Developing ethical geography students? The impact and effectiveness of a tutorial based approach

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Abstract
This paper explores the effectiveness of a tutorial based approach in supporting the development of geography undergraduates' ethical thinking. It was found that overall the intervention had a statistically significant impact on students' ethical thinking scores as assessed using Clarkeburn *et al.'s* (2003) Meta-Ethical Questionnaire (MEQ). The initiative led to a convergence of scores, having a bigger impact on those who had a relatively low score prior to the intervention. Interestingly the approach had the biggest impact on students who self-identified as physical geographers. Unlike some previous research there was little evidence of difference between male and female students.

Key words:
ethics; tutorial; Meta-Ethical Questionnaire; gender; physical geography; human geography

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Introduction

> "Educators need to give greater attention to the teaching of ... ethics as part of our contribution to the education of responsible citizens." (Hay & Foley, 1998: 169)

As Hay & Foley (1998) argue, geography has long been a subject which engages with the wider community and teaches its students to recognise their impact on the world around them. Yet, over a decade on from their above call to focus upon how we teach ethics within the subject, Gannon (2014) and Boyd *et al.* (2008: 38) question the extent to which geography programmes produce graduates who are prepared "for practical and ethical engagement with their scholarly, professional and personal worlds." This paper attends to Hay & Foley's (1998) original argument by addressing this shortfall in preparing students for the wider world. It investigates the impact and effectiveness of a specific pedagogic strategy in engaging and developing critical thinking about ethics within a Single Honours Geography Programme at a post-92 UK University.

Ethical understanding for graduates is a broader concern beyond the geographical disciplines. It has become an increasingly important area internationally as universities have progressively focused upon defining the distinctive characteristics of their graduates (Barrie, 2004; 2006; 2007). Barrie (2004) identified 'Ethical, Social and Professional Understanding' as one of five key graduate attributes that universities promote, meaning that graduates should "hold personal values and beliefs consistent with their role as responsible members of local, national, international and professional communities" (Barrie, 2004: 270). However, Varsavsky *et al*. (2014: 946) argue that despite ethics being articulated as a graduate attribute, "not enough attention is being paid to ethics in the science curriculum". Escámez *et al.* (2008: 43) agree that the ability to think ethically is one of the most important generic skills for future graduates but feel current ethical teaching often leaves "students unarmed to cope with the frequent conflicts between ends, responsibilities, rights and duties that are bound to occur in their professional careers". Furthermore, learning to think through ethical issues develops critical thinking skills for dealing with 'supercomplexity', where "the very frameworks by which we orientate ourselves to the world are themselves contested" (Barnett, 2000: 257) and likely to change. For example, training students to be ethical researchers in practice must go alongside teaching them "reflective, self-critical methods that guide our moral decisions" (Turner, 2013: 399). Graduates need these skills in an uncertain world to enable them to negotiate increasingly dynamic and unpredictable professional and social lives.

Over the last decade public trust in business and, more recently, in politicians has eroded (Gao *et al.*, 2008; Ruhe & Lee, 2008; Carrell, 2009; Jukes, 2014). There is growing recognition that ethically and socially responsible behaviour plays a crucial role in good business practice (Nicholson & DeMoss, 2009), and that "moral meaning and agency are fundamental to the definition of professions" (Robinson, 2005: 2). In the wake of policy led attempts to 'professionalise' aspects of academic practice (for example Higher Education Academy 2006) there has been a renewed interest in the values that define academic life (Macfarlane & Cheug, 2008). Hargreaves (2008) argues that higher education in the UK aims to develop the intelligence and critical skills of undergraduates. To achieve this aim a commitment to critical thinking about ethics is essential. Moreover, it is within the environment of universities where students may first learn about the realities of citizenship and test its moral boundaries (Bruhn, 2008), exploring the nature of social responsibility (Vujakovic & Bullard, 2001) and develop the skills which, at best, could contribute towards transforming society for the better (Wellens *et al.*, 2006).

