (MLt), a participant needs to have registered with Mountain Training, this requiring the completion of twenty quality mountain days (Mountain Training, 2017), and to hold a Mountain Leader award (ML), there is a requirement for forty quality mountain days, and successful completion of a 5-day assessment. To attend a Winter Mountain Leader (WML) course, one must first hold a summer Mountain Leader award then additionally provide evidence of quality mountain days in winter conditions. In paddlesport, to hold a Level 1 Coach award one must already hold the relevant performance award (2* paddlesport) and have completed the Foundation Safety and Rescue Training (FSRT). Overall, the table above offers an overview of the level of outdoor activity experience of each of the participants in phase 2.

4.2.1 What do outdoor students consider critical thinking to be?

At the beginning of the first four interviews, (these were all individual interviews), before I had presented my definition to them, I asked the participants (Hazel, Joe, Mark and Dave) what they thought critical thinking was. The following were their responses:

> *"Critical thinking is kind of analysing your thoughts and the reasons behind them"* (Hazel)
>
> *"I think critical thinking is about analysing a situation and coming up with a balanced response to it"* (Joe)
>
> *"Critical thinking to me is not taking what you hear, read or are told about at face value, it's looking at it deeper"* (Mark)
>
> *"It's actually thinking before you do stuff, so almost like reflection as well"* (Dave)

With each of the responses above, the participants were not specific about the context that they were referring to, and when asked further into the interview to give examples of when they critically thought, examples came from many contexts, including outdoor activities, academic work and other environments, such as within their jobs (some of which was as an outdoor instructor).

The following examples from the transcripts demonstrate when the participants thought they had used/would use critical thinking, and my interpretations of similarities to my own definition[5] are in brackets.

> *"[When] rock climbing and if you're trad[itional] climbing you are critically thinking, if you are thinking about all the different nut placements* (holistic)*, the weight they can hold* (purposeful) *and all the little stages in between it and thinking about the ways in which they have been put in* (analysis/evaluation)*, and if you fall on that, if it is going to hold you* (questioning; making a reasoned decision/judgement)*"* (Hazel)
>
> *"[I used critical thinking] on the last practical week, we had someone when we were mountaineering who was struggling with fitness…one person stayed back, and I remember we all felt a bit ashamed about that because we realised how demoralised [they] felt"* (Joe) (Joe related critical thinking strongly with reflective practice)
>
> *"Something could happen…like their car might break down… I think a critical thinker wouldn't make assumptions* (open minded, reasoned judgement)*, would reflect quite a bit* (reflection)*"* (Joe)
>
> *"In retail, thinking about the customers that would come in, how they would approach the shop and… designing the layouts around that, and trying to recognise different signals either buyer signals or whether people wanted to be talked to"* (gathering information, evaluating and making reasoned judgement) (Hazel)
>
> *"It completely depends on the context whether you use [critical thinking skills] or not"* (relevance of context in critical thinking) (Dave)

I found that in the main, the students' perceptions of critical thinking included elements of the definition that I had created. However, at this stage I also observed that the more we talked about critical thinking, the greater the participants' awareness and understanding appeared to be. This was perhaps inevitable, in a previous piece of research for a Masters degree, I had found that when I talked to students about critical thinking, and in particular critical thinking in the outdoors, they almost had a 'light-bulb' moment when they contextualised critical thinking, and could recognise their own use of it in their own practice.

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[5] Critical thinking is a cyclical process of gathering, interpreting and evaluating information, then applying, testing and reflecting on decisions and judgements, which in turn leads back to gathering, interpreting and evaluating information. The critical thinker will have a willingness to take an open minded and holistic approach, yet be purposeful when necessary, ask questions when appropriate, and consider the context that they are in. With integrity, and engagement in reflective practices, they will reach reasoned decisions and judgements that can be explained and justified.

In a similar vein, this theme emerged in phase 2. This, therefore, raises the next question; do outdoor practitioners use a similar thinking process to critical thinking as defined in academic literature?

4.2.2 Do outdoor practitioners use a similar thinking process to critical thinking as defined in academic literature?

As discussed, I had made anecdotal observations during the interviews that the participants became more aware of what critical thinking was, as the interview progressed, and they started to associate it with how they think in the outdoors. For example, at the beginning of the interview Dave did not perceive that he used critical thinking skills whilst taking part in outdoor activities, though later suggested that critical thinking was a subconscious activity and eventually gave examples of its use and development in his own outdoor practice. To a lesser extent, this also seemed to be the case for Mark and John. Hazel and Joe, on the other hand, gave examples of using critical thinking in the outdoors from the outset of the interview, suggesting that they had not compartmentalised critical thinking into one particular domain. As discussed in chapter 2, there is disagreement as to whether critical thinking is a subject specific or general skill. Although my research cannot resolve this issue, I analysed the data with the view to shedding a light on whether there are shared characteristics between the thinking process used by outdoor practitioners, and critical thinking as defined in academic literature, as this question is relevant if considering transferability of critical thinking skills from practical to classroom environments of outdoor students.

One argument that I explored was the possible association between complex environments and critical thinking, for example in phase 1, I identified that critical thinking was "used in problem solving" (Halpern, 1998) and in "courageous truth seeking" (Facione and Facione, 2007), both of which are potentially complex. I asked the question during my analysis: When and where do outdoor students use critical thinking?

Table 4: When and where do outdoor students use critical thinking?

When and where do outdoor students use critical thinking (not specifically in the outdoors)?	**Theme**
"You critically think... when your life is in danger" (Dave) *"[At school] I did philosophy and history and it was pushed* (critical thinking) *quite heavily there"* (Ian) *"[Studying] psychology and politics"* (Mark) *"Unfamiliar environments bring it out of you"* (Beth) *"[If my] car broke down"* (Joe)	These could all be considered to be **complex environments** (many different parts to them and difficult to understand)

In chapter 2 of this thesis, I argued that outdoor activities are associated with complex environments. The technical experts consulted in phase 1 also implied this when they commented on examples of critical thinking use in outdoor activities, and participants in phase 2 appeared to suggest also, that they associated outdoor activities with complex environments:

Table 5: The type of environment that outdoor activities take place in, according to outdoor students

In what type of environment do outdoor students think outdoor activities take place?	**Theme**
"Outdoors there is a lot of choices you have to make" (Ian) *"Risks [are] inherent"* (Beth) *"You're trying to read into how the environment is going to affect you"* (John) *"There are so many influences on the outdoors"* (Mark)	**Outdoor activities are associated with complex environments** (many different parts to them and difficult to understand)

The students also gave explicit examples of their (perceived) use of critical thinking specifically in the outdoors (as reported in the previous sub-chapter, the students' perception of critical thinking was similar to the definition that I gave them):

Table 6: Examples of use of critical thinking in outdoor activities

Critical thinking use in the outdoors	**Theme**
"If you are trad[itional] climbing you are critically thinking" (Hazel) *"[The outdoor] environment forces you to critically think"* (Ian) *"[During] outdoor activities you critically think more than indoor activities"* (Ann) *"[In the outdoors] you have to do some sort of critical thinking whether you are aware of it or not"* (Beth) *"Outdoor education most definitely requires critical thinking"* (John) *"I think it's just one of those things if you are in the outdoors you just do"* (Dave) *"[In the outdoors] you are dealing with an unpredictable environment [and I use critical thinking in the outdoors]"* (Hazel) *"[I used critical thinking] on the last practical week"* (Joe)	**Students in this research perceive that they use critical thinking in outdoor practice** (Based on the definition of critical thinking given to them from phase 1).

If critical thinking, according to the participants in this research (students in phase 2 and two technical experts), is associated with complex environments and outdoor activities take place in complex environments, it could be argued that these outdoor practitioners use a similar thinking process to what is described in the literature as critical thinking. When giving examples of when they had used critical thinking whilst participating in outdoor activities, no outdoor activities stood out more strongly, and across the responses, there were examples from many outdoor activities. However Ann suggested that she critically thinks more whilst rock climbing outside than she does if she goes to the climbing wall, because there is more to think about outside;

more information to process. Therefore, it may be that the level of critical thinking used in the outdoors depends, to some extent, on the complexity of the environment. This may also be the case in the classroom, a student may use less critical thought when the subject is, to them, easily understood, and more when they find the subject complex. It is of importance that the level of complexity of an environment is different for each person, for example, an inexperienced climber may have a different opinion to Ann, perhaps finding indoor climbing complex. Complexity of an environment is relative to each person. This point is also of significance later in this thesis, when consideration is given to the role of the lecturer/instructor[6] in helping outdoor students to develop critical thinking.

Overall, I concluded that the three themes outlined above led to the following learning point: **There are shared characteristics between what is thought of as critical thinking in academic contexts, and the thinking process of an outdoor practitioner.**

A summary of this analysis process is represented in the diagram below:

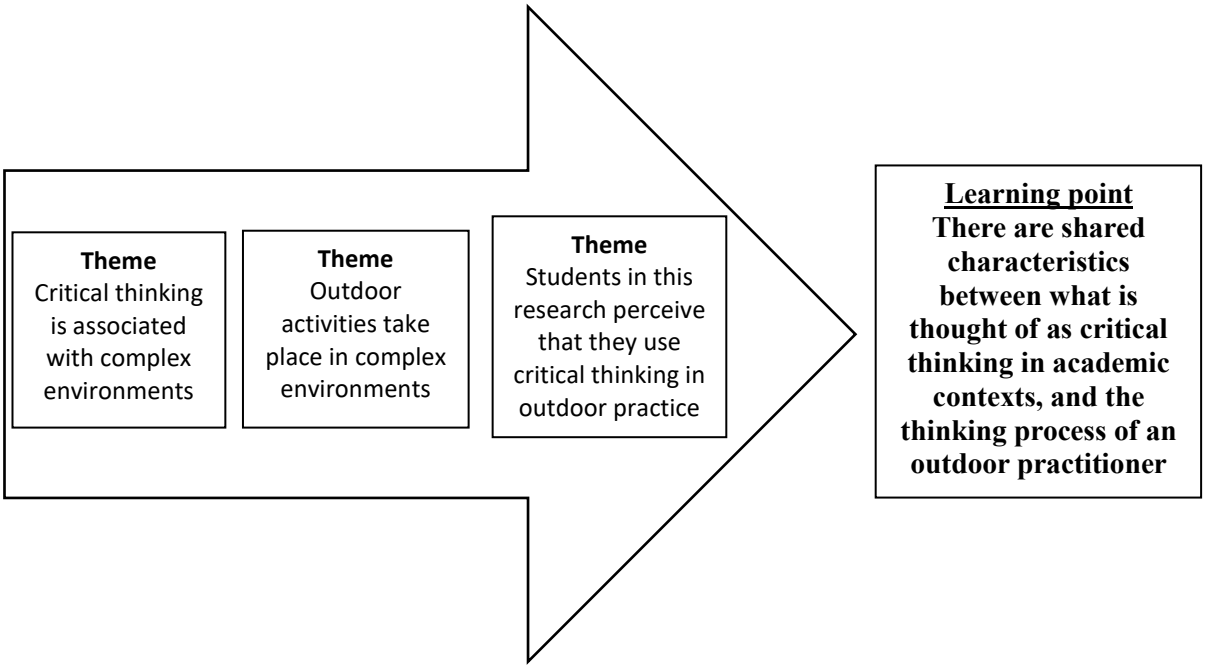


Figure 5: Representation of how I reached a learning point in Phase 2

[6] Throughout this thesis, the term lecturer/instructor is used to describe those who facilitate learning in the context of the outdoor students in this research. Although other terms exist, for example guide/coach/teacher etc., it is not for this thesis to debate any potential differences between these terms.

4.2.3 Can critical thinking be developed through participation in outdoor activities?

Having established that there were potentially shared characteristics between what is thought of as critical thinking in academic contexts, and the thinking process of an outdoor practitioner, the next question in my research was whether critical thinking was developable through outdoor activities.

During the interviews, I asked participants how they thought they had developed their own critical thinking, rather than starting with the question: "Have you developed critical thinking through outdoor activities?" This was to allow the students to talk freely about how they thought they had developed their critical thinking, rather than risk influencing their responses, though all participants received an information sheet, which suggested that this was what I was interested in, and this may have influenced some to talk about development through outdoor activities explicitly. However, I hoped that by not directly talking about outdoor activities in the initial stages, this would help to present me as an objective researcher who was interested in their responses, rather than looking for specific answers. To some degree, entering phase 2, I had assumed that all students had developed some critical thinking skills, and therefore were qualified to discuss how they had developed their critical thinking. This assumption derived from my experience interacting with them, that critical thinking is a desired outcome of higher education, as well as the emerging argument that critical thinking (in an academic sense) shares characteristics with the thinking process of an outdoor practitioner.

The participants gave a range of answers to the question: "How have you developed your critical thinking?" It was difficult at times to tease some of the responses apart, both by the participants themselves, and during data analysis, and each participant had their own personal interpretation of critical thinking, even if they agreed broadly with the definition presented, therefore, I could not guarantee that they were all referring to the same concept. However, the responses could be roughly themed into five key areas: **university** (lectures, independent study etc.); **practical sessions** (students (n=7) on the three-year programmes undertake a minimum of 10 weeks of practical outdoor activities); their own **participation in outdoor activities**; **general life**; and **work**. The following table presents examples from the transcripts, and an indication as to how the data was themed:

Table 7: How have outdoor students developed their critical thinking?

Examples from transcripts	**Theme**
"Definitely through the time of being a graduate" (John) *"[I have] developed since being at university"* (Beth) *"[University] contributes quite a bit... I became more purposeful"* (Joe) *"[I have been] given a tool box"* (Hazel)	**University** (lectures, independent study etc.) (n=9)
"[My critical thinking has been] massively enhanced by those practical weeks" (Hazel) *"[I have developed critical thinking] definitely through the practical [elements of the course]"* (Dave) *"It's because of those practical weeks especially that my critical thinking has developed"* (Beth) *"[I developed critical thinking] on the last practical week"* (Joe)	University **practical sessions** (n=7)
"I would definitely say [outdoor activities] would be part [of my development]" (John) *"I definitely think a lot has been developed though outdoor activities"* (Hazel) *"I think outdoor activities do [contribute]"* (Mark)	**Outdoor activities** (independent of university or work) (n=9)
"Through life experiences" (Suzy) *"On my own"* (Joe)	**Life** (n=9)
"In the [outdoor] centre where I work" (Ann)	**Work** (n=9)

Overall, there was roughly an even mix between the five themes, though of note is that participation in outdoor activities made up almost half of the responses when university practical sessions and students' own independent experiences are combined. In addition, for many of the students, "work" was as an outdoor instructor, therefore adding to the contribution that outdoor activities made, to the students' perceptions as to how they had developed their critical thinking (as part of their work, on their degree programme and independent participation).

However, because it was difficult (for them and me) to tease their answers apart, later in the interview, having already received a response to the question of development more generally, I asked the question I was particularly interested in, more explicitly; did the participants think that they had developed critical thinking through participation in outdoor activities? In addition, in some interviews I shifted the emphasis to whether somebody else could develop critical thinking skills through participation in outdoor activities, this perhaps offering an alternative way of looking at the question. It was notable in many of the interviews that the participants felt more strongly towards the end of the discussions that outdoor activity participation helped to develop critical thinking skills, than they had at the beginning. This may have been, as reported earlier, due to increased awareness of critical thinking resulting from the discussions, and increased awareness of the act of critical thinking in outdoor activities. However, it is also possible that as the researcher, I led the participants to suggest that they had developed critical

thinking through outdoor activity participation, despite my own view that I took care not to do this. Appendix 1 of this thesis contains reflective notes from the interviews. I drew this diagram after conducting all the interviews, bringing together the notes that I had made after each individual one. As can be seen, at the end of each interview, I was concerned as to whether I was leading the participant, and wary of this in each interview. On balance, I do not believe that I led participants and an example from a transcript (below) demonstrates some of the ways I managed this:

> Me: So, for you (this was the group interview), where do you think you have developed most of those skills? (I used an open-ended question)
>
> Ann: *"In the centre where I work, the outdoor pursuits centre."*

Later in the discussion:

> Me: Can you tease apart the work and the participation in outdoor activity personally and doing it through the degree? (Ann had given responses associated with each of these, and I asked her to try to separate them)
>
> Ann: *"Being in that outdoor environment, like being in a centre or something like that you are in a place where you are going to have loads of different situations, you've got different people, different activities and you are always going to be faced with something new that you have to think right that needs to be sorted and I think being in the outdoors, if something is to… not go wrong, but happen, you have to be quite efficient about it for safety wise and everything so you have to be like really on it and I think that's kind of what develops my critical thinking"*
>
> Me: What is your opinion (this was to the whole group) on whether outdoor activities have a role to play? (Specific question, but intended not to imply any researcher bias)
>
> Beth: *"I think it is a huge role and I think because of our practical weeks especially"*

I asked some students specifically whether they thought that critical thinking could be developed through outdoor activity alone, without studying an associated degree in the subject. Responses to this question were mixed, for example, when Ian was asked whether somebody could develop critical thinking through outdoor activities alone, Ian replied, *"maybe, but it would be a very slow process".* This was interesting because, as the data above suggests, approximately half of reported development of critical thinking was through outdoor activities. However, as Ian was on the full time degree programme, he would have attended the ten practical weeks, and therefore may have associated this outdoor activity with simply being part of the degree.

I asked John (who was a top up student, therefore would not have attended the 10 practical weeks) a similar question:

> Me: Can somebody develop critical thinking through outdoor activity without doing a degree?
>
> John: (who had worked in the outdoor industry for 10 years) *"If I wasn't doing the degree I think the only way we would get it is by… the more we experience the more qualifications you were to gain"*
>
> Me: Where do you equate that level of qualification against the degree?
>
> John: *"So take mountaineering… I would expect an MIA [Mountain Instructor Award] to have gone through that process"*

As can be seen in table 7, John had indicated that he thought that outdoor activities had helped to develop his critical thinking, and as John was a top up student, he could not be referring to outdoor activities that were part of his degree course. In the dialogue above, John suggests that someone could develop critical thinking through outdoor activities alone, though he implies that it might take longer. I have made this interpretation because the Mountain Instructor Award (MIA) that John refers to is a higher-level qualification in the outdoor industry, requiring a Mountain Leader qualification and substantial experience in mountaineering and multi-pitch rock climbing. It is of note that that none of the participants in this phase of the research held a Mountain Instructor Award (MIA). This does not mean that only MIA's (without studying a degree) have critical thinking skills and those with lower qualifications do not, John himself reported that he had developed critical thinking through outdoor activities but did not hold an MIA, but does imply that perhaps without studying a degree in a related subject, the process of development might take longer.

In summary, the participants in phase 2 thought that to some extent they had, and could, **develop critical thinking through participation in outdoor activities** (based on the definition from phase 1, and the notion that there are shared characteristics between what is thought of as critical thinking in an academic sense, and the thinking process of an outdoor practitioner). However, many participants also suggested that this development might be slower if they were not studying an outdoor related degree at the same time.

4.2.4 Emerging theme: "Facilitating critical thinking"

As previously reported, some participants in phase 2 suggested that critical thinking development through outdoor activities alone (without studying a related degree) would be slower. I also got the sense that the students thought that they were developing their critical thinking skills faster than their peers/friends who were on a different degree course or were from their outdoor practice, rather than on the same outdoor related degree as them. The reasons for this varied. For example, Suzy said that it was because the course that she studied (Adventure Sports Coaching) had a practical element to it (of note; both the Outdoor Leadership and Adventure Sports Coaching programmes, at the time of this research, followed a similar pattern of practical and theory teaching in year one and two):

> *"If you look at our course compared to a course that doesn't have a practical side… having a practical side is really beneficial"* (Suzy)

Combining practical and theory, however, is not unique to outdoor courses, though the ratio on other programmes may be different, and/or the method of facilitation may alter. Similar to Suzy, other students also compared their course to others', when discussing why they thought their development was quicker than their peers/friends was. For example Hazel had said, *"I know I think [as a result of this course] a lot more about things"* and Mark suggested that it was the subject itself: *"outdoor leadership-it is more conceptual [than] maths, chemistry [or] sciences"]*. Mark's point here suggests that outdoor activities is in part based on concepts and ideas that are formed in the mind, thereby conceptual, that critical thinking also contains a conceptual element to it, and that to him that meant development of critical thinking was faster on his degree course. Dave had suggested that compared to another student he knew, who studied a different degree subject, even though that student was a climber, he thought that they did not critically think as much as he did. Dave put this down to his course helping him to understand critical thinking:

> *"I think you become more of a critical thinker than someone who just does stuff without understanding why they do it or the theory behind [it]"* (Dave)

All students participating in this phase of the research were studying outdoor related degrees, and therefore were to some extent facilitated in their development of critical thinking. In the first interview I conducted, as can be seen in appendix 1, a question regarding whether or not facilitation plays a role in students' development of critical thinking was raised, and although it was not originally part of my interview questions, due to its apparent significance in that interview I had added additional questions to subsequent interviews.

