Developing, enhancing and sustaining research skills in a diverse population of students undertaking a Masters in Public Health: an action research study

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Abstract:

Within UK Higher Education, strategies to improve teaching and learning have persistently remained high on the agenda. When the Public Health Masters was launched it became apparent that some students arrive with a limited knowledge and understanding of key research skills. With the marked increase in the recruitment of international students, and the perception that this student population faced additional challenges, it became increasingly clear that we needed to explore the nature of our student population and the interaction between student and teacher in more detail. Only after exploring what our students expected from us, and the course, could we evaluate our pedagogy and practice in relation to the development of Master's level research and evaluation skills. An Action Research approach was taken. Participants (n=169) are all students undertaking a taught or online Masters in Public Health in a UK University. Demographic data gathered; highest qualification on entry, mode of learning, status of student (international or home), and prior research experience. Student perception of research knowledge was gained on starting and completing the course. Teaching and learning strategies were evaluated. Assessment grades were used as an outcome measure. Findings challenge our perceptions and the possible reasons for this are explored. Changes to pedagogy and practice are examined; future challenges identified and implications for the University's post graduate curriculum framework and recruitment strategies are explored.

Key Words: Internationalisation; Master's level research skills; curriculum

Introduction

The Dearing Report (1997) identified that HE in the UK needs to be "*at the leading edge of world practice in effective learning and teaching*". Just under 10 years later, in 2006, The Prime Minister's Initiative for International Education (PMI2) echoed this sentiment. This 5 year strategy set out to "*secure the UK's position as a leader in international education*" and stated that in order to do this it is imperative that we maintain our reputation within the international arena (PMI2 2006). Although exact figures are difficult to determine, the British Council figures indicate that there are over half a million international students studying within the UK (Pont 2009). This figure suggests that the UK is closing in on the United States of America – the world leader in international student recruitment. Twitchell (2004) identifies that in the USA 'Higher Ed, Inc.' is a multi-billion dollar business that is "bigger than religion and much bigger than art" (p47). Indeed, the University of Bedfordshire (UoB) has seen a rapid expansion of the enrolment of postgraduate students and in the 5 year period between 2004 and 2009 report an 11% increase in the number of EU students and a 33% increase in non-EU students (Atlay et al 2010). However, the growth in internationalisation is not without problems. In the UK it has led higher education institutions (HEIs) to question whether the predominantly 'white and Eurocentric' curriculum fails to characterize the diversity of cultures in the UK today (Open University Curriculum Planning Group 2000 cited by Haigh 2008). Haigh (2008) contends that international students are 'dumped' into an educational system that is geared to meet the needs of home students. He further suggests that international students are disadvantaged by a system that assumes an understanding of local knowledge and conventions of teaching, learning and language. A system, Maguire (2001) advocates that even students from non-traditional backgrounds can struggle with. Stier (2003) identifies that for many students studying in an educational system that is unfamiliar to them requires greater effort because they have to cope with such things as varying teaching styles, mutual expectations (in terms of being autonomous learners), and unfamiliar assessments methods. Indeed, this does seem to be something that is supported by our diverse student population. One of our international student recorded in his reflective blog "*hmmm...I hope I can handle all these [units] ??? quite different, the method of study here, assignments and all as compared to practicals and exams in Nigeria*". As a consequence it is now commonly accepted that if internationalisation is to be successful, HEIs must re-evaluate and adapt their pedagogy

and practice in order to ensure there is constructive alignment between their educational mission, financial goals and management structures (Haigh 2008).

Literature Review

Strategies to improve teaching and learning within UK HE are many and varied and remain high on the agenda and academics in HE are now working in a rapidly changing environment. Fanghanel (2007) argues that:

> "…*in a context of increased massification, teaching has become an activity at the same time more complex (directed at an increasingly diverse body of students in increasingly 'flexible' learning environments), more problematized (through educational development and targeted funding initiatives), and more managed (through audits and managerialist understandings of pra*ctice (p4).

Norton (2009) argues that these continuous changes have resulted in academics facing a number of competing demands on both their time and energy. Incorporated into these demands is the need to be excellent at teaching, research and administration. Revisiting curriculum design and constantly evaluating pedagogy and practice, in addition to already increasing work loads, adds to these demands.

Student support also remains an important academic role. Historically the types of support required of HEIs have included such things as emotional and personal issues, and concerns surrounding academic work load. More recently, with changes in legislation and the Labour Government's commitment to widening access to HE, the range of support that needs to be offered has extended. Equity of access to HE is now available to those designated as non-traditional students by virtue of their income, class, age or ethnicity (HEFCE/ LSC 2001). HEIs now have the additional responsibility of supporting, not only international students who do not have English as a first language, but also home students who now enter HE with a broad range of cultural beliefs, customs and learning styles and who may also have underlying communication and language problems.