Ethical thinking

The type of applied ethics explored in this project concerns ethical ways of thinking, as opposed to higher levels of conceptual ethics or theorization (Boyd *et al.*, 2008). The Collins English Dictionary (Hanks, 1979: 502) states that to be ethical is to act "in accordance with the principles of conduct that are considered correct". However, these principles vary according to what a person values, may relate to social, religious, or civil beliefs and may be that of a particular group or profession. In order to think ethically it is necessary to understand what your 'code of behaviour' is based upon and to recognise and accept that other people's beliefs, and hence their codes of behaviour, may be different. This goes beyond making explicit the values that underlie personal behaviour to assess the extent to which they influence your well-being and that of others, as would be attempted in values education (Mondal, 2015). Rather, in learning to think ethically, students need to engage in *critical thinking* about the issues concerned rather than just following prescribed ethical codes. Broadly speaking, critical thinking is understood here as "the identification and evaluation of evidence to guide decision making" (Critical Thinking Co., 2011: no page). Critical thinking covers a range of skills including analysis, interpretation, inference, explanation, and evaluation (Facione, 2000). Through using these skills students may monitor and, where appropriate, reassess their own reasoning, meaning that critical thinking is about "judging in a reflective way what to do or what to believe" (Facione, 2000: 61). This is essential when responding to ethical issues where there are no clear right or wrong responses, and where an individual's code of behaviour is based upon a range of factors personal to them. This research has therefore adopted a practical, active method of teaching and learning to address ethical issues which involves two main critical thinking elements: 1) reflection upon one's own and other's principles and how these underlie their codes of behaviour; and 2) critical analysis, interpretation, inference, explanation and evaluation of ethical issues whilst recognising that such processes are situated within the lens of the individual's code of behaviour. We consider this to be *ethical thinking*.

For many students, their contact with ethics relates primarily to the ethics of undertaking research (Boyd *et al.*, 2008) rather than consolidating "a sense of responsibility toward common good expressed through civic ethics" (Escámez *et al.*, 2008: 43). Going through ethical clearance procedures has in many cases become relatively mechanistic, after which students may give ethics little further consideration. Teaching in this way suggests that once through the research ethical procedures, students may feel that they no longer have to think ethically (Kearns *et al.*, 1998). This highlights the distinction between teaching about how to think through ethical issues and teaching about ethical process. In most universities teaching about ethical processes is necessary in order to enable students to progress with research projects such as their undergraduate dissertations. However, the aim in teaching ethics should not just be for students to comply with ethical procedures but more to meet "the far more creative challenge of teaching ethical engagement" (Howitt, 2005: 320). Here we are interested in the broader skill of *thinking* ethically in all parts of their academic and professional lives, not just in research. This does not involve teaching prescriptive ethics; rather the focus is upon teaching students to consider ethical issues critically (Hay & Foley, 1998; Smith, 1995). This means developing an ethics education which is not structured around a set of 'rules' for moral behaviour (Hay & Foley, 1998), but which emphasises the significance of ethical consciousness in autonomous individuals (Hay, 1998). This form of teaching supports individuals to become ethically accountable for their own choices and actions whilst situating them within a supportive ethical community.

It is recognised that the character of an individual influences the development of ethical thinking. For example, a range of studies using different assessment mechanisms, have found that female students tend to be more ethical than their male counterparts (Whipple & Swords, 1992; Barnett & Brown, 1994; Tse & Au, 1997; Persons, 2009; Donoho *et al.*, 2012). This has led authors to argue that women may be predisposed to support ethical positions more strongly as a consequence of their conditioning as caregivers (Ludlum & Mascaloinov, 2004). However, there are anomalies away from, and nuances within, this

general trend, with some studies finding no significant difference between men and women when investigating their perceptions about ethics (Kelger, 2011). Research by Phau & Kea (2007) in Singapore, Hong Kong and Australia generally found males to be more ethical than females. These different outcomes may relate to the significant challenges of measuring what it means to be ethical. It may also relate to the location of the research. For example, many of the studies where females were found to be more ethical than males were conducted in North America, which might be connected to cultural upbringing and background. However, even in the US the male/female differences found in some studies have only been very slight (Ludlum & Mascaloinov, 2004). Furthermore, Peterson *et al.* (2001) found that the ethical views of men tended to become more aligned with women's as they aged.

Ethics in Geography Higher Education
Smith (1995) argues that moral issues are often marginalised within contemporary education, and that the discipline of geography is particularly well positioned to address this deficiency. Geography deals with many "inherently controversial subjects, from population control to environmental change" (Vujakovic & Bullard, 2001: 276), providing a significant range of contemporary topics in which to situate ethical discussion. For example, 'sustainable development', a contested concept that underpins many contemporary geographical debates, is replete with ethical questions. An additional advantage of focusing on geography is that it crosses the pure and social sciences (and some of the arts). This enables exploration of teaching approaches that have potential for application in a wide range of different disciplines (Escámez *et al.*, 2008).

The UK Geography Benchmark Statement claims that
> "Geography fosters a range of personal attributes relevant to the world beyond higher education, which promote the ability of geographers to engage in lifelong learning, to consider ethics and values, to contribute to the wider community, and to gain employment" (QAA, 2014: 7).