I asked students what had helped their development, and whether they thought that critical thinking development required facilitation. The following examples from the transcripts are in relation to this latter question regarding the requirement for facilitation:

> *"[It] depends what level they are at or what kind of setting you are in [whether or not critical thinking development requires facilitation]"* (Beth)
>
> *"I think [it is] dependent on the person and how their mind works"* (Mark)
>
> *"I think it's very situational and personality based"* (Hazel)
>
> *"I think it's your learning style [that influences whether facilitation is required]* (Dave)
>
> Me: Does critical thinking development need facilitating? *"No, I think some people naturally do it, I think facilitation definitely helps, it can help steer you towards it, if they're not sort of inclined"* (Ian)
>
> *"It depends on the person, the attributes of an individual"* (in response to a question about the amount of time allocated to facilitation is required) (John)
>
> Beth had said, "*I'm quite a dependent person"*, whereas Ann said that *[she like[d] to do things independently"*

What is notable in these responses is perhaps that the only clear message is that it depends on the individual and potentially the environment in which the facilitation occurs. However, all participants gave examples of, what I identify from my experience as, facilitation activities. The participants described how facilitation activities (as I identified them) had been beneficial to their development, and further analysis of this specific data led to six potential themes. It is notable that each student would describe a number of activities, rather than one in particular, that they perceived had been of benefit to them, which suggests that there is potentially a range of activities that may be of benefit to one student.

The table below demonstrates how data was coded and grouped together to arrive at the themes. The participants referred to a range of contexts when describing the activities, and I have indicated these using the following colours: classroom/academic context (red), a practical outdoor setting (green) and not specific (black), as this continues to build on the learning point gained earlier in this thesis, that critical thinking is developable through outdoor activity participation:

Table 8: Activities that students thought were effective in developing critical thinking

Examples from transcripts. The context being referred to is indicated by the following colours: outdoor practice; classroom; not specific	**Themes: Activities that may promote critical thinking development**
Lecturer/Instructor should: *"[Lecturer/instructor should say] this is what I am thinking about at this point in time, these are the things you might want to think about if you were presented with this same situation"* (John) *"Verbalise in front of people"* (Hazel) *"Show how I would use critical thinking and then [I should] be put in that scenario"* (Beth)	**Lecturer or Instructor modelling critical thinking**
"Talking about it with someone has definitely made me more aware of it" (Beth) *"Having a discussion with someone [influences my development]"* (Ian) *"Talking about [critical thinking] with other people; talking about why we're doing stuff and what we're doing, rather than just doing it [helps my development]"* (Dave)	**Taking part in discussion**
"This course has really focussed my mind…. prompted me into thinking" (Mark) *"I've thought about it [critical thinking] much more since this degree"* (Dave) *"I didn't know about it before the degree – it was the trigger"* (John) *"I like a bit of facilitation because it makes me think"* (Beth) *"Facilitation definitely helps, it can help steer you"* (Ian)	**Being triggered or being prompted (this may also motivate a student)**
"We were allowed to ask lots of questions" (Joe) *"Asking questions when perhaps involved in outdoor activities at appropriate times is a good simple way of facilitating"* (Mark) *"Lecturers… have got lots of probing questions"* (Hazel)	**Having the opportunity to question and be questioned**
"[There was] …space to free think" (Suzy) *"You've got to allow people to have the experiences and time to reflect and time to question themselves"* (Hazel) *"I developed most… when I had time to think"* (Joe)	**Reflection (having time/space to think)**
"From going out and doing it… learning practically" (Dave) *"I probably learn it better just going out and doing it by myself"* (Ann) *"Allow people to have experiences"* (Hazel) *"You don't really develop critical thinking until you are out there practically doing it on your own"* (Beth)	**Practicing critical thinking**

In summary, findings from this phase of my research regarding **facilitation**, suggest six activities that may be effective in developing critical thinking in outdoor students. However, what is notable is that individuals may respond differently to these, and that facilitation of critical thinking depends largely on the individual. In addition, it is notable that of the six activities listed above, some may require the lecturer/instructor to be more explicit, and to lead the activity, for example modelling and triggering critical thought, and others could be more student led.

4.2.5 Emerging theme: "Awareness of the act of critical thinking"

An additional theme that was noticeable in phase 2 was that the students often appeared not to be aware of their own use of critical thinking. For example, some students suggested that they thought that critical thinking was a subconscious, rather than conscious activity, this implying that someone may not be aware of when they are using critical thinking. Also, students referred to critical thinking as being a natural process, and rather than meaning 'part of being human' I took this to mean that the process of critical thinking can happen naturally, essentially that it is practiced to the point of happening 'automatically' or 'subconsciously'. In addition, the term 'intuition' was used, and I interpreted this to have a similar meaning in this context. Examples from the data that are associated with the theme of 'awareness' are presented in the following table (codes used are in **bold**):

Table 9: Examples from the transcripts that relate to the theme of 'awareness'

Examples from the transcripts	**Potential theme: Awareness of one's own critical thinking**
John, when discussing how he uses critical thinking said that sometimes it was *"**intuition**"*	**Intuition** is taken here to mean something that is **subconscious…**
*"I deliberately do do them, definitely, but I don't think I deliberately don't do them, I just do them, I don't think 'I'm not going to think critically about this'. "I think it can happen quite **subconsciously** and you might not think you are thinking critically but you are"* (Dave) *"We could do it **subconsciously**… but it can also be conscious"* (Joe) *"I think it is **subconscious**, but if you understand what it is you can be conscious of it, but I think the actual process is subconscious, you know you do it **naturally**"* (Ian)	**Subconscious** activity suggests that we may not be **aware** of it, it might happen **naturally…**
*"I think it might work best when it's not forced and it happens **naturally**"* (Suzy) *"It's a very **natural** thing" "I think that people who do it have a **natural** tendency"* (Hazel) *"It's a **natural** thing, some people are more **naturally** critical, maybe that's through their early development or maybe it's just their personality"* (Ian)	If something happens **naturally**, we may not be **aware** of it
*"You have to do some whether you are **aware** of it or not"* (Beth)	Suggests that a person may not be **aware**

Some of the examples from the transcripts did not give a specific context, and so the participants could have been referring to the academic context, though most of the examples were from the outdoor context (this is not necessarily evident in the table above, but it was implied in the discussions and subsequent transcripts). The participants gave the appearance of increasing their understanding of critical thinking, and in particular within outdoor activities, as the interview progressed, suggesting that they were not aware of their own critical thinking in

the outdoor context, though Dave did note that critical thinking for him also happened subconsciously when writing an assignment.

This may suggest that critical thinking in the academic domain is a more conscious activity, and this could be due to the nature of the context. As discussed in chapter 2, an expectation of higher education is that a student will develop their critical thinking skills; therefore, critical thinking is likely to be discussed more explicitly. Critical thinking (in my experience) is not often explicitly discussed in outdoor practice, and if outdoor students are more likely to discuss critical thinking actively in an academic context, their **awareness** of their own critical thinking in outdoor activities will be less, and this could have implications for any potential considerations regarding transferability.

4.2.6 Summary of findings from Phase 2

Phase 2 findings suggest the following: Firstly, that the outdoor students that I spoke to, in general, perceived critical thinking to be similar to my definition, therefore it can be taken that the definition I provided (from phase 1), is appropriate for use in this research. Secondly, findings from phase 2 suggest that there are shared characteristics between what is thought of as critical thinking in academic contexts, and the thinking process of an outdoor practitioner.

In terms of the main research question for this phase: **can critical thinking be developed through outdoor activities** (thereby enabling discussion regarding transferability in the context of outdoor students) what the students were telling me was that they thought that they had, to some extent, developed their critical thinking through outdoor activities. This was through a mixture of facilitated outdoor activity as part of their degree, their own participation, and work that was outdoor related.

The points above are summarised in the following diagram, which demonstrates how I arrived at the second key learning point for this phase of my research, that critical thinking can be developed through participation in outdoor activities:

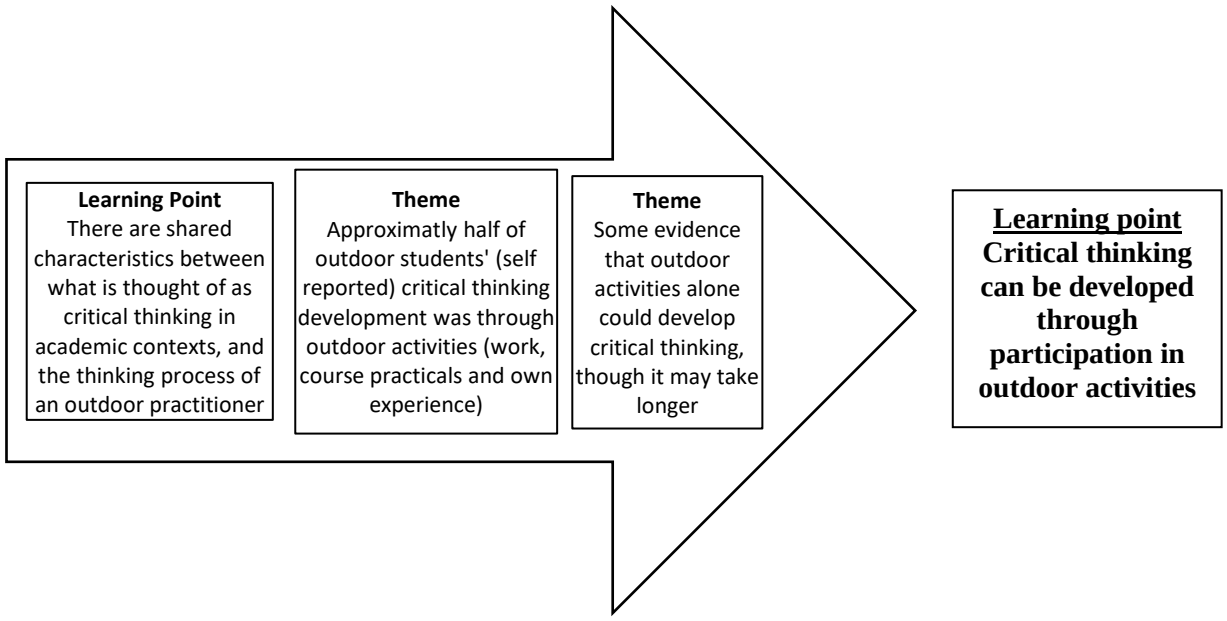


Figure 6: Representation of how the learning point was reached

Emerging themes from this phase include that **facilitation** may affect critical thinking development in outdoor students, and that outdoor students may not be **aware** of their own critical thinking. This latter emerging theme led me to design a conceptual model of critical thinking that I could use to communicate the concept of critical thinking when teaching. I presented the original version of this model at a Teaching and Learning conference at the University of Central Lancashire, and devised phase 3 to enable me to develop the model further. The original version of the model is below, to allow the reader to observe how it was developed and adapted as a result of phase 3:

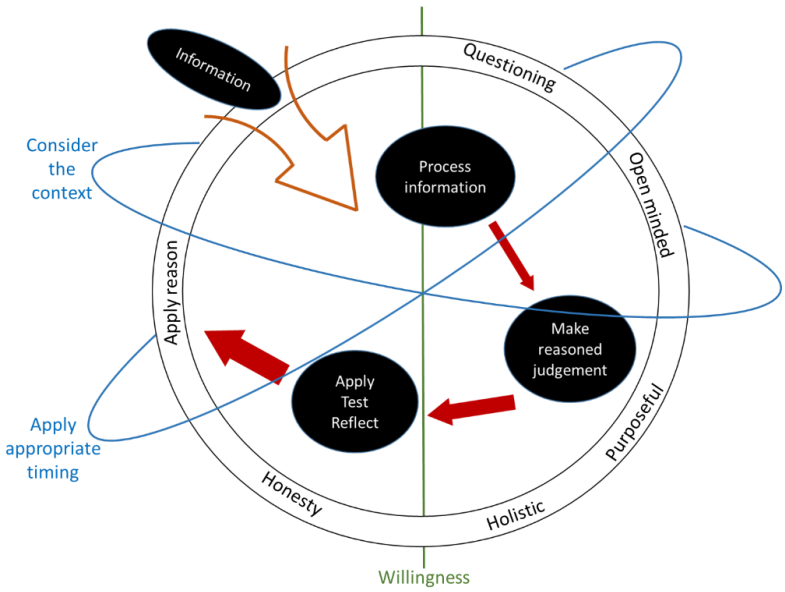


Figure 7: Version one of the conceptual model of critical thinking

4.3 Phase 3: Are critical thinking skills transferable from outdoor activities to classroom/academic settings?

Firstly, this section of my thesis reports findings regarding the research question: **Are critical thinking skills transferable from outdoor activities to classroom/academic settings?** In addition, building on phase 2, this section includes findings concerning **awareness** of one's own critical thinking and **facilitation** of critical thinking development. Following this, findings from the additional research question added to this phase, are reported: **Can critical thinking be communicated using a conceptual model, and if so is the model of benefit to learners?**

In phase 3 of my research, three focus groups were presented with one or more versions of the conceptual model of critical thinking I had developed and were asked questions regarding transferability and facilitation (focus group 1 initially saw version 1 only). Focus group 1 and 2 lasted approximately one hour, and focus group 3, with two participants lasted 45 minutes. I did not explicitly ask about awareness of the concept/act of critical thinking, as arguably this would create awareness thereby changing their responses. In the reports below, I have referred to the focus group participants using the following identifying numbers:

Table 10: Phase 3 participants

Focus Group (chronological order)	Details of the group	Referred to as:
1	Blended Top up cohort (BA Hons. Outdoor Leadership) 7 students, plus their lecturer (n=8) Note: mainly mature students studying part time	Participants 1-8
2	Third year students (BA Hons. Outdoor Leadership) 5 participants (n=5)	Participants 9-13
3	Second year students (BA Hons. Outdoor Leadership) 2 participants (n=2)	Participants 14-15

Data regarding levels of experience in outdoor practice was not explicitly collected in this phase. All participants were attending the same outdoor related degrees as the sample group in phase 2; they either attended practical sessions within the programme or had sufficient accredited prior learning in outdoor activities to attend the top up degree (or direct entry into year 3 of the fulltime programme). Also, it was the norm within the participants in phase 2, that they had outdoor experience that extended beyond their degree; therefore, to a certain extent I expected this to be the case here too. Anecdotally, because I taught the students, I was also aware that many of them worked in the outdoor industry either full time (this was the case for most of focus group 1) or part time/seasonally (as was the case for the majority of focus groups 2 and 3).

4.3.1 Are critical thinking skills transferable from outdoor activities to classroom/academic settings?

During the interviews in phase 2, I had not often specifically asked about transferability, however, when it came to analysing focus group data from phase 3, I found it beneficial to go back to the transcripts from phase 2 to reconsider the data. These findings are included here first, as they contribute to the overall picture.

Re-evaluation of data from phase 2:

I found that some students were explicit about their thoughts on transferability of critical thinking, for example:

> *"I think it's because of our practical weeks especially that my critical thinking has developed and I think is then transferred back to into study and everyday life"* (Beth)

In the case of this interview, we were not discussing transferability as such, simply how Beth had developed her critical thinking, and later on in the discussion, she said, *"I think the practical weeks have had more of an impact on how I critically think in lectures, than the other way round"*. Reassuringly for me, this data appears to support my original objectives for this research, however on further analysis; the picture was considerably more blurred. Hazel suggested that she had transferred critical thinking from her work experience:

> *"Because I've worked in retail, I've worked in hospitality and I've worked in the outdoors, the critical thinking and engagement with other people is different again and I think I have transferred this across."* (Hazel)

This perhaps raises the question as to whether critical thinking is different in each of these contexts, and therefore not directly transferable, however my interpretation was that Hazel was suggesting that she had transferred critical thinking from her previous experiences to the context she was in now. However later in the discussions, Hazel was less convinced. When we discussed transferability and whether it could work, Hazel used the example of a group of 16-year olds on an outdoor expedition who were encouraged to engage in critical thinking, and Hazel questioned whether her students could transfer this critical thinking back to their everyday life.

Dave raised an important point about transferability. His experience was as a skier, with reasonably extensive experience in complex and dynamic snow sport environments. When asked if he thought critical thinking was subject specific, he interrupted me part way through the sentence to say *"no"*, but that you need subject knowledge of the other context into which you

want to apply critical thinking. Later, Dave said that *"I think you can definitely transfer the skills and I guess you can transfer it from the outdoors to your assignments… but [it needs to be] transferring it into something I understand".* This raised the important point that essays are different to skiing, and that although the critical thinking process shares characteristics in each context, you need some knowledge about essays before you can transfer critical thinking from your skiing experience, though how much, was at this stage unknown.

When asked whether critical thinking skills were bound to a context, and therefore not transferable, John, a mature student with a wide range of experience in the outdoors and with a number of high-level outdoor qualifications, thought that this was not the case, implying that critical thinking was transferable. Later, when asked about the role he plays as an outdoor instructor, in developing critical thinking in others, John gave examples from his experience saying that his students would *"take [critical thinking from outdoor activities] into their role that they would be undertaking, they may have to adopt a more critical approach"*.

Overall, in phase 2, four (n=9) students indicated that they thought that (to some extent) critical thinking is transferable, though not everyone was explicitly asked. There were no examples of students suggesting that it was not transferable, though out of the four who had commented, Hazel questioned transferability in the context of a group of 16-year olds, and Dave raised the point that knowledge of the subject, into which critical thinking was to be transferred, was needed.

Focus Group 1:

In focus group 1, one student thought that critical thinking was not transferable, though they did appear to change their mind later in the discussions. When the group were discussing the conceptual model of critical thinking that I had presented them with, after a while, one participant said:

> *"I do like that [the model], on another hand I would have several of these for different kind of subjects and different kind of things of that subject so I would go in for the information and that might be I don't know, erm skiing, what kind of position I am in and then this will be like another… I would break it down and have several of these."* (6)

My understanding of what participant 6 was saying was that they wanted a different model for different contexts, suggesting that critical thinking is subject specific rather than generic, and therefore perhaps not transferable, or that it was something in between, that there are similarities, but that they were not always obvious.

Participant 5's view on transferability appeared to be that it would be hard, as when responding to a comment from participant 1, they said:

> *"I think you* (referring to participant 1) *said that I critically think in the outdoors, I think I do, but then when trying to do that critical thinking when it comes to sitting in front of a laptop and writing…"* (5) (The tone of their voice seemed to be suggesting this was much harder).

When asked more directly towards the end of the discussions, whether they thought critical thinking was transferable or not, there were some strong suggestions that it was:

> *"I think it is completely transferable"* (7)
>
> *"I think it is transferable"* (8) (Lecturer)

These two participants appeared more confident in their responses, and that for them, they considered critical thinking to be transferable.

Focus group 2:

Participants in focus group 2 questioned the notion of transferability. There was a mixture of responses, for example three students conducted a dialogue between themselves, during which they seemed to be unsure whether they could transfer critical thinking skills or not:

> *"I'm not sure if it should be transferred because I think you can over think things like if you're in the outdoors and you're leading a group you need to be able to make snap decisions that are right, and I think if you sit there thinking about, basically thinking, then you will never come to a decision so yeh, you could transfer it but I don't know if you'd want to, I think there comes a level where academic critical thinking is very different to real world critical thinking."* (9)
>
> *"Is it not like academic critical thinking just in practical form? That's just transferring it and actually physically using it just the skill of critical thinking"* (13)
>
> Me: Are they skills we can develop in one place and use somewhere else? (I asked this because the conversation had stalled)
>
> *"Are you meaning transferability to different scenarios in different areas, whether it's work, social, emotional or critical thinking used in the classroom can be applied to an outdoor scenario, can be applied to a holiday situation, can be applied to your social concept or scenario… is this learning experience transferable to the next experience is this something that happens to you out on the hill or out on the rock climb you've had to*

evaluate that and make that decision if you have to be in a different scenario in a social situation, do you use the same process?" (12)

"That's what she's asking us!" (13)

"Yeh" (12)

Laughter

"I'm just trying to work out, do you use the same process, use the same concept… in that split second scenario or situation, do you use the same process, probably I think yes, subconsciously you do, I think you probably do." (12)

"You can do it in different tasks I guess, like in one of our lectures we did loads of different things so, [the lecturer] talked, then we did stuff in groups, then by ourselves so I guess it's lots of different scenarios where [they] were getting us to think about something, so I guess that's automatic transferability." (13) (*automatic*: I interpreted this to mean that participant 13 was suggesting that they did transfer critical thinking from one activity in class to another, though not necessarily 'automatically' as such)

There were many key points within this dialogue. Firstly, it seemed that the students did not reach a conclusion regarding transferability. Secondly, the students appeared to be going through the process of deciding whether critical thinking was the same in the outdoors as it was in the classroom, and for those that were unsure, they eventually concluded that it was. It was noticeable that they shifted their opinion as they discussed the topic more, and they thought (similar to many of the students in phase 2) that critical thinking was a subconscious activity. These points are followed up later in this section.

Focus group 3:

In focus group 3, when asked their opinions on whether critical thinking was transferable, one of the students highlighted that it was much easier for them to understand critical thinking in an outdoor context: *"yes it is transferable, but for me I struggle to put it into an academic context"* (14). This may have meant that they thought that critical thinking is not transferable, so I explored this by explaining the conceptual model of critical thinking that I was developing, using examples of critical thinking in an academic context. The response was *"yeh that makes much more sense now"*. Although they may have been offering a response that they perceived to be of benefit to me, my judgement as an experienced teacher who receives responses from students regularly, was that at that time it made more sense to the student. This prompted me to consider further, the possible use of the model as a teaching resource to aid transferability as well as development. There were only two students in this focus group, and the other student

said, *"yeh I think you can apply it to both contexts"* (15), though it is not clear whether participant 15 meant that critical thinking is transferable, or simply that it can be applied in a variety of contexts (of note: this is followed up in chapter 5.4).