Skills acquisition

Reynolds et al (2002) argue that learning is a process of acquiring new knowledge, skills and capabilities. However, although there is no question about the importance of the role of HE educators in ensuring students 'learn' it has also been suggested that learning organisations must facilitate the learning of all its members and continually transform themselves (Pedler et al 1991). Stier (2003) suggests it is vital that an empathic, tolerant and respectful and productive learning environment is created if students are to feel motivated and at ease. The author proposes that the same kind of environment is equally important to academics if they are to be sufficiently knowledgeable and motivated to develop curricula that are 'fit for purpose' in a rapidly changing HE system. Furthermore, there is also the additional expectation for graduates to demonstrate high level employability skills (Yorke 2006) and it is no longer acceptable for HEIs to just concentrate on 'subject specific learning' (Pedagogy for Employability Group, 2006). Jenkins et al (2007, p3) reinforce this viewpoint by stating that *"teaching students to be enquiring or research-based in their approach […] is central to the hard-nosed skills required of the future graduate workforce"*.

In the UK the standard-setting body for specialists in public health is the Faculty of Public Health. This body defines the competencies required to work as a practitioner within this field and our course has incorporated these into its curriculum. The course learning outcomes are well aligned with the three domains of public health practice, health protection, health improvement and service quality (Faculty of Public Health, 2009). Central to public health practice is knowledge and understanding of research and evaluation. Practitioners must have an understanding of research methods appropriate to public health practice; including epidemiology, statistical methods, data handling and interpretation skills, critical appraisal skills and other methods of enquiry including qualitative research methods. It is essential that our curriculum prepares students for employment, be it in the UK or internationally, and hence, this was one of the key drivers for undertaking this research. Additionally, during the development the course, our curriculum was also mapped against the National Health Service Knowledge and Skills Framework (Department of Health 2004) and the Public Health Skills and Career Framework (Public Health Resource Unit 2007). Other considerations when the curriculum was being developed were ensuring that the assessment and delivery were aligned to the UoB's Master's level descriptors and addressed the requirements of the UoB's curriculum framework (Atlay, 2010).

Whilst Brew (2006) believes that by the time students reach university they have already had considerable experience in investigation, project research, and inquiry based learning, others disagree. Schroeder (2004) suggests that contemporary HE students have changed dramatically, which has resulted in many experienced lecturers feeling both "bewildered and frustrated". He also asserts that many HE students display a lack of confidence in their intellectual abilities and are uncomfortable with abstract ideas. Additionally he believes that they have difficulty with complex concepts, a low tolerance for ambiguity, are often less independent in thought and judgement and more dependent on the ideas of those in authority. Contemporary students are also more dependent on immediate gratification and exhibit difficulty with some basic academic skills. Schroeder (2004) further suggests that these students require a practice-to-theory approach rather

than the more traditional theory-to-practice approach. Whilst developing and launching our Master's in Public Health we shared similar expectations to Brew (2006). However as time passed it soon became apparent that this was not the case and we began to observe in our student population many of the traits described by Schroeder. This was further supported when we asked the 2007 student cohort about their research experience prior to enrolling on the course and discovered that 28% perceived that they had no prior research experience and 22% only limited experience (n=32). Hence, 50% of our students entered the course with a lower perceived level of research knowledge than we had anticipated for M-level students. As the Faculty of Public Health's learning outcomes require students to be able to design studies, critically appraise published papers and draw appropriate conclusions from quantitative and qualitative research it is important that we use effective teaching strategies that complement our students learning approaches so that students gain the research skills required for '*real world*' practice.

Student demographics

Our student population is diverse and many face difficult challenges in their studies. It includes not only a large number of international students (approximately 47%), but also many home students who do not have English as a first language or who have not previously studied in the UK. Experience highlights that academic skill in such student populations are variable with many struggling with basic concepts. Topics such as literature searching, evaluating the quality and content of the literature and referencing are not familiar to many. However, our students' perception of some key research skills on entry to the course indicates that they are generally quite confident with referencing and ethics but perceive themselves to be least confident with critical appraisal skills and statistical analysis and interpretation.

The notion of independent and self-directed learning appears to be a particularly challenging concept to grasp. Although it has been argued that the key to getting and keeping students actively involved in learning lies in understanding learning style preferences (Halstead & Martin 2001). Anderson (1988 cited by Smith 2001) argue that many learning style models are underpinned by 'Western' assumptions and do not consider differences in cognitive and communication styles that may be culturally based. With the knowledge that the character of students entering Higher Education has changed it became clear there is a need for us to respond to these changes. In order to know that what we are teaching has real value we can benefit from understanding both the effect of how we are presenting our material; and to whom we are presenting it. One major issue for us as educators is to come to an understanding of the nature and level of support required by students to gain the most from their learning activities. Doing this will allow us to explore which teaching approaches enhance learning. Our findings will identify how future provision needs to change in order to improve the student learning experiences and enhance their research and evaluative skills.