It goes on to emphasise the need to teach students "the moral, ethical and safety issues involved in all aspects of geographical enquiry" (QAA, 2014: 12). Similarly, Whalley *et al*. (2011) stress the need for these skills to be embedded into a 21st Century Higher Education Geography curricula. However, what is not considered are the potential differences between human and physical geography[1]. Smith (1995) argues that physical geography topics such as resource utilisation and environmental protection contain aspects of moral deliberation. Yet, wider everyday ethical issues are not always seen as the remit of physical geography, with some potentially considering these as a separate dimension of life that does not influence their everyday academic practice (Smith, 1995). Many other ethical issues and debates fit more naturally within human geography subject material as it analyses human behaviour and relationships. This includes developing sensitivity towards how social worlds are constructed, and critically analysing the production and consequences of these social and cultural environments (Kearns *et al.*, 1998). Consequently, human and physical geography students are likely to be exposed to different opportunities to learn how to think through ethical issues and may respond differently when confronted by them.

This project develops the research field by proposing a strategy for the development of ethical teaching and thinking within an undergraduate BSc geography programme which includes elements of both human and physical geography for all students. The next section explains the intervention and the method used to assess its impact. This is followed by the analysis of the findings exploring the impact overall, by discipline preference and by gender.

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    Physical and human geography as classified here are based on prior student experience at A-Level and how the BSc programme is constructed. These are classified as distinct from environmental geographers who work more closely with the human-environment interface.

Intervention and Research Method

In 2010-11 a new activity based on ethical scenarios was integrated into the existing second year undergraduate Tutorials module. Scenarios are a common mechanism used to teach ethics in higher education (Smith *et al.*, 2004). Tutorial groups of 6-7 students are formed at the start of the year and meet every two weeks. Each group is allocated the same tutor throughout and it is their role to facilitate reflection and focused inquiry (Hay & Foley, 1998), based around selected readings and a question brief provided in advance. There is an emphasis on debate and, at their most effective, exposure to a diversity of attitudes (Prager, 1993). In general terms, the module content focuses on the history and development of geography as an academic discipline, its role in contemporary society, and the knowledge and skills that make geography and geographers distinctive. Each tutorial is assessed using detailed marking criteria provided to students and tutors at the start of the module.

The 'ethical student' strand was added to this existing pattern of activities in the module and students were provided with an ethical scenario at roughly two week intervals, to consider and decide on the course of action that they would take in the circumstances described. The students were encouraged to use a standard reflection sheet to record their thoughts in relation to each scenario focusing, in particular, on their final decision, the rationale for it, and the degree of challenge that the scenario offered to them (Figure 1). In due course, these notes formed the basis of the assessed discussion in the final tutorial.

[Figure 1 inserted here]

A total of eight scenarios were devised and provided to the students and it was decided that if a broad understanding of the importance of ethical decision-making was to be achieved, then the scenarios would need to embrace not only academic problems, but those that might be experienced in the social and professional lives of students too. Table 1 provides a brief summary of each scenario and Figure 2 plots them on to these three dimensions of student life, showing that often the scenarios deliberately encouraged consideration of the possible tensions between these different 'worlds'. Furthermore, it was intended that the scenarios would display two other features: chronology and progression. The number of each scenario illustrates the order in which they were given to the students. The first scenario was situated close to the start of the first year at university moving forward in time to finish with a work placement-based dilemma towards the end of their second year at university. Additionally, it was intended that the scenarios would gradually display a greater degree of challenge in terms of, for example, the range of issues that might have to be considered.

Table 1: Scenario Summaries

Scenario	Summary
1. Lending lecture notes to a new 'friend' who had not been attending sessions	In the first few weeks at university you have an essay due. Another student who hasn't been attending lectures wants to borrow your lecture notes to help them with the assignment. You have heard that they've borrowed someone else's notes before and not returned them. What would you do?
2. Problems in group work for an assignment	You are working in a group of four to produce a poster. You've met with two of the group members regularly, but it has been difficult to arrange a meeting with everyone as the fourth person doesn't live in the local area so has only attended one meeting. The fourth person offered to work separately but the other two members felt that this was unfair. Since then the fourth person has done very little. Now the poster is finished the other two members think that this person should be marked down for the lack of work on the poster. What would you do?