In summary, when combining the data from phases 2 and 3, the majority of students said that they thought that critical thinking is transferable. However, the concept they are describing is complex and although it is easy to accept statements at face value, it is clear that participants found it difficult to agree to a clear-cut opinion on transferability of critical thinking. Many did not comment, therefore it is unknown what they thought, and some did not seem sure. It is also of note that I did not give the students (in phase 2 or 3) a specific definition of transferability; therefore, all discussions regarding the topic were, to some extent, based on their own interpretation of the concept. In each of the focus groups, if the group themselves did not give any examples of transfer, I offered similar examples to the ones that had prompted this research; transferring critical thinking skills from outdoor activities to academic work such as writing an essay or researching a topic for an assessment. These examples were based on the definition of transfer articulated in chapter 2 of this thesis.

Although my findings regarding whether critical thinking can be transferred from an outdoor student's outdoor practice to their classroom work were inconclusive, the students did raise some important points that could affect practice. For example, that some knowledge of the subject into which critical thinking it to be transferred is required, and that students reported that they found it hard to transfer critical thinking to their academic work. These points are considered alongside the themes of awareness of the act of critical thinking, and facilitation of development later in this thesis.

4.3.2 Facilitation of critical thinking development

In phase 2, facilitation of critical thinking development featured as an important factor, and examples of activities that promote critical thinking development were themed. I analysed the transcripts from phase 3 with these activities in mind, also employing the data analysis tools of constant comparison and negative case analysis to 'test' these six activities.

The following table has the six activities from phase 2 in the left hand column, corresponding examples from phase 3 in the centre, and the right hand column indicates the resulting approaches to teaching, that could be used by lecturers/instructors to promote critical thinking development in outdoor students:

Table 11: Approaches to teaching to promote critical thinking development (incorporating themes from phase 2)

Themes from phase 2 (activities that may promote critical thinking development)	**Examples from phase 3**	**Approaches to teaching that could promote critical thinking development**
Lecturer/instructor modelling critical thinking	*"I'm not sure it would make sense if you hadn't talked me through it"* (9) *"you see it done well"* (1)	**Model critical thinking**
Taking part in discussion	"*I think facilitating discussion is a good way of doing it"* (15) *"When you start talking about it and underpinning what it is then yeh it gives you that deeper understanding"* (1)	**Facilitate discussion**
Being triggered or being prompted (this may also motivate a student)	*"Maybe try and establish how much you can prompt them because a lot of the time when I am pushed to do something I get to the point that I am so frustrated I shut down"* (13) *"You have to be encouraged to be a willing participant* [in critical thinking]*"* (12) *"When something has gone wrong to provoke that thought"* (14) *"By playing devil's advocate and giving different contexts"* (9)	**Prompt/trigger to start critical thought, but perhaps also stop if the environment is too complex** **Motivate**
Having the opportunity to question and be questioned	Participant 5 gave an example of questioning to develop critical thinking when running a kayaking session. *"*[A task in class] *was asking you questions and I found it quite easy to be a bit more critical then rather than just reading it on my own"* (13) *"Asking other people within the group 'what do you think about that, is that your opinion, do you share that opinion, would you do anything slightly differently'"* (3)	**Encourage questioning**
Reflection (having space/time to think)	*"The more you're immersed in it for the longer period of time"* (7) *"Taking a step back and walking away for 5 minutes"* (12) *"My only concern is where is the stop point for critical thinking?"* (8) *"You can go on forever, you can think about something too much"* (15)	**Facilitate reflective practice** **Allow space/time to think, though teach a student to apply appropriate timing to the critical thinking process, to know when to stop.**
Practicing critical thinking	*"The more you do it the more experience you get"* (5) *"Time is key"* (2) *"For me it's about creating the environment… the opportunity"* (1) *"You need a real context not an imaginary one"* (9) *"[It would not work] in [an] environment where they have a phobia or something, they are going to freeze"* (4)	**Create opportunities for practice** **Ensure appropriate environment for the student (this will be different for each person)**
	"I am a bit more of a reflector, so I would have to read it a few more times" (1) *"Different people could interpret different things"* (15) "*I personally like the word willingness"* (7) (demonstrating that the language itself may need to be individualised) "*it's got to come from the person"* (9) "[it is] *dependent on you knowing your group… knowing their characteristics"* (11) "*I wouldn't like it if they called it critical thinking training!"* (13)	**Individualised approach**

The six facilitation activities that were highlighted in phase 2 also appeared to be prevalent in phase 3, and there were no cases of these factors being objected to. The data above does suggest three additional factors to consider; that the role of the facilitator may also be to stop critical thought, and that the environment in which critical thinking takes place is important. In addition, in phase 2, a point was raised that individualising critical thinking development is important (though not noted in table 8) and this was strongly suggested in phase 3 as well.

4.3.3 Awareness of the act of critical thinking

Phase 2 had highlighted that awareness of one's own critical thinking was significant to understanding and possibly developing critical thinking skills. In phase 3, this theme was also prevalent. As reported earlier in this section, in focus group 1, participant 6 had implied that critical thinking skills were subject specific. At the time, I put this question to the focus group and the following dialogue resulted:

> *"I think it's your understanding of how to apply that into any situation rather than whether it's holistic* (I interpreted this as meaning 'generic') *or subject specific it's your understanding of that process which then means you can apply it in different areas of the subject."* (5)
>
> Me: Ok, do you feel then it is actually a holistic skill? (I meant here 'generic': a skill applicable in all contexts, rather than subject specific, but I used the same word as participant 5. In hindsight, I should have changed the word at the time to ensure clarity in the discussions.)
>
> *"Yeh, I think it's a holistic skill, but looking at that, if the whole purpose of this is to see how non-academic people get into this critical thinking thing, to me, critical thinking doesn't come naturally, so I would have to use all of this and I would have to go from one step to another to try and meet every criteria to enable that critical thinking, whereas the more I do that, the more I experience I've got of it, things will start becoming autonomous…"* (5) (Note: my interpretation of what participant 5, and subsequent participants meant by '*autonomous*' was that critical thinking would become more of a subconscious activity, more automatic) *"…and then I'll be able to critically think, then I will be able to understand this more, then I will be able to apply it more into different situations."* (5)
>
> *"Do you not think that you critically think already though? In the outdoors?"* (1)
>
> *"Yeh I probably do but not in an academic way."* (5)

"But you critically think?" (1)

"I'll sum up more options and I'll think I can either do that or I can do that, but I won't do that because that's… (trails off)*"* (5)

"Is that not following this same process here though?" (1) (Referring to the model of critical thinking)

"Is that critical thinking or is that just working off experience?*"* (8)

"That's what I'm saying, this critical thinking, the more you do it the more experience you'll get of doing it, then it will become more autonomous, then you can apply it to every situation, whereas now I think, what your saying is [be]cause that's not into your head at the moment, you'd have to break it down into different subjects to try and work through it?" (5) (This was addressed to participant 6, who had raised the point initially; who agreed that this was generally what they were saying)

During analysis of phase 3, similar to phase 2, the terms natural, subconscious, intuition, awareness and additionally here, autonomous (taken to mean automatic), were used as codes associated with the theme of awareness. The dialogue above suggests that after thinking about it, and with some help, a connection was made by the students between the skills that they used as outdoor practitioners and the definition of critical thinking that they were presented with. However, for some of them, they had perhaps not realised this, or preferred to think about them as two separate entities. Additional examples of this notion include, participant 1 who said, *"do you not think it is something subconscious that we do?"* to which the response was *"well agreed, yes"* (7), and participant 1 suggested that critical thinking *"happens subconsciously".* Participant 8, the lecturer, also referred to some of the process of critical thinking as being subconscious, suggesting that it was something you do as a professional.

In focus group 2, although not explicitly discussed in the earlier stages, later when discussion ensued about whether the critical thinking process was transferable, the notion of it being subconscious was raised. When participant 12 was mulling this question over, they said, *"yes, subconsciously you do, I think you probably do [think critically]".* In addition, as was seen earlier in this thesis, a dialogue between the students demonstrated how they were not necessarily aware that they used critical thinking in the outdoors. Participant 12 later said, *"I've always associated critical thinking with post process, not during process…that's probably my perception"*. This suggests that they were either not aware of critical thinking use during a process, for example as highlighted in phase 1, during decision-making or problem solving, or they were not clear what critical thinking was, and associated it more with post event reflective practice.

In focus group 3, participant 15, whilst discussing when critical thinking was used, said:

> *"I think when you are on the hill, you would do that* (critical thinking) *much more subconsciously, or you should, because you gain experience in that setting and you get used to making those decisions so at first it might be a very conscious [process]."* (15)

In summary, similar to findings in phase 2, phase 3 findings suggest that the students thought that to some extent critical thinking was a natural/subconscious process, and that they were not always aware of when they were doing it. The significance of this was that if a student were unaware of their critical thinking, this may have an impact on their ability to develop the skills, and this may be a contributing factor to the difficulties associated with transferring critical thinking from one domain to another.

4.3.4 Can critical thinking be communicated using a conceptual model, and if so is the model of benefit to learners?

As highlighted earlier in this thesis, at the end of phase 2, I had started to develop a conceptual model of critical thinking for use in my teaching. In phase 3, draft versions of the model were presented to the three focus groups for feedback. In general, the feedback I received was positive, in the sense that participants suggested that the model was useful, and that they could use it to help them either understand, and/or develop and transfer critical thinking. The following are examples of some of the generic feedback I received:

> *"[The model] gives you structure, guidance, it's easy to get off the rails…"* (4)
>
> *"I think it's proved it's done its job…looking at the model, is it this or is it that, surely that's the purpose of the model."* (7) (The group were discussing what the model meant)
>
> *"[The] model could actually be used for critically thinking in planning; planning a day out"* (participant gives example of ski mountaineering) (14) (Note: as an outdoor practitioner, planning is integral, as well as the physical activity of skiing itself)

Earlier findings in this thesis demonstrated that discussion itself helps to facilitate awareness and understanding of critical thinking, and it could be that this was the case here. However, having been involved in teaching and coaching for 25 years, receiving feedback from students regularly, my judgement was that feedback for the model was generally positive. There were though, many learning points from the focus groups that led to improvements to the final version of the model, and these are reported next.

Focus group 1 was shown the original version of the model (see figure 7), and their feedback prompted me to create two additional drafts before I met with focus group 2. The feedback from focus group 1 is summarised below:

- The model currently requires an explanation (which indicates that it could be presented in a way that is more self-explanatory).
- Critical thinking is a continuous process with no start or finish point, and this should be represented in the model.
- Choice of terminology is important when trying to create a model that can be used in both the academic and practical contexts an outdoor student finds themselves in.

Consequently, I took adapted versions of the model (there were now three versions, one being the original version plus two adapted versions) to focus groups 2 and 3. The feedback from all three focus groups was then analysed and a summary is in the following table:

Table 12: Feedback regarding the conceptual model of critical thinking in development

Examples of feedback from focus groups discussions	**Theme**
"For me it's almost like a continuous circle" (1) *"It should go round in a circle"* (5) *"It's a cyclical process that doesn't necessarily stop"* (12) *"You don't need to start with "information" you start in the applying stage and then question what you are doing and then you end up doing the research which adds information…. I think you can do it in any order"* (9)	**Model needs to reflect cyclical nature of critical thinking**
"So the willingness covers the motivational aspect?" (2) *"I personally like the word willingness"* (7) *"I prefer motivation"* (9) *"I would put willingness, because you might not be motivated but you might be willing"* (10) (this potentially highlights a difference in meaning between the two terms) *"I'd say motivation, just personal preference"* (12)	**Terminology is important - use language that is shared in both domains**
Dialogue in focus group 2 that raises an important question: *"I am not sure you need to be honest to critically think"* (9) Me: Ok *"But maybe that's unique to each person"* (9) *"Maybe considering the context of the outdoors I assume that would be really important thing [honesty] when you are dealing with risk and knowing your own limits"* (11) (though it is noted that I had used this example earlier in the discussions) *"To stay safe yeh"* (9) (participant appeared to be agreeing on the inclusion of honesty, in an outdoor/practical context)	**Questions the use of the word 'honest' when referring to critical thinking**

I made further adaptations to the draft models, and asked all participants in this phase, via email, to comment on the final three drafts (of note: focus group 1 had only seen the original version, so I was keen to ask their opinion on the later versions). Five (n=15) participants responded, and examples from the feedback included:

"I like the developments that you have made for a number of different reasons. Both of the new models I feel are easier to understand and visualise critical thinking, being less 'busy' than the original model."

"I much prefer the refined version to the old, it is less confusing and makes it clear to see that it is a cyclical process which continues to repeat itself."

During phase 3, I also spoke to the same technical experts that I had consulted in phase 1. I showed them the final three versions of the model, and the feedback I received is represented in the following table, alongside a summary of the feedback reported above:

Table 13: Summary of learning points regarding the conceptual model of critical thinking

Focus Groups	Email Consultation	Technical Experts
• **Simplify** the model • Critical thinking as a continuous process • Put the traits in the centre • Colour is effective • Explanation often needed • Flexibility needed	• **Simplified** model was an improvement • Willingness needs to be more prominent in the model	• Prefer **simplified** model • Use 'influences' to describe the inward arrows • Honesty is an integral part of critical thinking

In summary, after collecting feedback from participants from three focus groups, as well as technical experts, I adapted my conceptual model of critical thinking. The final version is below, and it is critiqued and discussed in more depth in chapter 5.5:

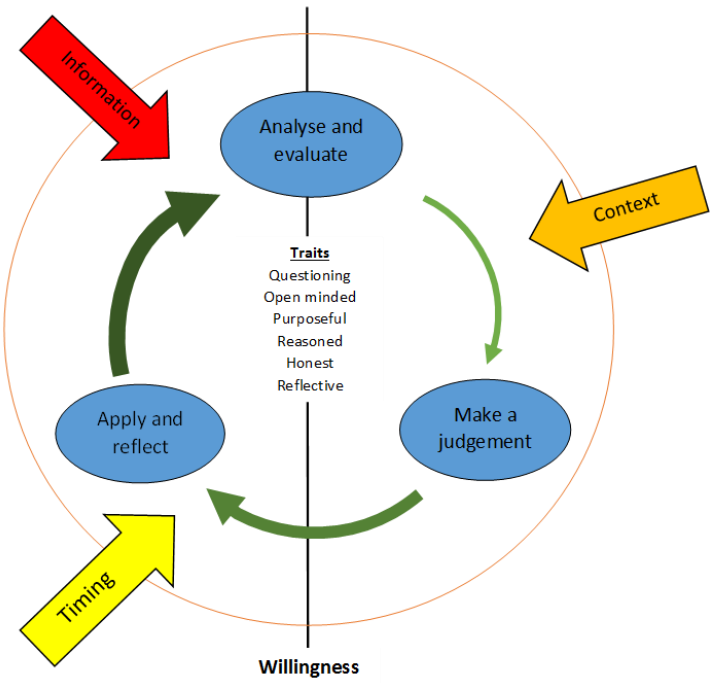


Figure 8: The final conceptual model of critical thinking, developed from phases 1-3

4.4 Phase 4: 'Testing' the conceptual model as a teaching resource

The final version of the conceptual model of critical thinking that I designed was used as the basis for a teaching session with a group of Master's (MA Outdoor Practice) students and their lecturer (n=7). Prior to the session, the participants were asked (via a questionnaire - see appendix 6) to rate their understanding of critical thinking in both the academic and the practical domains of outdoor practice, and the same question was asked afterwards. The following table shows the pre-session and post session responses for each participant. Participants are referred to using pseudonyms, and in this phase, letters are used. "L" refers to the lecturer who also participated. The scale used to self-rate was, ***None, Poor, Reasonable, Good, Very good, Excellent***.

Of note is that the data from phase 4 is represented in way that is non-statistical and it is therefore open to interpretation. However, the intention is to offer an overview of the findings from phase 4 (the size of the arrow in the increase/decrease/equal column acting as a visual representation of the data):

Table 14: Findings from phase 4

Participant	Pre-session		Post-session		Increase/Decrease/Equal	
	Academic	Practical	Academic	Practical	Academic	Practical
A	Poor	Poor	Very good	Very good	↑	↑
B	Very good	Very good	Excellent	Very good	↑	=
C	Good	Reasonable	Good	Good	=	↑
D	Reasonable	Reasonable	Good/ Very good	Very good	↑	↑
E	Poor	Good	Very good	Very good	↑	↑
F	Reasonable	Good	Very good	Very good	↑	↑
L	Excellent	Very good	Excellent	Very good	=	=

I also asked participants (via the questionnaire) "To what extent has this session helped your understanding?" giving the scale of, ***Not at all, A little, Quite a lot, A lot***:

Responses, alongside the findings from the table above are shown below. It is notable that for some participants, the level of help that the session provided appears to be more than the increase/decrease column suggested in the table above:

Table 15: Responses from participants in phase 4

Participant	**Increase/Decrease/Equal** **Academic**	**Practical**	**To what extent did it help your understanding?**
A	↑	↑	A lot
B	↑	=	Quite a lot
C	=	↑	Quite a lot
D	↑	↑	Quite a lot
E	↑	↑	Quite a lot
F	↑	↑	Quite a lot
L	=	=	A little

Participants were also asked to provide some feedback on the session regarding their development and understanding of critical thinking, their thoughts on transferability and whether they thought that there was anything in the session that would be of benefit to their academic studies.

There were some specific examples of how the session had helped:

> *"I felt the diagram and use of resources was useful in grasping the concept"* (E)
>
> *"It was an easy model to follow allowing a better understanding"* (C)
>
> *"This model helps with understanding how I think... it took seeing this and putting it into an academic context for me to realise the usefulness of the skill set I gained in the outdoors."* (A)

There were also less specific examples of how the session had helped, though they could be grouped into two main themes, **Awareness and Applicability**:

Awareness

Like the findings in phase 2 and 3, awareness of the concept of critical thinking, and their own use of it was a key theme. It was reported in phase 4 as one of the main benefits of the teaching session, that used the conceptual model of critical thinking as the main teaching resource:

> *"[I] realise[d] the usefulness of the skill set I had gained"* (A)
>
> *"Interesting to see the traits that your research has associated with critical thinking"* (L: Lecturer)
>
> *"I believe I use critical thinking as a means of understanding the world/situation around me all of the time, but could not identify the specific process my head goes through – this is probably why pre-session I marked my understanding as reasonable"* (D)
>
> *"[Understanding] differentiation between other concepts such as reflective thinking"* (B)
>
> *"Critical thinking is something that can often be used in outdoor practice without the realisation that it is being used"* (F) Note: I had perhaps prompted this; however participant F had suggested that the session had helped "quite a lot" in their understanding.
>
> *"The diagram provided me with the realisation that I knew more about the subject* (critical thinking) *than I first thought"* (E)

Application

Participants also gave examples of how the session had helped them in terms of applying critical thinking, both in their academic work and other areas:

> *"The entire concept can be helpful in how to process research"* (F)
>
> *"Linking critical thinking and how I currently deliver sessions – i.e. I often question – provide suggestions based on critical thinking"* (E) This is taken to mean that the participant had learnt something that they could apply to their own teaching.
>
> *"When I was looking at the model I was imagining different scenarios – if I did that in my studies I would be able to track or trace my development in a… project or assignment."* (D)

4.4.1 Summary of findings from Phase 4

Overall, the participants in phase 4 suggested that the teaching session using the conceptual model of critical thinking was of benefit to them. Participants reported that the session had been helpful in their awareness and understanding of the concept of critical thinking. It is notable, however, that the participants were students that I taught, and that the session was delivered as part of a weekend of teaching. It is therefore possible that the students responded more positively because of this. On the day I collected data, I took care to not pre-empt the session, and I was not the main lecturer for that day of teaching, thereby delivering the research teaching session in isolation. It may be that the responses are a little inflated; however overall, considering this, and noting the range of responses, I concluded that for this sample group the teaching session and use of conceptual model of critical thinking was of benefit to their awareness and understanding of critical thinking. Further consideration of this is discussed in the concluding section of this thesis.

In terms of transferability, only one participant commented on this, saying that they thought transfer of critical thinking was possible *"assuming the individual has the ability to understand the context, knowledge and timing of the task"* (F) (this point also being raised in phase 2). Three participants implied transferability by suggesting application of what they had learnt to another situation, however, the teaching session did not measure this application; therefore, it is not possible to conclude that transfer did happen as a result of the session.