Perhaps another important consideration with our diverse student population is the length of time available for contemporary students to develop the necessary skills in time to complete the research-based dissertation. Not only do many have to familiarise themselves with an 'alien' education system but the full time students (who are expected to complete in one year) have to submit a research proposal and ethical approval application within the first 4 months of the course in order to ensure they gain approval in time to carry out their research and write up their dissertation. This is a difficult task for UK educated students who are familiar with our education system. However, when considering the additional challenges faced by many non-traditional and international students, and the fact that many lack a number of the basic key skills to approach this task, the question needs to be asked whether they do not achieve as well as they could have done had they had more time to develop these skills? Recently Olcott (2010) provided a thought-provoking, and perhaps contentious, debate on the length of UK Master's courses. He states that *"at its core a masters degree is an empirical and scholarly degree"* (p33) and, hence, it is key that if students are to be able to objectively assess, comment on, and learn from, existing research it is imperative they are taught the rudiments of scholarly and empirical research, critical analysis and synthesis– all essential skills that our students perceived they lacked confidence with. Although it is not conceivable that the UK will move away from short Master's courses in the near future it is important that HEI's develop curriculum frameworks that facilitate student development of these skills.

Carr & Kemmis (2002) identify macro and micro levels as the first of five dimensions which help distinguish different types of curriculum research. They explore relevant research studies that investigate the macro level in terms of the education system as a whole; the effects of education and family in relation to inequalities, educational policies at systems level, and individual school (and classroom) curriculum research. They discuss micro levels in terms of studies that explore *the "specific interactions between teachers and students''* (p22) as these can identify some revealing insights about the consequences of different kinds of learning opportunities and learning processes. Although it is impossible to discount the macro level the main focus of this work will be on the micro level, in terms of looking at interaction between student and teacher and pedagogical belief.

It became apparent that there was a need to formally explore the background of the students, listen to their voices in terms of which specific research skills they needed to develop further, and investigate which teaching approaches are effective in enabling them to do this. Only by doing this would it be possible to ascertain if our perceptions of student ability are in

line with Brew's (2006) perception of HE students' or whether they mirror those of Schroeder (2004). In other words we needed to evaluate our teaching and learning and ensure that the 'student voice' is being listened to. Possible methods of doing this were explored and it was agreed that employing action research was the best method to facilitate this. A research protocol was drawn up and local research ethical approval gained. Funding was acquired from the Centre of Teaching and Learning (CETL) within the University of Bedfordshire

Method of Investigation

Action research is a form of research that focuses on the effects of the researcher's direct actions on practice within a participatory community with the goal of improving the performance quality of the community or an area of concern (Reason & Bradbury, 2001; McNiff, 2002). One definition offered by Carr and Kemmis (1986: 162) is:

> . *"Action research is a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices, and the situations in which the practices are carried out"*

Dick (2002) describes action research as a flexible, spiral process that is well suited to situations where change (the "action") and understanding (the" research") need to be achieved at the same time. In other words this spiral process allows informed change that is informed by that change. However, Smith (1996, 2001, 2007) suggest that we should be cautious about accepting the concept of an AR spiral purely in terms of it being a '*one- fit- all'* template for all phases of the study as there may be the tendency to forget that this method is interpretive and, therefore needs to be thought of in terms of making refinements as the study progresses over time. Hence, for the purpose of this study AR will be referred to as being a cyclical, rather than a spiral, process. This research method allows experience to facilitate learning, and therefore, an action research study does not begin with a fixed hypothesis but can begin with quite imprecise research questions. It allows enough flexibility to allow "*imprecise beginnings while progressing towards appropriate endings"* (Dick, 2002, p5*)*. As AR is interpretive it is only after the research cycle has been repeated and study refinements made, can teaching practice be reviewed holistically (Norton, 2009). This aspect of AR is key with this study as it is looking at different groups of students over time, making changes to practice and then re-evaluating these changes in line with the findings. At its core, AR allows the researcher to test new ideas and implement action for change.

Figure 1: Action Research Cycle Source: Higher Education Academy LLAS subject centre

Identifying and Defining the Problems:

Our students come from a diverse range of backgrounds and as many as 50% begin the course with limited understanding of many of the concepts of research methodology. Assessments suggest that many students are unfamiliar with a number of key graduate skills that, arguably, should have been developed during undergraduate studies. Elements that prove particularly difficult are referencing, critical analysis of literature and literature searching. As a result of our observations we asked:

- Do international students have similar levels of academic skills as home students who have already experienced the UK HE system?
- Does qualification level at point of entry impact on the outcome?
- Is our pedagogy and practice 'fit for purpose' to ensure that all our students gain the research skills required for '*real world'* practice?