3. Finding a future exam paper	You find an exam paper dated for the upcoming summer exams between two hand-outs. The exam is for a module in the department that one of your housemates is taking. You have heard rumours that the assessment and feedback for this module has been poor and the tutor inaccessible. Despite working hard it looks like your housemate will fail the module. What would you do?
4. Fabricating primary fieldwork data after methodological error	Your group are working with other groups to collect primary data on a field trip. At the end of the day you realise that you've collected your sample from the wrong location. Back in the lab your group is the last to analyse your sample. By this time, all the other group members have entered their figures into a spreadsheet and you see a clear trend in the data. Your group's findings and the wider project for that day are in danger of being undermined. You note that it's relatively easy to predict what the results from your sample would show if they had been collected correctly. What would you do?
5. Someone appears to be cheating in an exam	During your first exam of the year you are distracted by a nearby person who appeared to pull out a small piece of paper from their pocket and hide it under the question paper. None of the invigilators appeared to have noticed. Inevitably, you wondered if this person had been cheating, but couldn't be sure. In your second exam, once again, you became suspicious that the same person was cheating in the same way as before. There are three more exams to go. What would you do?
6. Choice between two jobs in different organisations and with varying pay	It's the beginning of your second year of university and you need paid employment. You have been offered two jobs for the same number of hours each week. Job A is with a large, multinational, retail chain. The company is very successful and very well known, although it has regularly been in the news due to worker exploitation in the manufacturing process. Job B is with a much smaller, single shop, business, in the city centre, which has just begun trading. The shop places particular emphasis on the sale of sustainably sourced products. Job A is currently offering a third more money than Job B. However Job B offers opportunities for increased responsibility and is more interesting to you. What would you do?
7a. Discovery of a Facebook site criticising boss	You decide to take Job A. Two of the people you work with are also students, one in the same Department as you. They've all worked at the shop longer than you and seem to have some 'history' with your manager. You overhear them talking about a Facebook group which has been set up, seemingly with the intention of ridiculing the manager. You find the site online, which includes degrading comments and edited photographs making fun of the manager. From what you know of your manager you doubt that they are aware of the Facebook group. What would you do?
7b. Accidentally over-charging a customer at work	You decide to take Job B. Just recently, you overheard a conversation suggesting that the shop might be struggling financially. When reviewing the takings at the end of a working day, you realise that you over-charged a couple for a painting by £150. You immediately think back to the people who bought the artwork. They were pleasant, friendly, seemed very affluent, and

	were visitors to the city You have their contact details for the purposes of delivery. What would you do?
8. Problematic research findings during a work placement	The University has organised a placement for you with a private environmental consultancy which is analysing pollutant levels in river water. You are working on a project which monitors whether farming activities are adhering to the standards outlined for this environmentally sensitive region. The work involves collecting repeated water quality samples from prescribed locations. At the end of the placement, there will be a formal meeting between all the key stakeholders at which you will present your findings. The data analysis shows that pollutant levels in some streams are appreciably above the recommended levels. In the absence of other potential sources of pollution, three farms in particular appear to be the source of the poor water quality. You are aware that Natural England tends to impose quite severe financial penalties on offending farmers when pollutant levels exceed the maximum threshold. However you have got to know some of the farmers personally during your placement and are aware of the particularly difficult financial situation several of the farms are in. What would you do?

The process of devising the scenarios posed some interesting challenges (see Authors, *in progress*). The primary goal was to encourage reflection on ethical issues but, in the process, there is the danger of choosing topics that might make some students uncomfortable, in turn undermining engagement. Ethical scenarios were constructed which, as far as the tutors knew, did not represent any direct experiences of students taking the module. However, there are clearly limits to the knowledge of the tutors in this respect. The intention to make the scenarios appear realistic was sometimes challenging. Although firmly situated within aspects of student life and often associated with academic study in some way, the scenarios may not appear realistic if they do not resonate in some way with a student's specific past or current experience or those of their peer group. Furthermore, in endeavouring to construct scenarios of growing complexity, perceived realism might be undermined as one difficulty is layered upon another and events 'conspire against' the student. Additionally, in terms of progression, what might appear an ethical problem from a tutor's point of view may not be problematic to some students, and vice versa. In other words, overall there is a danger of imposing tutor perspectives about realism and difficulty, filtered through their own values and life experiences, on to the students.

[Figure 2 inserted here]

After the first year of this intervention minor changes were made to the detail of some of the scenarios but the structure and mechanisms of the intervention remained the same.

Overall the marks for the ethics tutorial showed the highest average each year, all in the 2.1 category (63% 2010-11; 63% 2011-12; 62% 2012-13). The sustained high average mark shows that there was a comfortable fit with both learners and the marking criteria.   . The topic enables students to present an argument for a particular perspective and to discuss and debate alternative choices or rationales with one another. The higher average marks may also relate to this being the final tutorial of the year meaning that students have had time to develop their oral skills and as such were likely to do better in the any tutorial topic towards the end of the year.

Generally the ethical strand of the tutorials module has proven to be relatively popular with the students. When asked to identify which tutorial they found most interesting and which tutorial they found least interesting in the end of module evaluation form, the ethics tutorial

has consistently been ranked either the most interesting or the second most interesting. It is however important to note here that the response rate to the end of module evaluation for this module is traditionally relatively low and so these rankings may not be representative of the broader class.