4.5 Summary of findings from all four phases of this research

The following diagram summarises the findings from all four phases of this research and the connections that I made between them, the next chapter discussing the implications of these findings on practice:

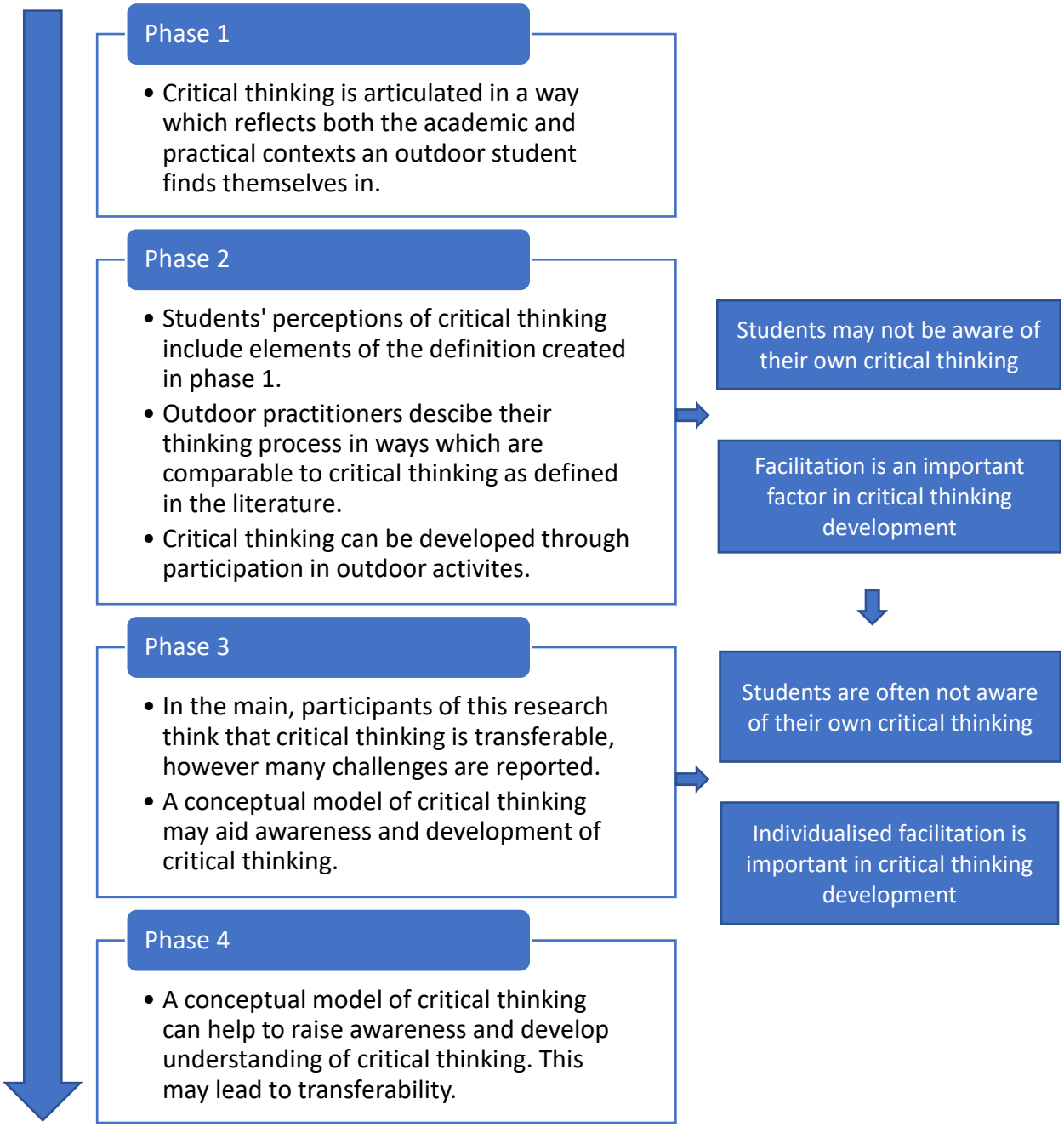


Figure 9: Summary of findings from all four phases of this research

5 DISCUSSION

This chapter has five parts. The first part, drawing upon all phases of this research, discusses communication of critical thinking when working with outdoor students, in both the classroom and outdoor domains. The second section, based on the findings of my research considers the importance of awareness and understanding of critical thinking, before development and transferability can be considered.

In the third section, the role of the lecturer and/or outdoor instructor in facilitating the development of critical thinking is critiqued; this section also suggests approaches to teaching that could be used to promote critical thinking development in outdoor students. The fourth section addresses the findings of this research on transferability, with the fifth section reviewing the conceptual model of critical thinking, as reported in the previous chapter, which could be used as a teaching aid to raise awareness, build confidence and promote development and application of critical thinking.

5.1 Defining and communicating critical thinking

I highlighted in the introduction of this thesis that my research stemmed from wanting to help people whom I perceive to be like me: people who come from a background in (outdoor) practice but find themselves in an 'academic' situation. Through four phases of research, each adding a layer to the previous, I have investigated the development and transferability of critical thinking in outdoor students. However, I found that central to my research was defining critical thinking; therefore this is discussed in this thesis first.

My preliminary literature review suggested that critical thinking was difficult to define, and although critical thinking is arguably still a contested notion, my research set out to explore the notion of critical thinking and find a practical way to communicate it that was appropriate for both the academic and practical learning environments in which outdoor students find themselves. During phase 1, through analysis of twenty definitions and consultation with two technical experts, I drafted a definition of critical thinking that I could use as a start point for this research. However as the later phases unfolded, and in particular when the perceptions of the students were taken into account, I found that I wanted to adapt my definition to incorporate this learning. As highlighted earlier in this thesis, Forbes (2018) suggests that students' perspectives are an important part of understanding critical thinking. In my research, development and transferability may need to build on what the students perceive critical thinking to be already, therefore the students' thoughts and perceptions as to what critical thinking is, is of significance. Sikandar (2015) discusses Dewey's concern that in education, a

child's experiences must be connected to the concepts being imposed upon them. Here, understanding what the students perceive critical thinking to be helps me, as the educator, to find a connection between their experiences, their perceptions, and the concepts I teach.

A question that was raised at the beginning of this thesis and to some extent throughout my research was: are critical thinking skills generic or subject specific? Although my research cannot entirely resolve this question, my findings do suggest that there are shared characteristics between the thinking process used by outdoor practitioners and definitions of critical thinking that derive from academic literature. In research by Tiruneh, Cock and Elen (2018), they propose that although there has until now been little agreement as to whether critical thinking skills are domain specific or more general, there may now be a shift towards accepting that there is a common set of critical thinking skills that can be used across a number of domains. In chapter 2, I outlined parallels between what may be thought of as critical thinking in an academic sense, and the practice of an outdoor practitioner (in associated literature), and my findings in this research support this notion, enough to enable discussion as to the nature of critical thinking, in both the academic and practical learning environments for outdoor students. This is discussed next, followed by an articulation of critical thinking based on this premise.

The students in phase 2 gave examples of when they perceived they had used and developed critical thinking, and these examples came from a range of environments. For example, Joe suggested that he had, and would, develop and use critical thinking: when a car broke down, on a practical week as part of his degree course, and whilst studying the degree in general. I interpreted this as Joe perceiving that, based on the definition of critical thinking that I gave him; he used critical thinking in all of these contexts, thereby implying that to him, it was a generic skill rather than subject specific. Joe was in his first year of the degree programme, and was perhaps less experienced in understanding critical thinking, if it is presumed that in line with higher education expectations, his degree course develops critical thinking in students. However, Hazel, a third year student, appeared to share the same opinion. Hazel described how she had used and developed what she understood to be critical thinking, again based on the definition that I gave, in traditional climbing, in the classroom, and in her work in retail, also implying that for her it is a generic skill. Other participants also gave examples of critical thinking use in a range of contexts, all of which were based on the same definition; the one that I gave them.

In Forbes's (2018) research however, when four students from different undergraduate programmes were asked for their perspective on critical thinking, their responses were more in line with McPeck's (1981) perspective, that critical thinking is subject specific. Forbes (2018) does suggest though, that this question is to some extent unresolved, and does not rule out the possibility of transferability. Forbes (2018) found that across the four subject areas that the

students represented, there was little consensus on their conceptualisation of critical thinking, and that tutors should talk with their students about the differences and specifics of their field. The participants in my research did not report that critical thinking was associated with a particular context, though many participants took time through the discussions to associate critical thinking with outdoor practice. Although it is possible in the individual interviews that I led them to this new association, in the group interview and the focus groups, the students themselves led the discussions and subsequent association. The technical experts I liaised with did not report any difficulties associating the definition of critical thinking I gave them with outdoor activities, though they were experienced practitioners, and qualified teachers, thereby familiar with the notion of critical thinking. Equally, critical friends (I spoke to 3 during my research), who were higher education researchers, educators and outdoor practitioners commented that what they perceived critical thinking to be (as articulated in the literature) was the same thinking process used in outdoor activities.

In addition, the findings of my research suggest that the participants associated critical thinking with complex environments, whatever the subject or context. Participants gave examples of use of critical thinking (based on my definition) from an everyday sense, such as when in an unfamiliar environment, as noted earlier, if one's car breaks down, with subjects that they found to be complex and difficult to understand, as well as outdoor activities themselves. These findings strengthen the argument that because outdoor activities take place in complex environments, there are shared characteristics between what is thought of as critical thinking in an academic sense, and the thinking process of an outdoor practitioner.

Overall, after building up the layers of the four phases of my research, plus associated reading and discussions with critical friends, I conclude that the critical thinking process (as defined here) is similar across the two domains discussed in my thesis: the academic studies of an outdoor student, and an outdoor practitioner. Some characteristics of critical thinking may be used to a greater or lesser extent, depending on the specific context, though the underlying principles are the same. The following discussion outlines critical thinking from this position, and includes examples of application in both the academic and practical domains of outdoor practice.

What is critical thinking in practical and academic settings for outdoor students?

Drawing the findings of this research together, the following is a definition of critical thinking that has been adapted since the version presented in phase 1, to reflect the findings from subsequent phases. It can be used when communicating critical thinking with outdoor students in the academic and practical learning environments:

> *Critical thinking is a cyclical process of gathering, interpreting and evaluating information, and applying, testing and reflecting on decisions and judgements. A critical thinker is open minded, purposeful when necessary, asks questions when appropriate, and considers the context that they are in. Taking an honest, reflective and timely approach, they will reach reasoned decisions and judgements.*

Critical thinking can be interpreted as a process, this being like the findings of research carried out by Krupat et al. (2011), who had conducted a piece of research within the medical profession where they asked ninety-seven medical educators what they thought critical thinking was. My analysis led to the suggestion that there are several stages employed when we think critically. The beginning of the process includes exploring a situation (Kurfiss, 1988), and the gathering of evidence or facts (Eggen and Kauchak, 1996; Dewey, 1933; Paul and Elder, 2006). This may be gathering research reports for an assignment on sustainable practices in the outdoors, or gathering a number of weather forecasts to inform the planning of a day in the mountains. This information is evaluated and analysed (Cottrell, 2005; Giancarlo and Facione, 2001; Ruggiero, 2012), then a judgement, decision or conclusion is made. This latter stage could be articulated in several ways. For example, thinking and acting differently because of the process (as suggested by Brookfield, 1987), deciding what to do (Ennis, 1993), drawing conclusions (Facione, 1999), or as Joe (phase 2) suggested, *"critical thinking is about analysing a situation and coming up with a balanced response to it"*. However, when specifically considering the context of outdoor students, the term 'judgement' is common, and is therefore appropriate here.

There is perhaps no end to the process though, it is cyclical (possibly multi-directional as suggested in the findings from phase 3), each stage feeding into the next, a notion echoed by Giancarlo and Facione (2001) who suggest that critical thinking is nonlinear. An outdoor student is in a constant cycle of learning and growing, with assignments to complete which capture their development at that point. The same could be said in a practical learning environment, where, operating in a dynamic environment, there is a seemingly endless cycle of gathering and interpreting information, leading to decisions and judgements. This seemingly endless process, interjected with decisions and judgements is complex. As Garrison (1991) suggests, critical thinking involves learning new concepts and contemplating abstract philosophical issues,

therefore there is more to it than simply the process suggested above, this distinguishing it from other processes such as problem solving.

The findings of my research suggests that there are a number of traits associated with critical thinking, and these are used by outdoor students to a lesser or greater extent depending on the context at the time. For example, an outdoor student who is thinking critically takes a ***holistic and open-minded approach***. In phase 2, Mark had suggested that critical thinking is about *"not taking what you hear read or are told about at face value, it's looking deeper"*, implying that an open-minded approach is needed. Also, Cottrell (2005) suggests that someone who can critically think, can identify with other people's positions, though can also recognise if a certain position is made to look more appealing. Being open minded is identified as a trait in the Delphi report, as well as by Facione and Facione (2007) in later work, and Kincheloe's (2000) notion of disengaging from tacit assumptions could be interpreted as implying an open-minded approach. In terms of application, an outdoor student (who has critical thinking skills) would take an open-minded approach to a piece of research that they read in class, and when in the practical environment would be open minded to other group members' opinions when making a decision about what to do next.

However, in both of these examples the person needs to ***apply purpose***. They need to have purpose in their enquiries (Halpern, 1998), and adopt a self-regulatory approach (Giancarlo and Facione, 2001). This means that in a classroom setting the outdoor student must narrow down their focus (Ruggiero, 2012), and be clear about their issues (Delphi report). This could apply equally well to the practical setting, for example if an accident happened, an outdoor practitioner would need to be purposeful in their decision-making process, balancing this with taking a holistic and open-minded approach, which would allow them to gather the information needed.

Throughout the critical thinking process, an outdoor student would need to ***ask questions***. As Bartels (2013) suggests, critical thinking involves questioning, and taking a questioning approach will enable decisions about when to be purposeful and when to be more open minded. A critical thinking outdoor student will question assumptions (Brookfield, 1987), will raise vital questions (Paul and Elder, 2006), and will be inquisitive during the process (Delphi report). For example, when researching a topic for an assignment, this often requires questioning the reliability of sources. This is also the case in a practical setting, where it is important to take a questioning approach to ensure that appropriate information is gathered.

Questioning also requires questioning of oneself, and therefore another trait of the critical thinker is that they would be ***reflective***. In Facione's (2015) work, self-examination and self-correction are an important part of the process. Additionally, the critical thinker should reflect

on issues (Cottrell, 2005), will evaluate their own interpretations (Giancarlo and Facione, 2001), and critical thinking is, in part, reflective thinking (Ennis, 1985) and reflective decision-making (Facione and Facione, 2007). It was notable that the students in this research often talked about the connection between reflective practice and critical thinking, demonstrating that they perceived that reflective practice was an integral part of critical thinking, though this may in part be due to the emphasis on reflective practice in outdoor leadership, and the explicit inclusion of it in their degree programme. Nevertheless, reflective practice is an integral part of critical thinking.

Whilst questioning, being purposeful, open-minded and reflective, a critically thinking outdoor student also needs to ***consider the context***. The context is of vital importance in the practical setting, as it is an ever-changing dynamic environment. The (seemingly) endless cycle of gathering (new) information, evaluating that information and deciding, requires attention to the context at all times. This notion is not exclusive to the outdoor practitioner though, as Brookfield (1987) suggests, it is integral to critical thinking in general, and Giancarlo and Facione (2001) note that the judgement, as an outcome of the process, is contextual. Moon's (2005) discussions on critical thinking also suggest that the context is an integral part of making the judgement.

A critical thinker also needs to be ***reasoned***, and this is perhaps the most prevalent trait within the literature (for example Halpern, 1998; Mogenson and Mayer, 2005; Delphi report; Facione and Facione, 2007; Paul and Elder, 2006). As Ennis (1985) suggests, critical thinking is reasonable thinking. Reason is applied not only in the making of judgements, but throughout the critical thinking process. The critically thinking student is trustful of reason (Delphi report); confident in reasoned decision-making (Facione and Facione, 2007); identifies the most reasoned ideas (Ruggiero, 2012) and is guided and shaped by reason (Garrison, 1991). Although many of the students in this research did not use the term 'reasoned', as is reported in chapter 4.2.1, my interpretations of what they said led to similar conclusions, that 'reason' is an important trait in critical thinking.

A critical thinker finding their way through the process of gathering and interpreting information, whilst being open-minded and yet purposeful, asking questions, and considering the context, also needs to be ***honest and have integrity***. My interpretations of several elements within the literature definitions fell under the theme of honesty (truthful and sincere) and integrity. For example, the Delphi report notes the importance of fair-mindedness and diligence, and Giancarlo and Facione (2001) suggest that a critical thinker should have integrity. However, as is demonstrated in the findings section of phase 1, this theme derived from a small sample of the definitions, and this raised a question as to its relevance. I continued to question its

relevance throughout this research, particularly when some of the students also questioned it. For example, in focus group 2, the following discussion took place:

> *"I am not sure you need to be honest to critically think"* (9)
>
> Me: Ok
>
> *"But maybe that's unique to each person"* (9).
>
> *"Maybe considering the context of the outdoors I assume that [honesty] would be a really important thing when you are dealing with risk and knowing your own limits"* (11)
>
> *"To stay safe yeh"* (9)

Later in focus group 2, the same participant who had raised the question noted that they were not always honest in assignments. I interpreted this to mean that they were not honest about a situation or context that they were describing (perhaps in the case of a reflective piece of work), and that perhaps they thought that honesty was therefore not important (assuming that they thought that they used critical thinking whilst writing assignments). Of note though is that by suggesting this, this demonstrates honesty, and that they are fully aware of their lack of honesty in assignments (and perhaps demonstrates critical thinking itself). Subsequently, this is does not necessarily discount honesty as a trait of critical thinking. A similar discussion came up in focus group 3, though as the discussion continued the participants appeared to agree between themselves that honesty is a trait of a critical thinker. However, because some students raised this question, and I did myself, I took the question to the two technical experts I was consulting. When I discussed the question with them, they suggested that it should be included, and that honesty was a valid component of critical thinking. Overall, I concluded that on balance, honesty, when taken to mean being honest with oneself and honest, about one's own abilities, was an important trait in critical thinking and should be included in any subsequent articulation of the process. It may be important though to discuss with students what it means, though this is applicable to all elements of the process.

Another debatable trait of critical thinking that emerged from my analysis was the idea that a critical thinker would be able to *explain/articulate/justify* a decision and I decided to leave this one out of my final definition. Kurfiss (1988) suggests that a critically thought out decision should be justifiable, and Paul and Elder (2006) suggest that a critical thinker can communicate their decision effectively. However, my experience leads me to question this. I have spent a

number of years training and assessing people in a range of outdoor sports[7], and have observed some, or all of the above traits in people. However, they have not always been able to explain their decision. They have been able to present a point of view (as suggested by Cottrell, 2005), and they have been able to explain some of their judgement/decision-making process, however, to apply this trait to all the critical thinking process, it implies that a person would be able to explain and justify everything that is going on, throughout the process. My experience in both the practical and academic domains suggests that this is not always the case in people who are arguably thinking critically (they exhibit all the other components and demonstrate their competency at critical thinking through assessment). Also, Garrison's (1991) suggestion that critical thinking is a largely private process, and that often we only ever see the results, questions this notion, as well as the emerging theme from my research, that students (and others) are not always aware of their critical thinking. Therefore, the notion that critical thinking involves explaining and justifying your actions, is questionable. I discuss this in more detail in the next section of this thesis, during which, subconscious/conscious activity and tacit/explicit knowledge is considered.

With all the traits above, a critical thinker needs to consider the ***timing*** of their use. Although this element had not been prevalent within the initial stages of this research, when I consulted the two technical experts from the outdoors the first time, it became more prevalent, as they suggested that the timing of application of elements of critical thinking was imperative when operating in the outdoors. The students also highlighted the importance of timing when thinking critically in the outdoors, for example, in focus group 2, participant 9 discussed making decisions when hillwalking, saying that *"snap decisions"* are required sometimes. There is perhaps a difference between critical thinking 'in action' and critical thinking that is arguably more philosophical. The former of these questions whether critical thinking is used when an outdoor practitioner makes quick decisions 'in action'. In focus group 3, the students discussed that, sometimes, critical thinking had to happen quite quickly and there is a fine line between what would be termed 'reaction' and 'in action' use of critical thought, which is very difficult to determine. 'Time' itself may determine whether the thinking process used to make a decision/judgement ceases to be what is being discussed here as critical thinking, in other words there is a difference between reaction and critical thinking. The scope of this study did not allow consideration of the actual cognitive process that an individual person goes through; instead, it has dealt with perceptions of students, though this is challenged too, by the idea that it is not always possible to explain the critical thinking process. What can be learnt, however, is that for

[7] Experience spanning 15 years includes delivering training and assessment courses: ML, WGL, SPA, CWA, UKCC Level 1 (Paddlesport) and Level 5 Training (Paddlesport), UKCC Level 1 Orienteering.

an outdoor student, many time constraints exist that influence their use of critical thinking. In the outdoors, sometimes, because of the dynamic nature of the environment, critical thinking must be employed quite quickly; however, this does not exclude it from being considered critical thinking. What might be considered critical thinking that is more philosophical also has time constraints for an outdoor student. Deadlines need to be met, and to achieve at level 6 or 7, outdoor students need to demonstrate a level of critical analysis, and therefore a timely approach to critical thinking is important. When I presented my definition (using the conceptual model in chapter 5.5) at a research seminar at the University of Central Lancashire, feedback from colleagues across other disciplines suggested that there were examples in their own fields where timing was an integral element of critical thinking.