Student assessment performance and end of module feedback indicate some encouraging trends, but a more in-depth evaluation of the impact of this initiative was needed in order to understand the influence of the tutorial strand on students' construction of 'ethical reality'. Therefore Clarkeburn *et al*.'s (2003) concept of 'meta-ethical development' was adopted. This describes how students construct ethical realities, for example how students interpret the nature of ethical properties, attitudes and judgements. Pre- and post-experience questionnaires were collected over three academic years. The students participating in the Tutorials module were asked to complete a questionnaire at the beginning of the year and then again after they had completed the module. The questionnaire assessed their level of ethical development through Clarkeburn *et al.*'s (2003) Meta-ethical Questionnaire (MEQ). Such ethical development occurs within five elements:
1. The source and type of moral answers
2. The role of authority
3. The nature of multiplicity
4. Personal responsibility and relationship with multiplicity
5. The purpose of moral discussions

Student's development in these elements may not be synchronised, it is possible for a student to progress in one element but not another (Clarkeburn *et al*., 2003). This tool was rigorously developed and tested with a cohort of 478 Life Studies students at the University of Glasgow and the findings published in *Studies in Higher Education* (Clarkeburn *et al.*, 2003). The MEQ assessed how students constructed ethical reality, by asking them to respond to 10 paired statements. For each pair of statements students were required to position themselves along a 5 point continuum between the two statements (see Table 2 for an example). Following Clarkeburn *et al.* (2003) each student received an overall ethical score. The score was calculated using the following weightings for each question response: A=1, Ab=4, B=9, Cb=16, C=25 (Table 2). The responses to all the 10 questions were totalled and then averaged. Students who received higher scores are considered to demonstrate greater understanding of the complexity, uncertainty, variability and contingent nature of ethical issues. They also tend towards greater self-awareness, openness to other perspectives and taking ownership of their decisions. An anonymous PIN system allowed the tracking of responses between the pre and post intervention surveys.

Table 2: Meta-ethical Questionnaire response options and an example paired statement

	Definitely my opinion	More or less what I believe	Neither statement represents my view	More or less what I believe	Definitely my opinion	
Statement Type A: Moral questions have absolutely right answers.	A	Ab	B	Cb	C	**Statement Type C:** There are very few absolutely right answers in the world and answers to moral questions are not one of them.

Impact of the introduction of ethics tutorials

From 2010-2013, 97 students took the second year Tutorials module with 90 students opting to participate in the research. This article focuses on 67 responses (97% 21 or under, 100% UK nationals, 100% full-time students). The smaller number of responses reflects filtering for three reasons: 1) the questionnaire was not completed both before and after the tutorials intervention (11 respondents); 2) the response did not pass Clarkeburn *et al.*'s (2003) internal validity check on either the pre or post questionnaire (11 respondents)[2]; and 3) the respondent did not complete the MEQ questionnaire in its entirety (1 respondent). This small sample size reduces the potential for broad generalisations from the data. The data was analysed for reliability using Cronbach's alpha (pre-questionnaire $\alpha = 0.647$; post questionnaire $\alpha = 0.625$) which are considered to be acceptable reliability scores (Götz *et al.*, 2010).

Across the three years the results showed an overall increase in the ethical score of the students, with the mean rising from 14.08 to 15.53 (Table 3). The Wilcoxon Matched Pairs Test was used to compare the pre- and post-tutorials score for each student. This is a standard test to utilise when studying the difference between paired, non-normally distributed data (Kitchen and Tate, 2000). The analysis showed a statistically significant difference between the MEQ results of the 67 students before and after the tutorials module (Table 3). 47 students (70%) moved to a higher ethical score between surveys, 18 students (27%) moved to a lower ethical score, and 2 students (3%) stayed the same. This suggests that the majority of students have experienced some development of their ethical thinking. A closer analysis revealed that the mean ethical scores increased for all three years and that these differences were statistically significant for two out of the three years (Table 3).

Table 3: Pre and post-tutorials questionnaires (2010-2013): Summary

	Mean ethical score Pre-tutorials	Mean ethical score Post-tutorials	Difference	Significant difference (Wilcoxon test at 0.05)
2010-11 (n=24)	13.18	15.13	+1.95	✓ (.003)
2011-12 (n=15)	14.23	16.61	+2.38	✓ (.022)
2012-13 (n=28)	14.76	15.29	+0.53	✗ (.311)
All (n=67)	14.08	15.53	+1.45	✓ (.001)

Elements analysis
The ten statements in the MEQ are divided between five 'elements', which assess different types of ethical development (Clarkeburn *et al.*, 2003):
1. The source and type of moral answers
2. The role of authority
3. The nature of multiplicity
4. Personal responsibility and relationship with multiplicity
5. The purpose of moral discussions

A Wilcoxon analysis of the difference between student scores for each of the different elements indicates that three out of the five showed a significant degree of change between the beginning and end of the module (Table 4).

Table 4: Breakdown by elements (n=67)

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Two statements addressing the purpose of ethical discussion were essentially the same statement worded differently. If there was more than one step difference in a student's response to these two statement pairs, the response was considered invalid (Clarkeburn *et al.*, 2003).

	Pre-tutorials mean	Post-tutorials mean	Difference	Significant difference, Wilcoxon, 0.05
Element 1 - Source and type of moral answers	14.7	17.7	+3.0	✔ (.000)
Element 2 - Role of authority	16.1	15.2	-0.9	✘ (.541)
Element 3 - Nature of multiplicity	11.5	12.6	+1.1	✘ (.365)
Element 4 - Personal responsibility and relationship with multiplicity	12.5	14.6	+2.1	✔ (.000)
Element 5 - Purpose of moral discussions	15.8	17.9	+2.1	✔ (.000)

Element 2 is the only element whereby the average ethical score decreased (-0.9). This may be due to the assessed nature of the intervention. The score for Element 2 is based on one set of statements: 'I don't think teachers should assess my moral arguments if they do not know the right answers yet' and 'It is important that teachers assessing moral arguments look for logical structure and good reasoning rather than a particular answer'. Student responses to the survey may have been influenced by the fact that each tutorial is assessed. Even though it was made explicit to the students that their specific choices within the scenarios were not being judged, and that rather it was their explanations as to why they had made such decisions that were being assessed, students may still have felt that there was a 'right' response and as such looked to their tutor to find out what it might be. This seeming lack of comfort with the possibility of multiple 'correct' responses is also reflected in the mean for Element 3. This element showed the lowest score both before and after the tutorials intervention and showed a non-statistically significant increase of 1.1. The ability to consider multiple different factors within a given situation and make a decision having weighed up the potential consequences in relation to each factor is a life skill. The relative lack of comfort with multiplicity may relate to the age of the majority of the participants (97% of all of the participants were 21 and under), and their relatively limited life experience. This may also reflect the point at which these students were within their degree programme. As they go on to conduct large scale individual research projects (their undergraduate dissertations), alongside more challenging and varied content modules in the final year of their degree, they may increasingly recognise the nature of multiplicity within the subject area. Once they are recognising this within the content of the subject they have a greater chance of being able to apply it to ethical issues.

Geographical interest
Overall these results suggest that the intervention has had some impact on the ethical thinking skills of students. This raises the question as to the impact it had on students with different geographical interests – for example if they identified as physical or human geographers. The questionnaire asked students to indicate one of three preferences: 'Geography as a whole'; 'Mainly human geography' and 'Mainly physical geography'. For 46 students, these preferences remained constant between the beginning and end of the module but, inevitably, some students (21) recorded changes as their academic identities and interests developed during their second year of study. These changes also increased the range of analyses that could be completed. Such changes themselves are not the focus of this research, rather in order to make claims about differences in ethical thinking by subject preference it is important to analyse how students considered themselves both at the beginning and end of the academic year. This analysis indicates that whether the pre or post module geographical preference is used as the basis for analysis, clear common trends emerge in the results.

Firstly, the analysis was based on the students' stated geographical preference at the time of completing the two questionnaires. Table 5 shows that the mean ethical scores for the three categories increased. For those who selected physical geography as their main interest, the increase in the average mean was the highest (+2.05), which is also the only one of the

three subject categories which showed a statistically significant change over the course of the module. Kruskal Wallis was used to assess differences in the ethical scores between the three categories both before and after the tutorials intervention, showing that there was a statistically significant difference before the tutorial intervention, but not afterwards between the different sub-disciplines (Table 5). The means suggest that those students who identified 'mainly human geography' as their predominant interests before the intervention had the highest level of ethical development (15.81) and those who identified 'mainly physical geography' as their predominant interest had the lowest level of ethical development (13.15). Although the ranking of the ethical scores post the intervention remains the same 1) human geography, 2) geography as a whole, 3) physical geography), there is no longer a statistically significant difference between the different subject areas. This suggests that the intervention has brought the students closer together in their understanding and critical analysis of ethical issues rather than developing all of the students thinking about ethics to a similar extent.

Table 5: Sub-discipline preference and mean ethical scores

	Mean ethical score Pre-tutorials	Mean ethical score Post-tutorials	Difference	Significant difference (Mann Whitney test at 0.05)
Geography as a whole	14.16 (n=22)	14.94 (n=14)	+0.78	✖ (.470)
Mainly human geography	15.81 (n=15)	16.35 (n=22)	+0.54	✖ (.400)
Mainly physical geography	13.15 (n=30)	15.20 (n=31)	+2.05	✔ (.011)
				Significant difference (Kruskal Wallis test at 0.05)
Pre: Significant difference in ethical scores between the three subject preference categories?				✔ (.005)
Post: Significant difference in ethical scores between the three subject preference categories?				✖ (.298)