There is one other important factor of critical thinking in outdoor students: a ***disposition/willingness/motivation*** to engage in the process. A critical thinker will be open-minded, yet purposeful, will ask questions and consider the context, will make reasoned decisions whilst having integrity, and will apply, test and reflect. However, an important theme within my analysis suggests that a person may have all these traits, but without the disposition (inclination) or willingness to apply them, they may not think critically. Siegel (1990) referred to it as a 'critical spirit' or 'critical attitude', a willingness to engage in the act of critical thinking, and the Delphi report refers to it as a willingness to consider other people's opinion, and a willingness to reconsider. These latter points could be interpreted as being part of the trait of questioning, or that of reflecting, however the importance of them within the Delphi report has not only led to them being discussed in that report, but also to separating its associated critical thinking test into two parts. One part tests the extent to which their (Delphi report) traits are demonstrated while the other tests a person's disposition to using them (California Critical Thinking Skills Test and the Critical Thinking Disposition Inventory). During the focus groups in my research, many participants discussed whether willingness was separate to motivation and I explained that I had used the word 'willingness' in preference to disposition (commonly used in literature) or motivation. Although, when analysing the data there were some differences in opinion, of importance is what 'willingness' means, and it was evident in the focus group discussions that, although there were discrepancies in the choice of word, overall the meanings were, to the students, generally the same. A participant in focus group 1 called it *"a want"* to engage in critical thinking, and this was my interpretation of generally what all participants meant. This does raise the important point that because one of the aims of my research was to produce an outcome of benefit to practitioners, terminology that is more commonly used by outdoor students should be considered and 'willingness' is a possible compromise.

In summary, throughout this research process, I continually reviewed my definition, and I considered how to communicate critical thinking to outdoor students in a way that was appropriate in both the academic and practical contexts in which they find themselves. The participants' perspectives, both students and technical experts were invaluable in this process. A notable feature throughout my research though, was that the more the students discussed critical thinking, the more they became aware of it, and I discuss this next.

5.2 Awareness and understanding of critical thinking

I reported in the findings chapter of this thesis that many participants started their conversations not necessarily attributing critical thinking to something that they did in the outdoors. It was only through time and discussion that many shifted this opinion, to suggest that they did use critical thinking in outdoor practice and did develop it in this context. This was evident during the interviews of phase 2, the focus groups of phase 3, and in phase 4, where the participants reported that the conceptual model that I presented to them, increased their awareness and understanding of critical thinking. If, as my findings suggest, a student has developed critical thinking skills through their participation in outdoor activities, and I am seeking ways to help them to transfer them to their academic studies, the student needs to understand what critical thinking is, and thus be aware that they have (to some extent) developed these skills. As can be observed in this thesis, I myself went through a lengthy process to understand critical thinking and find a way to articulate it and understand it. For a student, there is presumably the same challenge. This section of my thesis draws together findings from my research that refer to the notion that critical thinking may be a subconscious activity, a natural and/or automatic process, based on intuition, or tacit knowledge, the consequence being that a student may not be aware of their own critical thinking.

Many participants reported that their degree course had triggered their awareness of the concept of critical thinking, and awareness of their use of it. For example, John said, *"I didn't know about it before the degree – it was the trigger"* and Hazel reported being more *"aware"* of her own thinking, though in most cases it was not clear whether it was classroom studies or the practical element of the course that had been the trigger. Only Hazel explicitly reported that the practical element of the degree had enhanced her awareness of critical thinking, both the concept and her own use of it. However, many also reported that they thought that critical thinking was a subconscious process, and this was particularly prevalent in examples from outdoor environments, perhaps implying that the participants were more likely to think that it was a subconscious process when they were operating in that environment. I have argued that what is considered to be critical thinking in academic literature shares the same characteristics

as the thinking process used by outdoor practitioners, but it was noticeable in phases 2 and 3 that some participants were not initially aware of their own use of critical thinking in outdoor practice. This is important, given that critical thinking in the outdoors is what I originally wanted the students to be able to recognise that they already had developed. Identifying their awareness of it could then lead to the ability to transfer it to other domains. Awareness may also be relevant in the academic context, as testing of it exists at Level 6, and an awareness may ensure understanding and application in a student's work. Although my research focuses on transferability from the outdoors to the classroom, the reverse of this may be equally important, as a graduate with critical thinking skills may need to learn to use them in an outdoor context, therefore awareness in this situation may also be necessary.

During focus group 1, a suggestion was raised by the participants that experience leads to automatic application of critical thinking skills, and participant 5 felt strongly that this was the case (participant 5 used the term 'autonomous' but I took this to mean automatic in this context). The idea that as we become more experienced, skilled or competent at something, this leads to automatic application is discussed in many areas of literature. For example, literature in the field of coaching and skill acquisition includes Schmidt and Wrisberg (2004), who refer to different stages that an athlete goes through, from the use of controlled processing, which is conscious information processing in the early stages of development, to automatic processing, which is often involuntary, in later stages of learning. Christina and Corcos (1988) speak of a similar notion, suggesting that athletes need to pay less conscious attention to how they execute a skill, when in the intermediate stages of learning. Some participants used the term 'intuition' to describe their use of critical thinking, and I associated this with the term awareness. I took this to mean that sometimes they thought that critical thinking was intuitive, and as a result, they may not be aware that they were thinking critically, as they were doing it intuitively. An experienced practitioner, making complex decisions in complex environments, may be using the characteristics of critical thinking intuitively, but not conscious of doing so.

In Dreyfus and Dreyfus's (1980) work, they introduce a model of skill acquisition, where the learner progresses from novice through to master. At stage 4: 'expertise', they suggest that often the process is intuitive, and the learner uses information and skills without being conscious of them. Additionally, the notion of intuition is discussed by Cross and Lyle (1999) in sports coaching, as they note that expert coaches use intuition, and are not always conscious of their decision-making processes. More recently, Collins, Collins and Carson (2016) investigated the use of intuition in decision-making by rugby coaches and adventure sports coaches, concluding that both groups of coaches used intuitive decision-making. Interestingly though, they found that although the definition they used of intuition refers to it as a subconscious activity, the coaches in the study reported that for them if the act was reviewed afterwards, it became a

conscious act, suggesting that through facilitating reflective practice, awareness was possible. Reviewing as a technique for learning is used regularly in the outdoors and supported by many (for example Gass and Stevens 2007; Greenaway, 2017; Kolb, 1984), and although others argue that it is not always necessary (Rea, 2007; Bacon, 1987), it remains an important aspect of outdoor facilitation. The work of Collins et al. (2016) highlights that there is potentially a use for it here in my practice: reviewing a session with a group after an outdoor activity could be used to highlight how critical thinking had been used during the activity, this then helping to increase awareness. The conceptual model presented in chapter 5.5 could be used as the basis for this, and in phase 4, when I delivered a teaching session using the model, many participants reported that it helped them to be more aware of critical thinking. One participant said, *"The diagram provided me with the realisation that I knew more about the subject [critical thinking] than I first thought"* (E).

There is a model that I have been using in my own coaching for many years that also helps to explain this. Although its roots are not entirely clear (Bate, Hutchinson, Underhill, and Maskrey, 2012; Flower, 1999), the four-stage conscious competence model of learning (many other names and formats for it are used) is often accredited to the US Gordon Training International Organisation (Adams 2012). My own experience is that it has been used anecdotally for many years in adventure sports coaching, and Cooley, Holland, Cumming, Novakovic, and Burns (2013) offer an example of its application in outdoor learning. The general notion is that as a learner progresses, they move from being unconsciously incompetent; to consciously incompetent; consciously competent and then to unconsciously competent. Critical thinking learning may follow the same pattern and outdoor students may go through the initial four stages of the model; however, this learning may not have been 'labelled' as critical thinking. This would be from no awareness or understanding of critical thinking, or their own ability in critical thinking; to an awareness of critical thinking but no understanding; then a level of understanding and ability to apply it consciously, to thinking critically but doing so subconsciously. However, if, as in my experience, critical thinking is not a regularly used term in the outdoors, an outdoor student, whilst passing through the stage of being consciously competent, may not have associated their thinking process with 'critical thinking'. I questioned earlier whether the ability to explain/articulate/justify was an integral element of critical thinking and argued that this is not in my experience always the case. The idea that a student may not be aware of their own critical thinking, that they are unconsciously competent, seems to support this.

Therefore, if I want to help students to recognise their own critical thinking, with a means to transferring it to another domain (the classroom), there is first a need to recognise that their thinking process may be similar to what is generally understood to be critical thinking, and

secondly, a need to go beyond this fourth stage of being unconsciously competent in critical thinking. There has been some argument for a fifth stage (Chapman, 2017; Dick, 2014) that suggests that we become consciously aware again of our heightened state of competence. Baume (2004), as a head teacher, suggested that a level above being unconsciously competent was necessary in order for him to be able to teach something (cited in Chapman, 2017); and in the context of my research, this fifth stage is also required. This fifth stage is referred to in many ways, though Baume (2004) referred to it as 'reflective competence' (Chapman, 2017). Given the strong relationship between outdoor practice and reflective practice, and the links between reflective practice and critical thinking that have been exposed during this research, this seems to be an appropriate term to use for this stage. The technique of reviewing an outdoor activity session could help to facilitate students' awareness of critical thinking, thereby addressing the first concern, that they may have developed critical thinking but do not refer to it as such, and secondly to move into the fifth stage of being reflectively competent. This does not however mean that I have now included 'explain/articulate/justify' in my definition, as it is not integral to critical thinking itself, but it may be necessary to ensure awareness and enable subsequent transfer.

A student may have developed an ability to think critically without realising it as such and could be described as unconsciously competent without having passed through the phase of being consciously competent, and therefore the student does not regard their thinking as 'critical' thinking. As a result, the notion of tacit knowledge (knowledge that is not easy to express) is useful here, as outdoor practitioners are likely to have developed this knowledge albeit without recognising how or when it has occurred. This notion is echoed by Rabu, Aris and Tasir (2013), who when proposing the use of online platforms to help to develop critical thinking learning, suggest that critical thinking is in the domain of tacit knowledge. For an outdoor practitioner, the idea that critical thinking is tacit rather than explicit could be explained by examining the environment in which they learn, and the learning experiences that they have engaged with. Eraut (2000) suggests that tacit knowledge is often learnt through experience and non-formal learning, and Holste and Fields (2010) suggest that tacit knowledge is learnt through interaction and observation of knowledgeable others. It is notable that the participants reported each of these facilitation methods as contributing to their critical thinking development, and my own experience, as a coach and coach educator in the outdoors for 25 years allows me to reflect on my experience and note that this is often the way that an outdoor practitioner will learn. An outdoor practitioner may have learnt more formally about the technicalities of rock climbing and paddle sport for example and have explicit knowledge in this area that they can demonstrate at assessment; however as critical thinking is not commonly taught in outdoor practice, this may have been learnt implicitly, resulting in it being tacit knowledge and therefore not articulable.

Therefore, an outdoor student, unless exposed to formal teaching activity in critical thinking, is likely to have learnt informally, this resulting in tacit rather than explicit knowledge. The implication of this is that they may not easily express or articulate critical thinking in outdoor practice; and any attempt at transfer will be problematic. Subsequently, a student's tacit knowledge of critical thinking would benefit from being converted to explicit knowledge. Eraut (2000) discusses why one might need to convert tacit knowledge into explicit knowledge, suggesting several reasons, one being to help improve performance, and in the case of my research, this performance could be students' academic work. Within the SECI model (Socialisation, Externalisation, Combination, Internalisation); introduced by Nonaka, Toyama and Konno (2000) to explain and facilitate organisational change, they suggest that tacit knowledge can be converted into explicit knowledge through discussion and practice. Although discussed in more detail in the next subchapter, discussion and practice were both approaches to teaching that the participants, in my research, reported to be helpful in their development. As can be seen in this thesis, I myself have gone through a process of moving from tacit to explicit knowledge of critical thinking, and this has had a positive impact on my practice. Enabling students to go through a similar process could be of benefit to their practice too. Understanding one's own thinking process and being aware of one's own awareness, leads to knowledge of one's own cognition; metacognitive knowledge, a more recent category in a revised version of Bloom's Taxonomy (Pintrich, 2002). Metacognition is defined by Lin (2001, p. 23), as the "ability to understand and monitor one's own thoughts and assumptions and implications of one's activities". Outdoor students may require a level of metacognition about their own critical thinking before transferability can be considered. Otherwise, a student remains unconsciously competent rather than reflectively competent. Scharff et al. (2017) discuss the role of metacognition in learning transfer, suggesting that there is a strong correlation between metacognitive behaviour and learning transfer. Therefore, promoting self-awareness and self-regulation of one's own thoughts may be important, when helping a student to transfer critical thinking skills from one domain to another.

Overall, the findings of this research suggest that an outdoor student may not be aware of their own critical thinking, having potentially developed critical thinking skills to the point of being unconsciously component, and not necessarily associating their thinking with 'critical' thinking. This is particularly prevalent when discussing critical thinking in outdoor practice with students and could be one of the reasons why outdoor practitioners, who are returning to academic studies, find it difficult to apply critical thinking to their academic work, as they are not aware that they may have the skills already. Although not explicitly mentioned by the participants in this research, it may be that increased awareness could help students to build confidence in their critical thinking. Increased confidence could in turn help a student to recognise their own level

of skill in critical thinking, and enable them to consider development and/or transferability. During the interviews and focus groups, whilst being exposed to critical thinking and discussing it, each of the participants appeared to become more aware of their own critical thinking, and although largely anecdotal, they began to discuss the notion more confidently. In addition, in phase 4, all participants reported that attending the twenty-minute session that used the conceptual model (see chapter 5.5) was useful for their awareness and understanding of critical thinking, and they gave examples of how they may apply this learning to their future practice.

5.3 Understanding the lecturer/instructor's role in facilitating critical thinking development

This section of my thesis discusses the role that a lecturer/instructor working with outdoor students could play in raising awareness of the concept and act of critical thinking and helping students to develop their own critical thinking. I discuss how the students in this research reported that they had developed their critical thinking and suggest some approaches to teaching to facilitate development.

The students reported that they attributed their development of critical thinking to university (lectures etc.), university practical sessions, outdoor activities in their own time, work (which for many was in the outdoors), and life in general. Some of these findings are to be expected: as discussed in earlier chapters of this thesis, one of the goals of university is to develop critical thinking, and the students reported that for them, this was the case. However, what I had not expected was that many students perceived that they were developing more quickly because of the specific course that they were attending. The students in this research were combining practical sessions in outdoor activities with theoretical work, for some this was through structured practical lectures in the form of 10, weeklong residentials, and for others, they attended the occasional practical session and studied the subject alongside working and practising in the outdoors. This may have contributed to their perception that their development was quicker than their peers' was. Combining practical sessions with theoretical work is discussed by Jorge, Coelho, Paraizo, and Paciornik (2014), who suggest that this combination of applying skills in the practical sessions alongside referring to research, favours critical thinking development. Also, James and Williams (2017) note that combining practical activities and theory, as part of learning design, promotes development of critical thinking. Interestingly, implied in each of these examples is that critical thinking skills are similar in each of the domains of a subject area, classroom and practical. Similar to my discussions earlier though, this does not then mean that critical thinking is definitely a generic skill, but that there are shared characteristics between critical thinking in the academic sense and critical thinking in the

applied element of that subject. Either way, my findings suggest that combining practical activities and classroom sessions with students on an outdoor course is beneficial to their critical thinking development.

For my own practice though, I was interested in the role I may have in students' development, and I questioned how a lecturer/instructor could help to facilitate critical thinking development, and whether there were common approaches to teaching that could be used.

Helping outdoor students to develop critical thinking

I first, however, considered whether critical thinking development needed facilitating, or whether it would happen naturally on its own. Students in this research gave their thoughts on the significance of facilitation in their own critical thinking development. For example, Hazel, when asked whether she had developed critical thinking skills at university, responded saying, *"much depends on the lecturer and the way things are run"*, implying that for her, some facilitation methods may have been more effective than others. Ian suggested that he thought that *"facilitation definitely helps"*, and when I specifically asked Joe whether he thought critical thinking skills could be developed through outdoor activities, he said, *"I do, but I think it could be down to facilitation as well".* I interpreted these responses to mean that there are a range of teaching approaches that may be of benefit to a student, but that overall, the students thought that facilitation helped their development, and I considered the wider landscape of literature on critical thinking development and teaching to inform my findings.

Several pieces of research consider the effectiveness of critical thinking teaching. For example, Helsdingen et al., (2011) suggest that in their research, critical thinking instruction benefited the overall performance (in this case, it was the performance of decision-making). This improvement, because of critical thinking instruction, was only short term; however, in their research they acknowledge that their research did not look at the long-term effect. Ruggiero (2012) also suggests that critical thinking is teachable, although in 1985 McMillan reviewed 27 research papers that considered the effectiveness of teaching critical thinking, the findings of which provided a mixed picture, with less than half of the papers reporting an improvement in critical thinking because of the instruction. McMillan suggested that critical thinking testing is required before and after instruction to help to reduce ambiguity and that attendance at college was most effective in developing critical thinking, rather than specific critical thinking instructional courses. Students that I work with do not regularly attend specific critical thinking instruction, though they do receive implicit instruction/facilitation through attendance in class and practical sessions, and it was this implicit instruction that I was interested in. I did not test the level of critical thinking in participants of this research; however, self-reported perceptions

of critical thinking development of the students in this research have helped to shape my own understanding of how critical thinking development might be facilitated in outdoor students. Further research could consider the relationship between attendance on outdoor related degrees, and critical thinking development in students, through pre and post testing.

In Goodstone et al.'s (2013) research with nurses, they did test critical thinking development, post facilitation. They used either case studies or simulation as the facilitation method and found that although there was little difference between the two methods, both resulted in an increase in critical thinking levels, implying that facilitation can be effective. In a more recent piece of research, Stone, Duffy, Pinckney and Templeton-Bradley (2017), despite finding mixed results, do conclude that with case study analysis as the facilitation method, students did improve their critical thinking as measured pre and post instruction. Also, Park et al.'s (2013) research found that simulation was effective in developing critical thinking, again suggesting that facilitation, albeit through case study or simulation, helps to promote critical thinking development. Both case studies and simulation are used in the outdoor programmes I have worked on, and this may contribute to the students' development of critical thinking. Overall, the students in my research reported that facilitation played a role in their critical thinking development, and associated literature appears to suggest the same. Combining learning contexts, case studies, and simulation may all be contributing to outdoor students' development, but of interest to my practice were the core approaches to teaching that may be effective.

In phase 2, based on the number of times mentioned, and/or the emphasis placed on them, six activities were identified as potentially promoting the development of critical thinking in outdoor students. In phase 3, these six activities formed the starting point for analysis and they were subsequently adapted in response to the new data. Summarised in the diagram below, the results are represented as two underpinning principles (individualising learning and creating an appropriate environment) and six approaches to teaching that could contribute to effective facilitation of critical thinking development, when working with outdoor students.

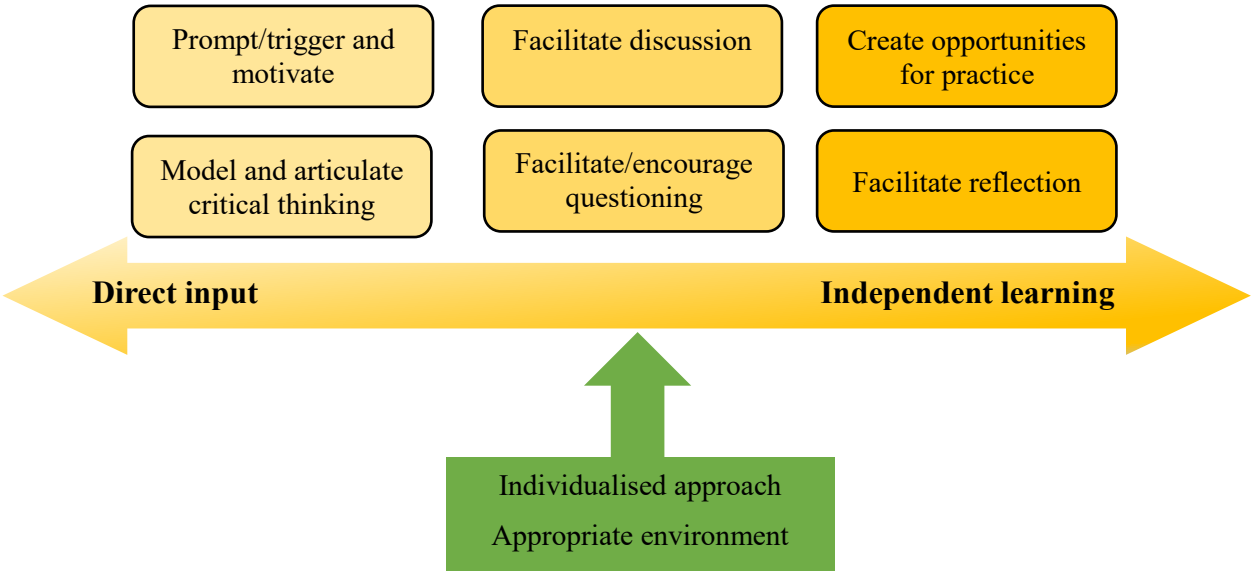


Figure 10: Facilitating critical thinking development in outdoor students

There are a range of approaches to teaching that a lecturer/instructor could use to help to facilitate the development of critical thinking in both the practical and academic settings, whether it be in a more explicit and direct way or by creating opportunities for independent learning. As Ann suggests: *"Sometimes I think you need proper guidance… I think it depends on the place, what you are trying to do, the situation, the people"*, and Beth seemed to agree: *"it depends on the scenario"*. In focus group 2, participant 13 also said that a balance was required when facilitating critical thinking development. Participant 13 said: *"maybe try and establish how much you can prompt them because a lot of the time when I am pushed to do something I get to the point that I am so frustrated I shut down"*, and participant 9 appeared to agree: *"that's true you can overload"*. Each of these examples highlight that facilitation needs to be individual to the person and that the environment is important, therefore, I discuss these underpinning principles first.