The second analysis between sub-discipline preferences explores the differences in students' ethical scores based on i) the geographical interest they selected in the first questionnaire (Table 6) and the ii) geographical interested they selected in the second questionnaire[3] (Table 7). As above all of the ethical scores increased, but it was only those students who originally or finally selected 'mainly physical geography' for whom there was a statistically significant difference in their scores pre and post the tutorials intervention. These differences may relate to the nature of the different sub-disciplines. Human geographers more often deal with opinion and perspective as part of their subject material, potentially making them predisposed to recognising the greater complexity and subjectivity of ethical issues than physical geographers who more often work with more objective data (Kearns *et al.*, 1998). Alongside this, the ethical issues students with a preference for physical geography have experienced maybe narrower. Primary data collection in physical geography often lacks interaction with people meaning that the ethical issues students face maybe restricted to limiting environmental damage. This reduces opportunities for students with preferences in this area to engage with a wider range of ethical issues. However, the differences in the findings may also relate to a higher number of students selecting mainly physical geography as their preferred geographical area and therefore potentially a wider range of abilities within this group of students.

Table 6: Pre tutorial survey sub-discipline preference and mean ethical scores

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[3]

As some students' preferences changed over the course of the year we have analysed the changes in ethical score based on both their stated preference at the beginning of the module and their preference at the end.

	Mean ethical score Pre-tutorials	Mean ethical score Post-tutorials	Difference	Significant difference (Wilcoxon test at 0.05)
Geography as a whole	14.16 (n=22)	15.37 (n=22)	+1.21	✗ (.106)
Mainly human geography	15.81 (n=15)	16.51 (n=15)	+0.70	✗ (.099)
Mainly physical geography	13.15 (n=30)	15.16 (n=30)	+2.01	✓ (.009)
				Significant difference (Kruskal Wallis test at 0.05)
Pre: Significant difference in ethical scores between the three subject preference categories?				✓ (.005)
Post: Significant difference in ethical scores between the three subject preference categories?				✗ (.408)

Table 7: Post tutorials survey sub-discipline preference and mean ethical scores

	Mean ethical score Pre-tutorials	Mean ethical score Post-tutorials	Difference	Significant difference (Wilcoxon test at 0.05)
Geography as a whole	13.79 (n=14)	14.94 (n=14)	+1.15	✗ (.108)
Mainly human geography	15.95 (n=22)	16.35 (n=22)	+0.40	✗ (.217)
Mainly physical geography	12.88 (n=31)	15.21 (n=31)	+2.33	✓ (.003)
				Significant difference (Kruskal Wallis test at 0.05)
Pre: Significant difference in ethical scores between the three subject preference categories?				✓ (.000)
Post: Significant difference in ethical scores between the three subject preference categories?				✗ (.298)

Gender

An analysis of the ethical scores by gender reveals that, although the male students' ethical scores were slightly higher than the female students' both before and after the intervention, these differences were not statistically significant (Table 8). This finding supports studies which suggest that there is relatively little differences between male and female ethical development (Ludlum & Mascaloinov, 2004; Kelger, 2011). In terms of change over time, for both genders the mean ethical score moved upwards with the increase for male students showing a statistically significant difference. An analysis of gender and geographical preference indicates that a similar percentage of males (pre: 42.9%, post: 50.0%) and females (pre: 44.4%, post: 44.4%) identified mainly physical geography as their preference both before and after the tutorial intervention (Table 9). This suggests that the differences in gender are not just picking up the differences identified between physical and human geographers above. We can therefore argue that the ethical tutorials strand had a significant impact on male students.

Table 8: Gender and mean ethical scores

	Mean ethical score Pre-tutorials	Mean ethical score Post-tutorials	Difference	Significant difference (Wilcoxon test at 0.05)
Male (n=41)	14.14	15.73	+1.59	✓ (.002)
Female (n=26)	13.98	15.21	+1.23	✗ (.079)
				Significant difference (Mann Whitney test at 0.05)
Pre: Significant difference between male and female ethical scores?				✗ (.733)
Post: Significant difference between male and female ethical scores?				✗ (.361)

Table 9: Gender and geographical preference

	Pre (67)						Post (67)					
	Male			Female			Male			Female		
	No	% ALL	% MALES	No	% ALL	% FEMALES	No	% ALL	% MALES	No	% ALL	% FEMALES
Geography as a whole	11	16.4	26.8	11	16.4	42.3	9	13.4	22.0	7	10.4	26.9
Mainly physical geography	18	26.9	43.9	12	17.9	46.2	21	31.3	51.2	12	17.9	46.2
Mainly human geography	12	17.9	29.3	3	4.5	11.5	11	16.4	26.8	7	10.4	26.9
Total	41	61.2	100.0	26	38.8	100.0	41	61.2	100.0	26	38.8	100.0

Discussion

The ethical strand within the Tutorials module appears to have had a significant impact on particular students. The key finding relates to differences between the physical and human geography students. The significant difference between the subject preference areas prior to the intervention supports the argument that that physical and human geography students are exposed to different opportunities to learn how to think through ethical issues and therefore respond differently when confronted by them (Smith, 1995; Kearns et al., 1998). However, the findings indicate that the ethical strand had the greatest impact on physical geography students, reducing the gap between the different subject preferences so that it was no longer significant.