Creating an appropriate environment

When using any of the six approaches suggested, the environment is key to a student's development. Participant 1 had said, *"For me it's about creating the environment… the opportunity"*, and others suggested that the environment itself might have a negative effect, if it was not appropriate to them. When discussing this in focus group 2, one participant said, *"you need a real context not an imaginary one"* (9). This is perhaps of note to the lecturer in a classroom, as this student appeared to be suggesting that talking about a situation hypothetically would not be effective for them, therefore if using simulation or case studies, ensuring that it is as close to reality as is possible may be worthwhile.

However, if in a real and/or practical environment, many of the participants suggested that caution might be required. For example, John, when referring to the context of the outdoors said, *"[critical thinking] does need facilitating maybe as the technicality increases"*, the implication being that the greater the complexity of the situation, the more that facilitation was required. Although John's example was referring to a practical setting, it is possible to envisage a similar situation in the classroom. If the topic becomes more complicated, greater facilitation of critical thinking development may be required. An understanding of the theory being discussed, and/or enough experience in an outdoor activity is required so that students are comfortable enough to develop critical thinking, and the learner absorbs any technicality increase. Mark also suggested that there is a level of *"bombardment"* that is tolerable. There is a requirement for care here, because earlier I suggested that critical thinking is used in complex environments, and it is possible that if the environment is too complex, it could hinder development. Outdoor activities often involve the participant being in complex and dynamic environments, and as a result, there could be a 'bombardment' of information meaning it is hard to find the balance between creating space and time to think, as well as operating in the environment itself. As Joe suggested, you need to be *"happy with the activity… you would start to reflect and critically think more, except if you are in a kayak and going down a grade 4 and you are [scared] you're not going to be critically thinking [except] after it when you might calm down"*. A participant in phase 3 echoed this notion, when referring to enabling development in others: *"[it would not work] in [an] environment where they have a phobia or something, they are going to freeze"* (4). This overloading could also come in the classroom, where a lecturer asks too many complex questions, or sets a complex assignment. Balancing the complexities of a subject (enough to understand the topic to be able to develop critical thinking) with allowing time to reflect and think, would be key to ensuring that the environment was appropriate for critical thinking development. In the classroom, this is more manageable, as the session can be stopped and perhaps changed, however, managing this in an outdoor classroom is more problematic, as it is often not possible to simply stop a session and remove whatever is causing the bombardment or complexity. Therefore, the session would need to be managed carefully, and consideration given to when to facilitate critical thinking development and when not to. The additional difficulty with this though, in both the classroom and the outdoor domains, is that some participants explicitly noted that this would be different for each person, and it may not always be possible to create the best environment for each individual (assuming that the lecturer/instructor is not working on a one to one basis).

When considering the level of complexity of the environment, the facilitator may also need to consider the combination of people in the group. Some participants alluded to the importance of having the 'right' people around them. Mark suggested that the people around you might make

a difference as to whether someone could develop critical thinking or not, his suggestion being that you need to be around peers who are also thinking critically. Ian had also suggested this, saying that for him, he needed to be around *"people with the same mind-set"*. Although, in my experience, it is not always possible to determine the make-up of the group a lecturer/instructor will work with, it may be important to consider this factor when facilitating discussion and deciding whether to group students randomly or intentionally.

Individualised approach

Alongside creating an appropriate environment to help critical thinking development, this research found that individualisation of facilitation was important to outdoor students and underpinned any choice regarding teaching approaches. When discussing what makes a good facilitator of critical thinking development, Brookfield (1987) suggests that the process is person specific. He suggests that the way in which individuals respond to facilitation methods varies from person to person, and similar findings are seen in my research: For example, the focus groups in phase 3 were asked their opinion on the draft model(s) I presented, and their responses demonstrate the individualised nature of critical thinking in general:

> *"Different people could interpret different things"* (15)
>
> *"It's got to come from the person"* (9)
>
> *"[It is] dependent on you knowing your group… knowing their characteristics"* (11)
>
> *"It comes back to that pertinent [point]; one [teaching approach] might work for one, and one for another"*, it "*depends what level [of outdoor activity] they are at."* (7)

Individualising teaching is a much-discussed notion. The Dearing report and publications by leading organisations (Nuffield, 2009; Hargreaves, 2004; Johnson, 2004; Leadbeater, 2005) demonstrate the significance of concepts such as Learning to Learn and Personalised Learning in Primary and Secondary education. Learning to Learn is high on the agenda in education, with many reports written on the subject along with Deep Learning and Personalised Learning (Sims, 2006; Sebba, Brown, Steward, Galton, and James, 2007; Hargreaves, 2005; Aspect, 2006). With each of these, the concept behind them is that each learner is an individual and should be treated as such. Personalised Learning (a more recent movement in education literature) does suggest however, that it is not a matter of tailoring your teaching to 'fit' the individual (Pollard and James, 2004) but a case of developing independent learners (Hargreaves, 2005, Aspect, 2006, Sebba et al., 2007). Jarvis, Holford and Griffin (2003) perhaps also suggest this, by discussing individualisation within the notion of self-directed learning, noting that in adult education the philosophy has always been to encourage individualised learning, rather than it being

compulsory or universal. Individualisation can be applied to assessment (Gardner, 1999), taken into consideration in skill acquisition (Boyle and Ackerman, 2004), within sports coaching, with Sharp (1992) discussing ways to achieve individualised coaching, and Cross (1999) offering a chapter on individualising training programmes, noting that individualisation is an essential element of the coaching process. However, individualisation is difficult. As Simon (1999) points out, complete individualisation is the ideal, however in practice, unless working individually, rather than with a class or group, it is difficult to individualise all the time. Here within the context of my research, the implication is that for the participants, it is important that critical thinking facilitation is individualised where possible, and this notion is echoed across many areas of learning literature.

The six specific teaching approaches that resulted from my research are discussed next, starting with those that are more direct in their instruction, to those that aim to facilitate independent learning. These should be considered alongside the underpinning principles when devising a facilitation method to aid development of critical thinking: individualised learning and an appropriate environment for the learner. Also of note is that there is some crossover between the six approaches, with each influencing another. This is intentional, as inevitably facilitation is a complex notion that is difficult to divide into compartmentalised approaches; however, they have been discussed separately to help to demonstrate how the lecturer/instructor could facilitate each.

Prompt/trigger and motivate students

Brookfield (1987) suggests that people do not change their thinking without some form of trigger, and that this trigger is often external, and the students in my research reported many examples of being triggered/prompted to think critically. Change appeared to be a common factor in triggering critical thinking. In phase 3, as participant 9 suggested *"playing devil's advocate and giving different contexts [encourages critical thought]"*. This is interesting, because if outdoor activities take place in dynamic, ever-changing environments, it could be argued that outdoor practitioners are frequently prompted to think critically. This must be considered though alongside the point made earlier, that too much bombardment could inhibit critical thinking. A balance is required if considering using a change in the environment, whether in the classroom or on practical outdoor activity sessions, to trigger critical thinking.

Many of the students suggested that engaging in undergraduate study in general, provided the trigger, for example, Mark, Dave and John alluded to this, saying that it was since starting the degree course that they were studying, that they were triggered/prompted to think critically. As most students in phase 2 perceived that to some extent, they had developed their critical

thinking through being at university, and critical thinking development is part of the role of a university (Dearing report, 1997; Holmwood and McGettigan, 2011; Newman, 1852; Oliver, 2001; RIBA, 2011), this finding is to be expected. Further analysis of the data revealed examples that were more specific, with Ian saying that *"throughout university you are pushed to think critically"* giving the example of: *"doing an essay that says to critically analyse"*, and I was interested in these specific examples of how a lecturer/instructor might trigger or prompt critical thinking.

One way appeared to be that by allowing students to take responsibility or ownership of what they were doing, students were prompted to think critically, whether this was in the classroom setting or in practical sessions. Examples included John, who suggested that his critical thinking was developing because he was *"taking more ownership",* within his academic work, and Suzy suggested that her critical thinking had developed when she was in a position of responsibility at work: *"when you are put in a position as an instructor"*. Suzy also gave an example from university: that within assignments, if she could choose the topic, she needed to be *"a lot more self-sufficient".* Ann, who gave examples from her work as an outdoor instructor, echoed this notion. She reported that she had developed her critical thinking when put in a *"more responsible role".* These findings at the time had an immediate impact on my own practice, as an educator. Within my own teaching, I considered the structure and nature of the assessments that I set, and I revised some of them to allow greater flexibility and more responsibility on the student. Through informally gathering feedback from students, as well as module feedback mechanisms, I found that other students echoed the findings in my research, that more responsibility in assignments prompted students to think more critically about them. This will not be the case for all though, as too much choice in assignments may cause confusion; care is needed and an individualised approach where possible. Not everyone will be motivated by increased complexity or responsibility, for Suzy, a trigger to think critically was enjoyment of the activity; when asked how she thought critical thinking should be facilitated, she offered, *"it might work best if you are having fun and it's enjoyable"*.

In Krupat et al.'s (2011) work, when they analysed the definitions of critical thinking offered by 97 medical educators, they found that critical thinking was a combination of ability and disposition/willingness to think critically. They suggest that educators need to nurture both (as noted in chapter 4.1 and in the discussions earlier in this chapter, I coded the terms willingness, disposition and motivation together; they essentially mean 'a willingness' to engage in critical thought). A lecturer/instructor could prompt and encourage outdoor students, thereby nurturing a willingness to engage in critical thinking. Participant 12 was explicit about this, and said, *"You have to be encouraged to be a willing participant [in critical thinking]"*. In response to my question: When might you question something? Dave said *"...when something really matters to*

you, you are going to get an actual purposeful gain out of it, something that's going to make a difference to your life in the future". I interpreted this to mean that Dave, when prompted by something (this could be external or internal), would be more willing to engage in thinking critically. Mark said something similar: *"if you want to attain a mark"*, and Joe said, *"I definitely think I developed more when I came here, I became more purposeful through [a] reflective journal [assignment]".* Of note is that what was not clear in my findings was whether the triggers reported were internal or external. For example, in the case of Mark, if attending the outdoor degree is a trigger to think critically, this could be an external trigger through facilitation by lecturers, or internally prompted, or a combination of both.

As a side note, these discussions add additional weight to the argument that outdoor students think critically when in complex environments, whether this is academic studies or the outdoors, and that, it is developable in both environments. The complex or dynamic environment can create a trigger, apportion greater responsibility and/or increase willingness to engage. Although not explicitly suggested by some of the participants, there is perhaps a link here to the level of risk involved. In the outdoors, this risk could be because of the dynamic environment, or at university, the risk of failure or not living up to expectations. When given additional responsibility, whether in outdoor activities, at work, or in an essay, this could be perceived as risky, leading to an increase in willingness to engage in critical thinking. This does raise a question as to the level of challenge involved: if the challenge is too high, the essay too vague, or the environment too complex, this may have the opposite effect.

Model and articulate critical thinking

The role of facilitators of critical thinking could be to act as a role model and articulate their own critical thinking. This notion may be linked with the idea of having the right people around you, but also relates specifically to the participants being able to observe critical thinking in practice. Hazel describes how she thought she had developed her critical thinking whilst watching other outdoor instructors verbalising what they are doing, the example given was whilst caving with an instructor who discussed the water levels and the subsequent decisions they were making. Dave described how whilst out map reading, his father would describe what he was doing and why he was doing it, and that this had helped him to develop his critical thinking. Hazel gave an example in class, suggesting her lecturer had articulated what they were thinking whilst teaching, and this had helped her with her development. This was the only example from an academic context, although Beth's example (below) was not context specific. It may be that articulating critical thinking in an outdoor context is more straightforward, although this does contradict my own observations that critical thinking is rarely discussed in

outdoor (practical) practice. In the examples above, the students imply that they had made the connection to critical thinking, rather than the articulator themselves describing what they were doing as 'critical thinking'. To help to make this connection, the conceptual model presented in chapter 5.5 could be used as the starting point for articulating and modelling critical thinking in both the academic and practical contexts.

Other examples from my research of modelling/articulating as a useful teaching approach include the thoughts of John who described how when acting as an outdoor instructor *"there is a transfer of learning from me being critical through to my students"*, suggesting that he was acting as a role model. Also, Suzy said, *"When you are an instructor you almost become a facilitator of [critical thinking] to other people, so you have to be a role model".* Beth demonstrates the balance though between facilitator input through modelling and allowing independent learning. When responding to a question about how Beth would want her critical thinking development facilitated, she said, *"It's good to be in a scenario where someone's showing how I would use critical thinking and then be put in that scenario where I have to do it myself, and maybe reflect on it and come back for more pointers"*. Another example was in phase 3, when participant 1 said that seeing *"it done well"* helped them to develop critical thinking, though this does imply that a student needs to be able to recognise critical thinking in another person, therefore a level of understanding of critical thinking is required by the student before modelling may be effective. The notion of modelling critical thinking to facilitate development is supported by Lodewyk (2013), who lists suggestions for fostering critical thinking through physical education. This list includes the teacher demonstrating what critical thinking is, as well as explicitly teaching critical thinking and structuring opportunities for practicing it. In Rabu et al.'s research (2013) they suggest that modelling, or articulating critical thinking to the learner can help the learner to move from tacit to explicit knowledge, and as was highlighted earlier in this thesis, this may help a student to be more aware of their critical thinking and perhaps enable transfer. It is however notable that this teaching approach relies on the lecturer/instructor being at a stage of reflective competence in critical thinking, to enable them to articulate and model critical thinking to others.

Overall, the students suggested that the modelling of critical thinking had been useful in facilitating their critical thinking development, and this was a pertinent learning point from this research, for me as a lecturer/instructor, and one that I have experimented with in my own practice. Also, I discussed earlier in this chapter that the participants did not always seem aware that they used critical thinking, and modelling could serve to demonstrate what it is and how it can be applied, in both the academic and outdoor contexts.

Facilitate discussion

In an article by ten Dam and Volman (2004), which reviewed 55 other research papers on critical thinking instruction, they argued that critical thinking development is a social process, and that participation is key to this. Discussion, as ten Dam and Volman suggest, leads to reflection, and from that, potential development of critical thinking. Many of the participants mentioned discussion, as a way of developing critical thinking, and the lecturer/instructor could facilitate this. The discussion could be with friends, peers, lecturers and instructors (depending on who, for them, was most appropriate), and could take place in the classroom or outdoors, and be of any relevant subject (again depending on which environment a student found to be most effective). For example, Suzy, when discussing which activities would most lend themselves to the development of critical thinking, suggested activities that involved communication, and gave the example of surfing. Suzy said that she was able to practice surfing for a while, then come in and chat to other surfers about what they were doing, and how they could all improve. Suzy was facilitating this herself, but it demonstrates that for Suzy the option to come and discuss the practice with others was beneficial to her critical thinking development.

Within other research, Higgins (2009) suggested that critical thinking skills could be developed through discussing sustainability issues whilst taking part in outdoor experiences, and Seymour, Kinn and Sutherland (2003) highlighted the importance of discussion as a way of developing critical thinking skills, their context being the field of nursing. In the context of the classroom, Scott (2008) found that debates could facilitate critical thinking in a technology class, and Guest (2000) discusses a facilitation method of introducing a catalyst to spark debate in class, then guiding the discussions to help develop critical thinking skills. Of interest to the context of my research is that Guest's work was aimed at 'non-standard' students, essentially those who have come to higher education through a non-traditional route. Students who come from a non-traditional route had sparked my interest in this subject and the relevance of creating opportunities for discussion to develop critical thinking influenced my own teaching.

The lecturer/instructor with outdoor students could facilitate discussion in the classroom, and when outside. Consideration in both environments should be given to individualising as appropriate and trying to ensure that the environment is appropriate for each student. For example, as noted earlier, it may be that students should choose their own group to discuss a topic. Both in the classroom and outside, consideration should be given to the level of complexity of the situation. If the environment is too complex, and students are not in a comfortable learning zone, any discussion to develop critical thinking may be ineffective.

Facilitate and encourage questioning, of others and of oneself

Phase 1 of my research had highlighted that questioning was an important trait in critical thinkers; when thinking critically we ask questions about the information we are receiving, about our analysis, and about the judgement that we have made. Examples from participants of how questioning had developed their critical thinking included: when asked questions directly (prompting/triggering); having the opportunity to ask questions (if it was the right environment and with the right people); and asking questions of themselves (space/time to allow reflective practice and be able to practice critical thinking). Examples from the transcripts of times when the participants thought they were able to develop their critical thinking included when *"we were allowed to ask lots of questions"* (Joe), whilst *"asking questions when perhaps involved in outdoor activities"* (Mark) and when *"lecturers… have got lots of probing questions"* (Hazel). In addition, John suggested that prior to studying the degree he had *"not really had the chance to voice that kind of questioning"*, thereby suggesting that having the opportunity to ask questions was helpful in his development. For Suzy and Ann, who had both put an emphasis on having a chance to work it out for themselves, they felt that asking questions of themselves was an important contributor to their development, thereby perhaps negating the need for a facilitator. However, what could be learnt from this latter point is that the lecturer/instructor could encourage students to ask questions when they are not there to facilitate it, and to start with, this could be facilitated more closely through pre-set questions and feedback. For example, participant 13 gave an example of how they had been prompted to ask questions: *"[a task in class] was asking you questions and I found it quite easy to be a bit more critical then, rather than just reading it on my own"*.

In focus group 1, the students were outdoor instructors themselves, and they gave examples of how they might facilitate critical thinking development through questioning, in an outdoor environment. Participant 5, for example, suggested using questioning to help development of critical thinking when running a kayaking session, and Participant 3 suggested *"asking other people within the group 'what do you think about that, is that your opinion, do you share that opinion… would you do anything slightly differently'"* as a way of encouraging critical thinking development. This latter example was in an outdoor environment, though a similar situation could be facilitated in a classroom, and this could be combined with facilitating discussion to develop critical thinking.

Facilitate reflection: create space/time

The students in this research suggested that reflection and space/time to think helped to develop their critical thinking. Ann described an example of when she thought her critical thinking had

developed; the context was as an outdoor instructor setting up a climbing session and then having time to reflect on it afterwards. Preston (2011) discusses the importance of providing space to allow critical thought and reflection, and there was a strong sense amongst many participants in my research, that critical thinking was associated with reflective practice. For example, when I asked Beth how she thought her critical thinking had developed, she said, *"since being at university there has been much more reflection… [and my critical thinking] has developed since being at university"*. Later in the interview, Beth reinforced that for her, reflection, and time for reflection was an important contributor to her development.

Joe and John both said that they had developed their critical thinking when they had had time to reflect during outdoor activities. Reflective practice and opportunity for reflection is an integral part of being an outdoor practitioner, and often incorporated into outdoor activity programmes (for example see: Campbell, 2010; Rea, 2007; Takano, 2010). The degree courses I teach on draw from reflective practice literature, with many modules integrating reflective thinking. Students are exposed to many models and theories, for example the work of Gibbs (1998), Johns (2004), Kolb (1984), Moon (1999; 2005) etc. The critical thinking process that I introduced the participants to in the interviews: gathering of information, thinking about it, changing what you do, and thinking about it further, on the surface appears very similar to some of the reflective models that we discuss in class. This perhaps led students to associate critical thinking with reflective practice, though a strong connection between the two can also be observed in associated literature; Dewey referred to critical thinking as reflective thinking (Fisher, 2001), and Ennis (1985) described critical thinking as reflective and reasonable thinking.

Of note is that reflective practice does not always need facilitating, as Rea (2006) suggests when using the 'mountains speaking for themselves' notion. Essentially, that the experience itself is enough for students to engage in reflective practice and learn, thereby suggesting that it does not always need to be facilitated. Similarly, Williams (2012) notes that when on solo activities (the context was outdoor learning) a facilitator is not needed to tell students what they should be learning. Arguably, though, arranging a solo experience for students, whether this is in an outdoor context or academic, did require some facilitation, and here in my research creating space/time to create an opportunity for reflective practice is a teaching approach that a lecturer/instructor could use.

A balance is perhaps needed though between creating space/time for a student to think, but also understanding when to stop. This was more noticeable in phase 3 of my research where several students reported their concerns about knowing when to stop thinking critically. For example, participant 8 had said, *"my only concern is, where is the stop point for critical thinking?"* perhaps implying that this may need facilitating by the lecturer/instructor. Participant 15 seemed

to agree: *"You can go on forever, you can think about something too much"*. The lecturer/instructor could, therefore, not only prompt critical thought, but also share guidance on taking a timely approach, which is an integral part of critical thinking. This may be particularly relevant in outdoor practice, where time constraints (darkness, tiredness, changes in the environment etc.) may mean that a decision must be made very rapidly. Equally though, a lecturer in the classroom could give guidance to a student regarding how much time to spend thinking about a topic, and this may simply be through structuring sessions to create time to think, but also curtailing these when appropriate.

Create opportunities to practise critical thinking

Integral to all the approaches discussed so far, is creating an opportunity to practice critical thinking. In academic work, Mulnix (2012) discusses how to teach critical thinking and emphasises the importance of 'extensive deliberate practice'. Many of the teaching approaches discussed above create the opportunity to practice critical thinking; therefore, it is perhaps unrequired as a separate approach. However, practice can be individualised according to the students' needs and the environment they are in, and it allows an opportunity for independent learning. Therefore, it is important to recognise it as an approach itself. For example, in phase 2 Dave said that his critical thinking development came *"from going out and doing it… learning practically"*, and throughout this interview, I got the sense that he preferred to learn in a practical setting, rather than the classroom. Hazel, when asked how she had helped others to develop critical thinking, said that she would *"allow people to have experiences"*. Although Hazel is not speaking about herself, she clearly places a value on learning through experience, to develop critical thinking. In both cases, it is not obvious if it is practical activity alone, that is effective, or the explicit or implicit use of teaching approaches discussed above. In either case, practice is important to both students. Ann seemed to question whether practice needed facilitating, as she said, *"I probably learn [critical thinking] better just going out and doing it by myself"*, however if a lecturer/instructor facilitates discussion and questioning, this may help to shape any recreational practice of critical thinking that a student engages in, promoting individual learning that could be applied elsewhere.

When facilitating a practical session with students, an instructor could set tasks to enable students to practice their critical thinking, for example, asking them to navigate a section on the mountain or planning a river trip in a canoe, then reviewing it afterwards and offering feedback for improvement. In the classroom, a lecturer could set structured independent work for a student, creating the space to practice critical thinking, with the addition of prompting and

perhaps motivating questions. In each of these cases, this could be individualised, and structured according to the environment.

Conclusions about facilitating critical thinking development

In conclusion, the findings of this research suggest that facilitation plays an important factor in critical thinking development, whether through explicit input such as prompting or triggering critical thought or through encouraging independent learning by creating opportunities to practice. A lecturer/instructor, when developing critical thinking in students could consider six approaches to teaching, which inevitably cross over with each other. They can be used to a lesser or greater extent depending on the student, the context and topic, and where possible, it is important to individualise and ensure an appropriate environment for development. Brookfield (1987), when discussing the facilitation of critical thinking, suggests that there is no standard model, and notes the importance of using different approaches, for example, ensuring diversity in materials and methods. Similarly, the approaches that I have discussed offer guidance as to how each might play a role in helping to develop critical thinking, in both the academic/classroom and outdoor contexts in which outdoor students find themselves.

5.4 Transferability of critical thinking

This section draws together findings from all four phases of this research, and literature regarding transferability. In chapter 2, I outlined what transfer means in the literature, and how this applies to the context of this thesis: the application of critical thinking skills in the classroom/academic domain that were learnt elsewhere, specifically outdoor practice. Therefore, transferability means the ability to achieve this. When asked about transferability of critical thinking, Beth said, *"I think the practical weeks have had more of an impact on how I critically think in lectures, than the other way round"*. Beth's comments appeared to suggest, that transferability, in the context of my research, was possible, and I was hopeful that all participants shared this perception. There were, however, many challenges reported by the students, though there were also several learning points from my research that were useful to my practice, and potentially will be to others.

Transferability in this context relies on two important factors; that there are shared characteristics between what is thought of as critical thinking in an academic context and the thinking process of an outdoor practitioner, and that an outdoor practitioner has (to some extent) developed these skills in their outdoor practice. The former of these I have argued throughout this thesis, and I discussed earlier how the students in this research perceived that they had

developed their critical thinking, and that they attributed some of it to their outdoor practice (facilitated or not). This was reported either through explicit examples of development through their own participation, the facilitated practical elements of their course, or through their work as an outdoor instructor. However, because they were studying a related degree at the same time, and perceived that they were developing more quickly than their peers on other courses were, I had also explored whether they thought that outdoor activities alone (without attending a related degree) would have the same effect. This is because, if I am working with a student who is new to academic studies, but who is an outdoor practitioner, I will consider whether they may have already developed critical thinking, without the degree course helping them with this. Hazel suggested that *"through… [outdoor] qualifications"* critical thinking development occurred, and that the higher the qualification a person held the more critical thinking was developed, and John suggested a similar scenario: *"the more qualifications you were to gain…the more knowledge you would gain to then allow you to develop your critical approach to the activities that you do".* Although this is not conclusive, drawing together strands of this research, it is reasonable that a discussion regarding transferability of critical thinking skills in outdoor students starts from the position that a student will, to some extent, have developed critical thinking through their outdoor practice, albeit perhaps slower if they are not studying a related degree at the same time.

Transferability in this context also relies on knowledge of the subject into which transfer is to be considered. Many students in my research reported this, as does Mulnix (2012) and Halpern (1998). In focus group 1, the lecturer taking part gave an example of putting an academic member of staff in a kayak for the first time. The lecturer suggested that even though it is likely that they think critically, they might be unable to apply critical thinking to kayaking, as they have no knowledge of the new subject. Anecdotally I witnessed a similar scenario a month later and observed just this. In the case of the students I work with, knowledge of academic work is therefore imperative before trying to transfer critical thinking skills from outdoor practice to academic work, however an unresolved question is: how much? How much kayaking knowledge and experience did the academic mentioned earlier need, before they would be able to apply their critical thinking abilities to their kayaking, and how much knowledge of academic skills would a student need?

Transferability in the field of the outdoors is a widely debated area. As highlighted in chapter 2 of this thesis, Brown (2010) suggests that transfer is the 'Achilles heel' of the outdoor industry. Learning through outdoor activities can be stimulating for a participant, the activities offering an exciting and adventurous medium through which to learn, however, in terms of transferring that learning, other methods such as the instructional method of simulation are argued to be more effective (Wallace, 1999). Several pieces of research with students who have attended Outward

Bound courses, though, have found that transferability of learning took place, in the sense that post attendance, the students reported that they were using what they had learnt, in other domains. For example, Neill and Dias (2001) report that controlled exposure (which implies some facilitation) to challenge, enhances participants' psychological resilience, and Martin and Leberman (2005) discuss what participants reported that they had learnt, three months after an Outward Bound course. In this latter piece of research, the participants had reported increased strength and courage, implying that the students had learnt this whilst on the course and had now transferred what they had learnt to their everyday lives (of which they presumably had enough knowledge). These pieces of research involving Outward Bound students suggest that transfer of learning is possible, and raises the question: What is Outward Bound doing that promotes transferability? My own experience working for two Outward Bound schools in the past means that I have some knowledge of their practice. Something I did observe during my work there was that the Outward Bound philosophy was integral to all courses, regardless of age, ability, or location, and this strong integral philosophy perhaps provides a positive framework for transfer. Some of the participants in my research reported that they thought that critical thinking was transferable from their practical activities to their academic work, and it may be that those students perceived there to be a strong positive framework, enabling them to consider transfer. However, if critical thinking is not a regularly used term and not an integral element of teaching in the outdoors, either in performance coaching or in coach/teacher education, it is difficult to see how students could perceive that a strong philosophy of critical thinking is an integral part of being an outdoor practitioner. Therefore, an outcome of this research for my own practice, and potentially others in this field is that critical thinking needs to be discussed more explicitly in both the practical and classroom environments of outdoor students' work, if transfer is to be considered.

In another piece of research, involving Outward Bound students, Bobilya et al. (2015) suggest that learning was transferred from the outdoor experience to the student's own life, two years after the course, though the authors note that intention to transfer was an important first step. This is interesting, and this may be relevant within the context of my research. Many students had reported that they needed a trigger to think critically, and the same may be the case when considering transferring critical thinking skills from their outdoor practice to their academic work. However, this too is problematic. When considered alongside theory regarding behaviour change, many behavioural change models highlight a gap between intention to change and making the change. For example, the widely cited Health Belief Model (Rosenstock, 1966) appears to presume that once psychological characteristics of the person and demographical variations are established, action (in other words change of behaviour) follows. Later behaviour change models, such as the Theory of Planned Behaviour (Fishbein and Ajzen, 1975) and the

Transtheoretical Model (Prochaska and DiClemente, 1983) do note that there is potentially a gap between intention to change and implementation of change; though do not necessarily offer solutions to this. Although these theories derive from health research, they are often applied and/or adapted for other contexts (for example see Hines, Hungerford and Tomera, 1987, who adapt them to environmental behaviour change). Here, alongside other findings in my research, they help in understanding the challenges an outdoor student may face when trying to transfer critical thinking skills to a new domain (essentially changing their behaviour in the new domain of learning). An outdoor student, who has developed critical thinking skills in their outdoor practice and wants to transfer these to their academic work, may struggle to implement that change, even with the best intentions. To help to bridge the gap between intention to change and actual change, Sniehotta et al. (2005) and Gollwitzer (1997) suggest that a goal implementation plan, or action plan, can help and this could be the role of the lecturer/instructor with outdoor students. The lecturer/instructor could facilitate the potential transfer using an individualised action plan, reviewing (as noted earlier in this thesis; Collins et al., 2016) and could include the use of the conceptual model of critical thinking presented in the next section of this thesis.

Other bodies of literature help when trying to understand whether outdoor students may be able to transfer critical thinking from their practice to their academic work, for example, the body of work on 'transfer of training'. Although this collection of research centres around understanding whether training courses are effective ways of developing a workforce, because the central theme is around whether learning is transferred from one domain to another, this body of work is of significance here. In Axtell, Maitlis, and Yearta's (1997) work they use self-assessment of what students thought they had transferred from their training to their work place and suggest that motivation to transfer is important, a notion echoed by Grohmann et al. (2014). I highlighted earlier that the role of the lecturer/instructor may be to motivate students to think critically, and it could be significant in enabling any transfer of skills as well. When Almannie (2015) discusses some of the barriers to transferring learning from a training course, to a work or job context, he suggests that 65% of participants reported lack of encouragement as a barrier to transferring training. Although Almannie's work is not concerning critical thinking specifically, this, along with the point made earlier, that in Bobilya et al.'s (2015) research they found that intention to transfer was important, does highlight a possible difficulty that students may face, and they may need encouragement, and potentially facilitation, to transfer critical thinking skills.

Although here I am discussing 'transfer' of critical thinking skills, Hager and Hodkinson (2009) suggest that we need to go beyond thinking about learning transfer and consider learning as 'becoming'. They initially outline four lenses through which learning can be viewed, arguing that in understanding learning, the propositional learning lens (referred to as lens 1) is widely

popular (Hager and Hodkinson, 2009). This lens, which they refer to as the 'quiz show' lens, assumes that learning is independent of the person, it is a 'product', and therefore for transfer to occur, the 'product' must be 'moved' from one place to another. Although critical thinking learning could be viewed through this lens, the second lens - the skill learning lens (lens 2) - is perhaps more appropriate. Again, the assumption is that what is learnt is independent to the learner, and, with relevance here in my research, that the skill is generic. Although there is little consensus whether critical thinking is subject specific, the view of McPeck (1981), or generic, the view of Siegel (1990) (my research concluding that there are some shared characteristics), it is often argued that if critical thinking is a generic skill, then it is transferable across domains (Halpern, 1998; Hanscombe, 2007; Wall, 2015; Davies, 2013). Critical thinking learning could be viewed through lens 2, as it is often discussed as an outcome of higher education, and something to be learnt by undergraduate students (Newman, 1852, Dearing, 1997, QAA, 2012), implying that it is a 'thing' or 'substance' (Hager and Hodkinson, 2009) that can be taken to a student's future job. If viewed in this way, and critical thinking is a generic skill, then transfer requires an outdoor student to move the 'thing' of critical thinking from their outdoor practice to their academic work. However, Hager and Hodkinson (2009) argue that when learning is viewed through this lens, much of the skill is implicit or tacit. As discussed in chapter 5.2, my research suggests that critical thinking in outdoor students is often implicit or tacit and this knowledge needs to be converted to explicit knowledge if transferability is to be considered. If critical thinking learning is viewed through the skill learning lens, where the learning is independent of the learner, although the skill may be considered generic and therefore (in the case of critical thinking) transferable, the learner may not be aware of this generic skill, therefore making transfer problematic.

Critical thinking learning could be also be viewed through one (or both) of Hager and Hodkinson's (2009) other suggested lenses. The third lens is the participation lens, the underlying assumptions being that what is learnt has moved beyond being a 'thing', and is instead, shaped by the context (Hager and Hodkinson, 2009). An outdoor practitioner who has developed critical thinking skills has arguably done so through participation, learning implicitly. If this is the case, then there is an argument to suggest that the knowledge - critical thinking - is bound to the situation (Gruber, Law, Mandl and Renkl, 1999) and therefore not transferable, though Gruber et al. point out that this question remains unresolved. Hager and Hodkinson (2009) also suggest a fourth lens through which to view learning - learning as a transformation or reconstruction, where the fundamental assumptions are that the learner is an integral part of the learning and that it is an evolving process. This lens includes constructivist learning, where learning is active and the learner constructs information; a form of learning that Olusegun (2015) suggests favours the learning of complex skills such as critical thinking. If critical

thinking learning is viewed through the transformation/reconstruction lens, which appears to be strongly associated with critical thinking learning, the concern is that Hager and Hodkinson (2009) suggest that there is little research on transfer, which uses this lens to view learning, though whichever lens critical thinking learning is viewed through, more research into transferability is clearly required.

In summary, the findings of my research suggest that direct transfer of critical thinking from the outdoor practice domain to the classroom domain is problematic. The outdoor students in this research have demonstrated that they learn implicitly, through participation, are expected to demonstrate critical thinking in their work, and they combine practical activities and classroom work to develop their learning (learning seen through lenses 2-4). It is also naive to think that all outdoor contexts are similar, and that all classroom contexts are the same; therefore, in hindsight, there are more domains than simply these two that outdoor students find themselves in. Subsequently, Hager and Hodkinson's (2009) argument that rather than 'learning transfer', it is thought of as 'becoming', seems reasonable. It is likely that rather than directly transferring critical thinking from one domain to another, outdoor students build their awareness, knowledge and understanding, and apply critical thinking to each context. For an outdoor student, rather than transfer the 'thing' of critical thinking from their outdoor practice to their academic work, learning regarding critical thinking, in a wide range of contexts, will be constructed and built on what has been learnt before. It therefore seems appropriate to cease discussing 'transferability' of critical thinking skills from one domain to another, and instead to consider how an outdoor student can build on their learning of this complex concept, with a view to applying it into many different contexts in the future.

5.5 Building confidence: A conceptual model to aid awareness, understanding, development and application of critical thinking

Key learning points from my research led me to design and develop a conceptual model of critical thinking. The aim of the model was to create a common language to talk about critical thinking with outdoor students, to raise awareness of its use in both the classroom and practical element of outdoor practice, and potentially help students to convert their tacit knowledge of critical thinking to explicit knowledge. The overall objective was to create a teaching resource that could be used by lecturers/instructors, thereby helping to build confidence around this complex subject, to help students to develop critical thinking, and start to consider and understand its applicability in a wide range of contexts. My experience is that like myself, outdoor practitioners sometimes find it challenging to engage in academic study, but having benefited from engaging in academic study myself, I was keen to help others to achieve the

same. My research findings were telling me that the outdoor practitioners I worked with had, in part, developed critical thinking skills during their outdoor practice, and therefore others that I work with in the future may have too.

Although the model was originally designed for my own practice, it is hoped that others, in different subject areas can adapt it to suit their own context. During my research journey, I consulted with the technical experts to get their opinion, discussed it with colleagues and critical friends, tested it with a group of Masters' students, and presented it at three internal conferences at the university I work at, each of which offered positive feedback as to its adaptability and applicability in other subject areas. The result of this journey, along with a critique and explanation are presented below:

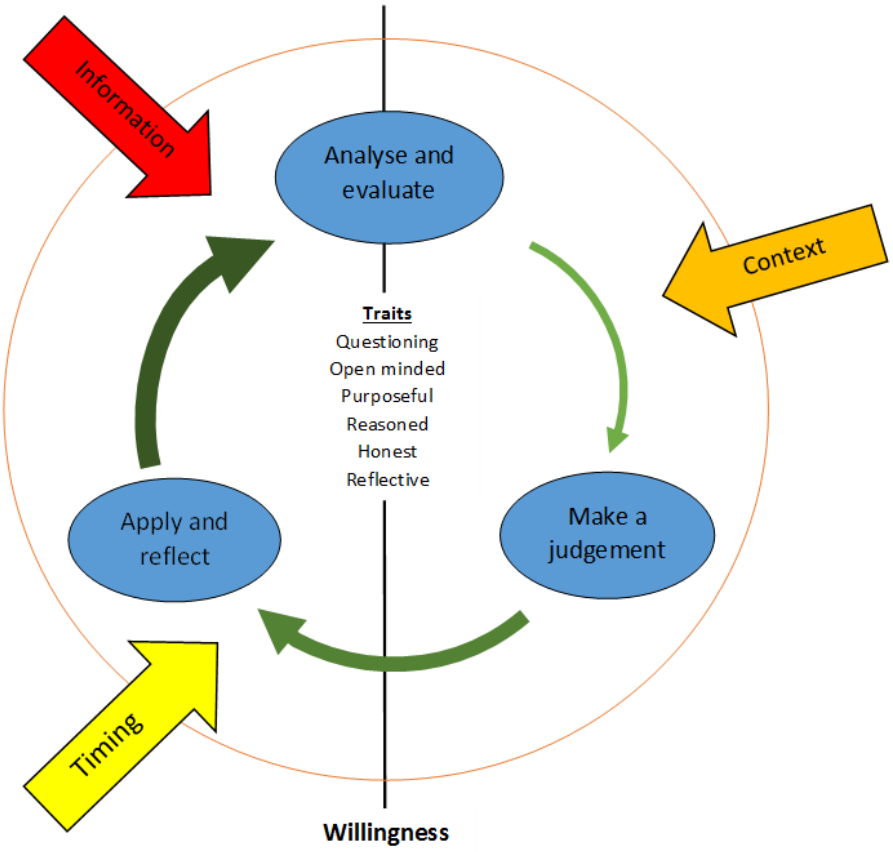
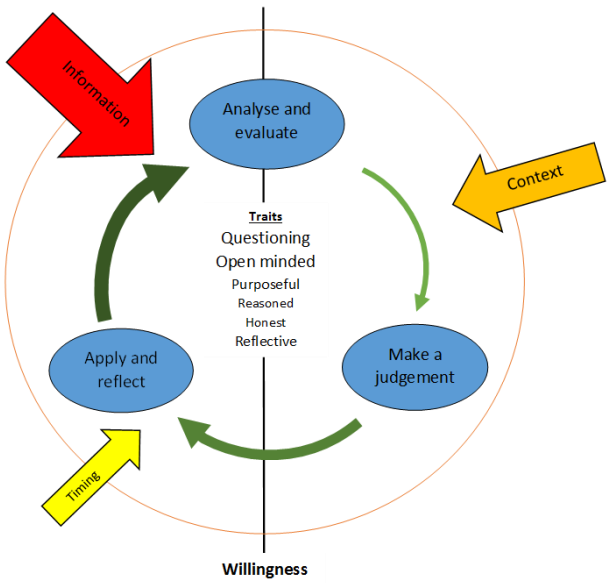


Figure 11: A conceptual model of critical thinking

The model offers an interactive means to discussing the complexities of critical thinking to aid awareness and understanding. A facilitator can use the model as a starting point for discussion, adapting it to individualise learning and to consider the context and specific topic. The arrows feeding into the critical thinking process represent the external, and/or internal influences, and can be larger or smaller depending on the situation. For example, when in a dynamic

environment, perhaps when rock climbing in the mountains, context might have a greater influence; therefore, the context arrow could be drawn larger. When researching a topic for an assignment, the information influence may be larger, and in an example given by a participant, when white water kayaking an hour before it gets dark, the timing arrow might be the largest of them all. In the centre of the process are the traits associated with critical thinking, their application again depending on the context or the situation an outdoor student is in. For example, at times, it will be more important to question, and at other times, being purposeful may be the most important trait to employ. In addition, critical thinking depends on a willingness to engage in the process, and as such, I have represented this using the axis.

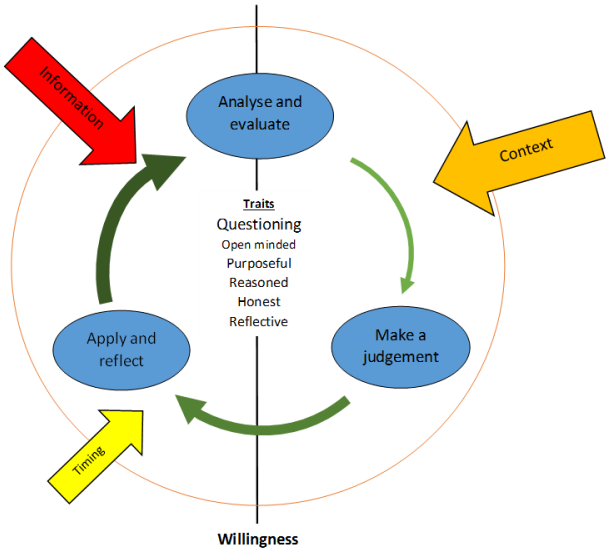
An example for each domain, academic and practical are suggested below, as a participant in focus group 1 suggested, *"I would have several of these for [different] subjects… I would break it down and have several of these"*:



Researching a topic for an assignment:

Information influences the process continuously, as more information is sought out, it needs to be questioned, also the student needs to be open minded, and at times reflective.

They need to keep in mind the context of the situation, the subject area, demonstrating application in their work, and be mindful of time and effective use of their time. All the traits are employed, but those indicated in larger font perhaps more.