In contrast to a range of studies (Whipple & Swords, 1992; Barnett & Brown, 1994; Tse & Au, 1997; Persons, 2009; Donoho et al., 2012), this research found the mean ethical scores of the male participants to be slightly higher than their female counterparts. However, in line with the findings of Ludlum & Mascaloinov (2004), the overall differences between the genders was marginal. This challenges the assumption that women are predisposed to ethical thinking as a consequence of their conditioning as caregivers (Ludlum & Mascaloinov, 2004). Taking both the gender findings and the geographical preference findings together we can argue that the main beneficiaries of the ethical strand were male physical geographers.

For a large number of students, their consideration of ethics relates primarily to the ethics of research (Boyd et al. 2008). The ethical strand of the Tutorials module has addressed Howitt's (2005) call to introduce students to a wider engagement with ethical issues and decision making. However, whilst the current tutorial assessment mechanisms have avoided teaching prescriptive ethics and focused on teaching students to consider ethics critically (Hay & Foley, 1998; Smith, 1995) they have emphasised the lecturer's authority. Within this model students appear to have difficulty recognising the validity of their views and therefore are not entirely autonomous individuals. This lack of confidence is a common issue amongst students.

This research can inform future teaching practice in relation to ethical thinking. Firstly, geography needs to consider ways to support students' understanding about the role of authority in relation to ethical decision making. The developing discussions around partnership (HEA, 2014; Healey et al., 2014; Cook-Sather et al., 2014) and inclusive partnership (Moore-Cherry et al., 2015) offer avenues for developing a positive reinforcement cycle in which students build confidence, take ownership, develop trust and respect and form an academic identity (Moore-Cherry et al., 2015). Central to this is a supportive and inclusive learning environment based on non-dismissive, mutual feedback from both peers and tutors. Students need to feel that they can be as authoritative as their tutors when it comes to ethical decision making. A key area in addressing this is to further support students to recognise the importance of the rationale for their decision rather than feeling that the decision itself should be 'correct'. A learning strategy that embraces this and

places a greater role on the students to take charge of the discussion is more structured debate. Healey (2012) has argued how debate can support the development of critical thinking skills. This may create a 'social learning experience' as students work together to prepare for and 'compete' in the debate; an 'active learning experience' as students learn through the activity of the debate; and a 'creative learning experience' as students design the focus of the debate, decide on the materials to be used and construct question(s) for the debate (Hall, 2010).

Secondly, we need to continue to support physical geography students to engage with ethical thinking. Significantly it is important that these students recognise the relevance of ethics to their sub-discipline. Practically this involves not only flagging ethics up at particular points within physical geography content, but embedding and integrating the principles of ethical thinking throughout the physical side of the discipline as well as the human. Until those students who are most unconvinced that ethics is a part of geography begin to understand the relevance, then the basic requirement of recognising ethical issues will still be wanting.

Finally, we need to develop further ways of supporting all students to deal with the nature of multiplicity when it comes to considering ethical issues. The consideration of multiplicity may be a skill that develops into the final year of the undergraduate programme, particularly when it comes to designing and undertaking a dissertation in which students are often managing a wide variety of issues at one time. Students then require support to apply this skill to ethical issues.

Conclusions
The tutorials intervention is built upon the critical thinking approach to ethics. It has encouraged students to reflect upon their own position in relation to their code of behaviour and supported them in taking a critical approach to a series of ethical scenarios. As the findings indicate overall this has been an effective mechanism to teach ethical thinking skills over the three academic years, evidenced primarily through the increase in the ethical scores of individuals. The discussion of ethical scenarios have been particularly effective for those students who expressed a preference for physical geography, which may be because they had less experience of applying their critical thinking skills in this manner prior to participating. There was little evidence of difference between male and female students. However, male participants benefited more from the experience of this module with their scores significantly increasing from the beginning to the end of the module. Overall, the tutorials intervention appears to have had a bigger impact on those students who began the module with relatively low ethical scores and therefore the ethical scores show more convergence at the end of the module compared to the start.

The model of using ethical scenarios here is transferable to other disciplines with only minor adjustments, given that it generally focused upon ethical issues relevant to all students, not just geographers. The effectiveness of this tutorial discussion based approach engages students in ethical thinking developing both their ethical decision making and critical thinking skills, whilst simultaneously preparing them for the super-complex worlds (Barnett, 2000) that they face upon graduation.

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