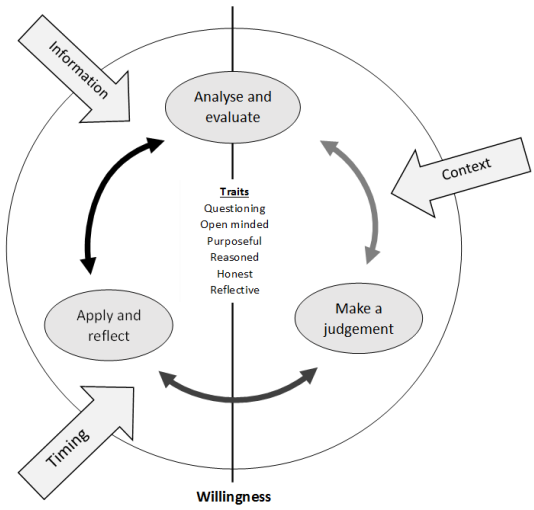


Hill walking with a group:

Information about the conditions and the group are continuously collected, also here the context is of significant influence. What are the objectives for the day, what can be achieved etc.?

The context continues to change as the day progresses; therefore, the size of the influencing arrows may change during the day. All the traits need to be engaged with at times.

Another consideration is the continuous and dynamic nature of the process, and the notion that there is no start point. The version below[8] demonstrates all the same components, but in this case allows the students to work out for themselves how the process might work:



"I think you can do it in any order, obviously you need to start with… no actually you don't need to start with information you start in the applying stage and then you question what you are doing and then you end up doing the research which adds information, and then you can do the judgement after you've applied, you might just get the information and run with it, and then think actually wait, and go back…. I think you can do it in any order." (9)

Whilst delivering the teaching session in phase 4, and at two of the conferences I presented my work at, I used 'cut out' coloured pieces of paper to 'build' the model as I discussed it. I

[8] The model is designed to be adaptable and flexible. Although suggested colours are offered, to enable individualisation other colours can be used, or grayscale. Equally, the terminology can be adapted to reflect the subject area it is being used in.

envisage that the model could be used in a variety of ways such as this, for example, students could be given the pieces of the cut out version and asked to build the model themselves, and the cut out version could be laminated for use in outdoor environments. Equally, the model could be presented digitally, in interactive and static ways, and again this could be used in both the practical and classroom environments.

The terminology within the model reflects the context in which use is intended: with outdoor students. Choosing terms, which are applicable and appropriate for both the practical and academic domains of outdoor students was challenging, as critical thinking, in my experience and as demonstrated in this research, is not regularly discussed in outdoor practice. I found that participants had differing opinions as to the appropriateness of each term, and what is presented here is perhaps a compromise. When I 'tested' the model in phase 4, the question regarding terminology was not as prevalent, as it was not raised by any of the participants. This could however be because I was presenting the model as the finished article, rather than a draft. In phase 4, the key piece of feedback, which has informed my practice, is that the model can be of use to students in a variety of ways. For example, one student suggested that it would help them with their research, and another had essentially had a 'light bulb' moment, suggesting that their understanding of the concept was as a result much greater.

In summary, the conceptual model that is presented here has been of use in my own practice and may be of use in others'. I designed it to be adaptable to other contexts and flexible so that a lecturer/instructor can individualise their instruction. Users in other subject areas could adapt the language to reflect their own context; equally, part of the teaching process could be to encourage a student to adapt the terms to suit their own learning and development. The ethos of the model is to enable communication of critical thinking, which in turn will help students to be more aware of critical thinking, provide a platform for development and possible application in a different context, and build confidence around this complex subject.

6 CONCLUSION

6.1 A contribution to practice and knowledge

Using a pragmatist approach, this research has investigated the development and transferability of critical thinking, with students studying outdoor related degrees. This research has considered what critical thinking is and how it can be communicated with outdoor students. As part of this, students' perspectives of critical thinking and its development have been explored. The research has also questioned whether critical thinking is transferable from practical experience to academic study. Using the learning points gained from each phase, as well as learning from my own practice, literature, technical experts and critical friends, the contributions to practice and knowledge are drawn together under the headings of the aims of this research:

The aims of my research were:

1. To explore the notion of critical thinking in outdoor practitioners;
2. To question the transferability of critical thinking skills;
3. To produce an outcome of benefit to both lecturers and outdoor instructors.

Exploring the notion of critical thinking in outdoor practitioners:

- **Students' perspectives of critical thinking** have been explored within this thesis and gaining an understanding of what they think critical thinking is, has helped to shape the recommendations as to how critical thinking can be taught.
- This research has demonstrated that significant similarities exist between what is considered critical thinking within academic domains, and the thinking process undertaken by outdoor practitioners. **Essentially, they share similar characteristics.**
- The research has demonstrated the significance of **'timing'** as an integral part of critical thinking. Although this is more prevalent in the outdoor thinking process, it is also an important element of critical thinking within academic learning.
- The role of outdoor activities in the development of critical thinking has been critically considered within this thesis, demonstrating that the likelihood is that **outdoor activity participation can aid the development of critical thinking**.
- However, my research has demonstrated that often, outdoor students are **unaware** of their use of critical thinking in an outdoor context, and that this may have an impact on their understanding and subsequent development and application of critical thinking.

Critical thinking, as has been discussed throughout this thesis, is a contested notion, and defining it has been found to be problematic. A significant finding in my research, and one that underpins questions related to development and transferability, is that the participants in this research were often not aware of their own use of critical thinking. Raising awareness may help to build confidence, as many participants reported; they found it challenging to apply critical thinking to their academic work. This research has not tested levels of awareness or understanding of critical thinking, instead it has relied on the views of students. However, student's views are important, as a shared view of what critical thinking means to both outdoor students, outdoor staff, and as defined in the literature could provide the basis for considering transferability in the future.

Applying critical thinking skills learnt in one context, to another (transferability of critical thinking):

This research has explored transferability of critical thinking, and several important learning points have emerged. Firstly, transfer itself is problematic; this has been demonstrated within literature on the subject, and by the participants in this research. As was suggested in chapter 5.4, it would be more appropriate to discuss application of critical thinking skills to a wide range of contexts, rather than 'direct transfer'. This research has highlighted some of the potential barriers to application that an outdoor student may face, and some of these factors are potentially controllable through careful facilitation. The barriers include not knowing enough about the subject into which they are intending to apply the skills and not having enough awareness of both the concept of critical thinking and their own critical thinking skills. Raising awareness of the characteristics of critical thinking in both the outdoor and academic settings can have a beneficial effect of students' willingness to engage in academic work. As willingness is identified as a crucial component of critical thinking itself, the student is more likely to 'take part' if they feel more secure in their own existing skills and the potential for future application. With that in mind, an outcome of this research is the conceptual model of critical thinking that was discussed in chapter 5.5, its use being, to raise awareness.

To produce an outcome of benefit to both lecturers and outdoor instructors:

The main aim of my research was to inform my own practice and produce an outcome of benefit to both lecturers and outdoor instructors. A summary of the learning outcomes that have subsequently shaped my practice as a teacher are below:

- My research has exposed some of the benefits of an undergraduate programme, which engages with **practical and academic elements of the subject** simultaneously.
- Facilitation of critical thinking development was investigated and summarised in a **model of approaches to teaching that could promote critical thinking development.**
- **A conceptual model** of critical thinking has received positive feedback when used in a teaching session with a group of outdoor students.

Outdoor students' perceptions of their own critical thinking development contribute to our understanding of how they develop critical thinking. Having conducted this research in order to understand critical thinking development from the students' perspective, suggestions have been made within this thesis as to how to help a student to develop their critical thinking. A simple model of facilitation, which demonstrates the delicate balance between input and independent learning, can be used as start point, to consider how to help a student to develop critical thinking skills.

The conceptual model of critical thinking that I have developed is to aid teaching, in both the outdoor and academic learning environments, and with potentially wider application. The aim is to provide a model that will help to inspire confidence, in both students who feel they are not able to engage in academic work and teachers who are introducing the topic to students.

My own learning as an outcome of this research:

A perhaps unwritten aim of this research was for me to learn, to inform my practice. Throughout the journey, there have been many learning points that have shaped my current practice. For example, when teaching, I was able to put in place what I was learning about the facilitation of critical thinking development. I adjusted the titles of assignments that I set, articulated my own critical thinking to students, and used my conceptual model in my teaching. My own practice, as a teacher, an outdoor practitioner and now as a researcher, has been challenged, informed and enhanced throughout this process and it is hoped that there are contributions here that will benefit others' practice too.

6.2 Limitations of this research, and recommendations for future research and practice

There were several limitations to this research, therefore wider application of the findings should be considered within the context that are to be applied. Firstly, I conducted this research with a small sample of outdoor students, in one university; therefore, the conclusions drawn are applicable to the context in which they were researched. In addition, as a novice researcher, I found that I increased in confidence as the process unfolded, learning as I progressed. Subsequently, the latter interviews, and latter focus groups were perhaps more focussed, and with less chance of bias.

Throughout the analysis process, I have taken care with what the participants were telling me, and hope that I have represented their thoughts accurately and appropriately. However, an additional limitation is that this research was conducted with students whom I also taught; therefore, it is inevitable that there is the potential for participants' responses to be biased or perhaps inflated. For example, in phase 4, I collected feedback on my teaching session from students who were attending the course that I led. Therefore, it is possible that their responses were influenced by wishing to please me, or a feeling of coercion may have been experienced despite my best efforts to make the aim of the session clear, i.e. to collect their genuine responses. Therefore, a suggestion for further research, which I would like to carry out myself, is to 'test' the model externally, with students that I do not already teach.

A recommendation of this research is that critical thinking is discussed more widely in outdoor practice. This could be within teaching, recreational practice and associated national governing body training and assessment courses. This is because my research has demonstrated that although not referred to as critical thinking, the outdoor students who took part in this research perceived that they used a similar process in their practice. Talking about critical thinking in outdoor practice may help students entering higher education to make links between the thinking processes that they use in the outdoors and what is considered critical thinking in academic literature.

In terms of future research in this field, further research into transfer, and specifically critical thinking, is recommended. In addition, to increase understanding of students' perceptions of critical thinking and its development, a useful future study could examine the concept of critical thinking across a range of degree topics. Such a study could explore whether my finding that students perceived their course to enhance development of critical thinking, is echoed elsewhere.

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Appendix 1: The journey of the interviews

Interview 1 3rd year OL Female on campus	
• First interview – found I didn't use the prompts/questions or planned slides • Was guided by what was raised • Had to tease out course in general and practical weeks • Wondered if I had intervened / led the discussions	Themes/questions **To facilitate or not?** Motivation/willingness Independent/ reflective practice Choose to CT or not?

Learning points for me for next interview:
Not sure if I need the prompts, (I had created a short ppt with slides if needed)
Care needed over leading the discussions

Interview 2 1st year OL Male on campus	
• Theme of reflective practice • I asked why they thought it was linked • Spent a lot of time discussing the traits which retrospectively was not good use of time/energy • Shorter answers – my technique?	Themes/questions CT as part of RP Subconscious – do we choose to do it?

Learning points for me for next interview:
Still did not need prompts
Decided to stick to no prompts/slides

Interview 3 3rd year OL Male Top up (via Adobe connect)	
• My first online interview • Internet actually meant I intervened less because of the slight delay) • Spent/"wasted" lots of time again on the traits • I was concerned about leading • Teasing apart was hard again	Themes/questions Motivation The degree as a trigger for CT **Facilitating** Question over maturity

Learning points for me for next interview:
Concerned now about use of time… I am spending too long asking what they think CT is
Did learn that that not intervening helps – clearer answer perhaps?

Interview 4 2nd year ASC Male on campus	
• Lots of discussion over context	Themes/questions Motivation "Explaining" when **facilitating**

• Used % to help articulation of how much they thought they had developed CT through different areas • Asking first about CT was difficult again	Is it context based? Personality linked?

Learning points for me for next interview:
Was I still leading too much?
Was there value to asking the participants what they thought CT was from the outset (before giving them my definition?)
Discussed this latter point with my supervisor and made the decision to start the interviews with my definitions rather than ask the students for their opinion first

Interview 5 3rd year OL Male Top up	
• Via skype – lost connection a couple of times • Explained to the participant that my tack had changed and that I was asking slightly different questions (i.e. not starting with their definition) • Asked specifically whether they thought CT was context based	Themes/questions Higher level of qualification – more development of CT? **Facilitation**

Learning points for me for next interview:
Felt more productive starting with my definition

Interview 6 3 x 2nd year ASC Females on campus	
• 3 people in the interview, a little daunting but they knew each other well and allowed each other to speak • When transcribed I was able to separate each person • Felt productive starting with the definition, and actually they seemed less likely to repeat it back to me - LP	Themes/questions Work as the place for development **Facilitation** Being on your own to develop

Learning points for me for next interview:
Seemed to be learning and improving in interview technique

Interview 7 2nd year OL Male on campus	
• Shorter interview, this seemed worrying at first, but after transcribing it I was less worried • Highlighted some different perspectives – I was a bit concerned at the time	Themes/questions Maybe outdoor activities don't help to develop CT?

Appendix 2: Information sheet and consent form, Phase 2

Phase 2

Building bridges between practice and theory. An investigation into the development and mobilisation of critical thinking skills in undergraduate students studying Outdoor related degrees.

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

- What is the purpose of the study?

The study aims to investigate the extent to which participation in outdoor activities can develop critical thinking skills in undergraduates. Also, it will consider the transferability of these skills from the students' experiences in outdoor activities to learning in the academic context.

- Why have I been invited to participate?

You have been invited to participate in phase one of the research because you are currently a student at UClan on an Outdoor related degree.

- What will happen to me if I take part?

You will be invited to be interviewed either on your own or in a small group (you can choose). If there are more volunteers than are needed then the sample group will be randomly selected. Before the interview starts you will be given a short questionnaire which will ask a few data questions, including questions about your own experiences in outdoor activities. The interview will last about 30 minutes, and you will be asked about your understanding of critical thinking and about the factors (with particular emphasis on outdoor activities) that you think help to develop your own critical thinking.

- What are the possible disadvantages and risks of taking part?

I do not consider that there are significant risks to taking part. Care will be taken to ensure confidentiality and your anonymity within the dissemination of research findings.

- What are the possible benefits of taking part?

You will be actively taking part in research, which may be of benefit to you in terms of designing your own undergraduate research.

- What if something goes wrong?

If something goes wrong or you become concerned, you may withdraw at any time. Also, you can contact me: rpowell2@uclan.ac.uk or you can contact my supervisor; Candice Satchwell; csatchwell@uclan.ac.uk

- Will my taking part in the study be kept confidential?

Yes. Transcriptions and interview transcriptions will be dealt with in strictest confidentiality and anonymised.

- What will happen to the results of the research study?

The results from this phase of the research will go on to inform the second phase, and will also contribute to our understanding of the role of outdoor activities in developing critical thinking.

- Who is organising and funding the research?

The research is part of my Doctorate in Education.

- Who may I contact for further information?

Rosemary Smith: rpowell2@uclan.ac.uk
or Candice Satchwell: csatchwell@uclan.ac.uk

Thank you for your interest in this research.

Consent form

Title of Project:
Building bridges between practice and theory. An investigation into the development and mobilisation of critical thinking skills in undergraduate students studying Outdoor related degrees.

Name of Researchers: Rosemary Smith

Please initial box

1. I confirm that I have read and understood the participant information sheet for the above study and have had the opportunity to ask questions. ☐
2. I understand that my educational entitlements and the assessment of my work will neither be affected by participation nor by non-participation/ withdrawal. ☐
3. I understand that any transcriptions or recordings will be securely and anonymously stored according to the requirements of the Data Protection Act. ☐
4. I agree to take part in the above study. ☐

Name of Participant	Date	Signature
_____	_____	_____
Name of Researcher	Date	Signature
_____	_____	_____

Thank you for taking part in this research. Please fill in the questionnaire and return to me either personally or by email. rpowell2@uclan.ac.uk[9]

[9] This was not included in the version of the consent form used for Phase 3

Appendix 3: Questionnaire used in Phase 2

Age	18-25	25-35	35-45	45+
Year	Year 1	Year 2	Year 3	Top up Blended
Course				
Sex	Female		Male	
How many years have you been taking part in outdoor activities?				
What are the main outdoor / adventure sports you take part in?				

Please give some details about the type of participation;	Student led by someone else / with friends / the leader / solo?	Any details about the type of participation eg; level; in Britain / overseas; indoor / outdoor; competition; off piste / on piste?	How much of your time is in this sport?	Do you hold qualifications in the sport?
Summer Hill walking / Mountaineering / trekking				
Rock Climbing				
Paddle sport; kayaking / canoeing				
Sail sports; windsurfing / sailing etc.				
Underground activities; caving / mining				
Winter mountaineering / climbing				
Skiing / Snowboarding				
Mountain biking				
Please add other activities				

Appendix 4: Information sheet, Phase 3

Phase 3

University of Central Lancashire

Building bridges between practice and theory. An investigation into the development and mobilisation of critical thinking skills in undergraduate students studying Outdoor related degrees.

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

- What is the purpose of the study?

The study aims to investigate the extent to which participation in outdoor activities can develop critical thinking skills in undergraduates. Also, it will consider the transferability of these skills from the students' experiences in outdoor activities to learning in the academic context.

- Why have I been invited to participate?

You have been invited to participate in phase two of the research because you are currently a student at UClan on an Outdoor related degree.

- What will happen to me if I take part?

You will be invited to take part in a focus group with other students from your course. During the session the group will be asked questions about their critical thinking development, and their thoughts on development and transferability of critical thinking. It is anticipated that the session would take no more than an hour, and will be recorded (voice only), and notes will be taken by the group and myself.

- What are the possible disadvantages and risks of taking part?

I do not consider that there are significant risks to taking part. Care will be taken to ensure confidentiality and your anonymity within the dissemination of research findings.

- What are the possible benefits of taking part?

You will be actively taking part in research, which may be of benefit to you in terms of designing your own research in the future.

- What if something goes wrong?

If something goes wrong or you become concerned, you may withdraw at any time. Also, you can contact me: rpowell2@uclan.ac.uk or you can contact my supervisor; Candice Satchwell; csatchwell@uclan.ac.uk

- Will my taking part in the study be kept confidential?

Yes. Transcriptions will be dealt with in strictest confidentiality and anonymised.

- What will happen to the results of the research study?

The results from this phase of the research will help to inform the previous phase, the hope being to contribute to our understanding of the development and transferability of critical thinking.

- Who is organising and funding the research?

The research is part of my Doctorate in Education.

- Who may I contact for further information?

Rosemary Smith: rpowell2@uclan.ac.uk
or Candice Satchwell: csatchwell@uclan.ac.uk

Thank you for your interest in this research.

Appendix 5: Information sheet, Phase 4

Phase 4

University of Central Lancashire

Building bridges between practice and theory. An investigation into the development and mobilisation of critical thinking skills in students studying Outdoor related degrees.

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

- What is the purpose of the study?

The study so far has investigated the extent to which participation in outdoor activities can develop critical thinking skills in undergraduates, and the potential transferability of these skills from the students' experiences in outdoor activities to learning in the academic context. This phase of the research aims to gather feedback on a conceptual model of critical thinking.

- Why have I been invited to participate?

You have been invited to participate in phase four of the research because you are currently a student at UCLan on an Outdoor related degree (undergraduate and post graduate).

- What will happen to me if I take part?

You will be invited to take part in a teaching session, during which you will be introduced to a model of critical thinking. This teaching session will last around 20 minutes.

After the session you will be asked to fill in a questionnaire that asks you to review the content of the teaching session, and to provide some feedback.

- What are the possible disadvantages and risks of taking part?

I do not consider that there are significant risks to taking part. Care will be taken to ensure confidentiality and your anonymity within the dissemination of research findings.

- What are the possible benefits of taking part?

You will be actively taking part in research, which may be of benefit to you in terms of designing your own research in the future.

The topic area is considered to be of relevance to both undergraduate and postgraduate students.

- What if something goes wrong?

If something goes wrong or you become concerned, you may withdraw at any time. Also, you can contact me: rpowell2@uclan.ac.uk or you can contact my supervisor; Candice Satchwell; csatchwell@uclan.ac.uk

- Will my taking part in the study be kept confidential?

Yes. Data from the questionnaires will be kept securely.

- What will happen to the results of the research study?

The results from this phase of the research will help to inform previous phases, the hope being to contribute to our understanding of the development and transferability of critical thinking.

- Who is organising and funding the research?

The research is part of my Doctorate in Education.

- Who may I contact for further information?

Rosemary Smith: rpowell2@uclan.ac.uk
or Candice Satchwell: csatchwell@uclan.ac.uk

Thank you for your interest in this research.

Appendix 6: Questionnaire used in Phase 4

Please only look at this side until after the teaching session

These questions (both pre and post session) relate to the topic area of the "outdoors"

<u>Pre-session:</u>

What understanding do you have of 'critical thinking'?

In academic work: None, poor, reasonable, good, very good, excellent

In practical work: None, poor, reasonable, good, very good, excellent

Post-session:

What understanding do you have of 'critical thinking'?

In academic work: None, poor, reasonable, good, very good, excellent

In practical work: None, poor, reasonable, good, very good, excellent

To what extent has the session helped your understanding?

Not at all, a little, quite a lot, a lot

Please give some feedback on the model and teaching session, with regard to:

- Your development and understanding of critical thinking

- Your thoughts on the transferability of critical thinking

- Was there anything in the session that you feel would be of benefit to your academic studies?

- Any other comments?