Sampling

All students who enrolled on the course between 2006 and 2010 (n 169) were asked to participate in this research. Questionnaires were either completed in the classroom or sent and returned electronically

Data Collection Methods:

Data was gathered using a variety of approaches and incorporates both quantitative and qualitative data collection methods. Qualitative data will be presented in another paper. Data analysis for this paper is exploratory as additional data is yet to be gathered from students who have not completed their dissertation.

Quantitative data: Questionnaires
Student demographics were gained– gender, academic level on entry, research experience, mode of delivery being undertaken (online / taught), international or home student, full or part time
- Student perception of research skills on entering the course and again on completion. Students were asked:
  - to rate on a scale of 0-10 their confidence of key research skills.
  - to identify which skills they specifically wanted to develop (on entry) and whether this has been achieved (on exit)
  - to state which teaching and learning strategies they found effective and what we could do differently.
  - Outcome measures – research methods assessment grades (completed early in the course) and dissertation grades (final assessment before completion) were used to explore if there was any differences in attainment by student status.

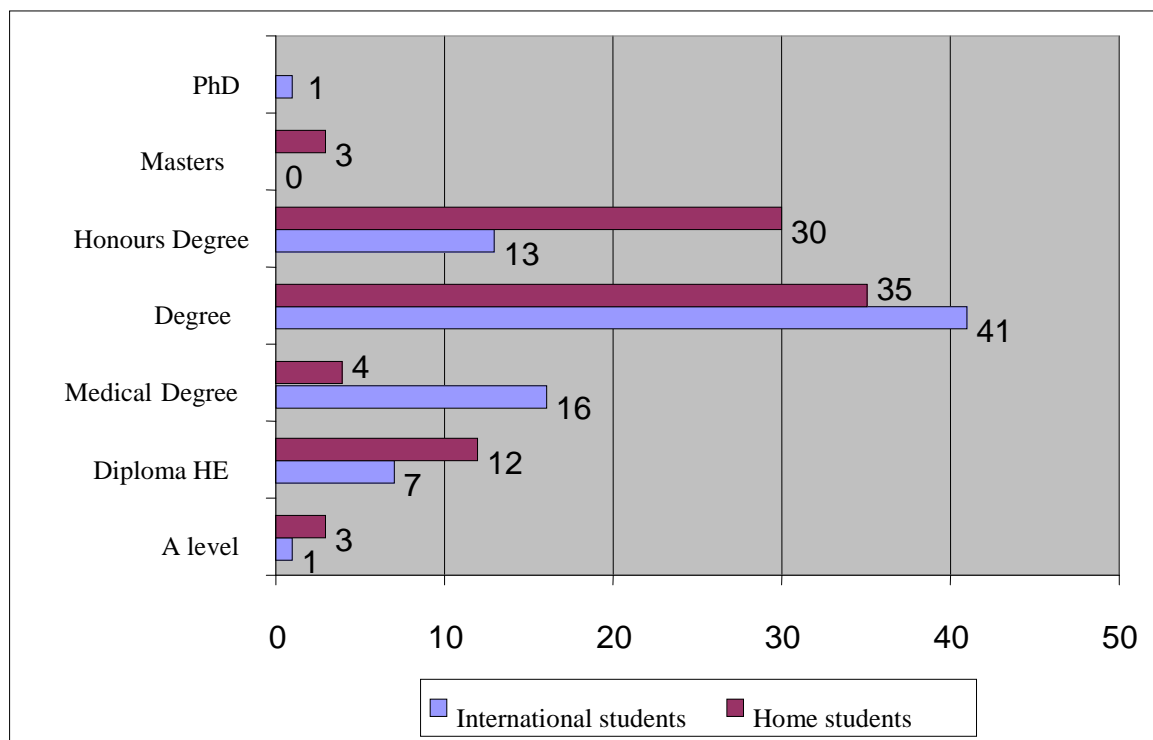Data were analysed using SPSS (version 17)

Results

Table 1 shows that the study population is fairly evenly distributed by gender (88/169 (52%) male and 81/169 (48%) female). The distribution of home and international students is also fairly evenly distributed and when the EU and International students are combined the non home students make up just under half (48.5%) of the study sample. The majority of students studied full time and completed within one year (72%) and most attended the university to be taught (120/169, 71%). 46 students (27%) completed via the solely on line mode of delivery and 3 students completed by undertaking the majority of the course by attending but completed a couple of units via the online environment due to a change in personal circumstances. Just over half the sample (53.3%, 56/105) identified that they had no, or very limited, experience of research prior to commencing the course. Of these 22% (23) were international students and 31% (33) were home students.

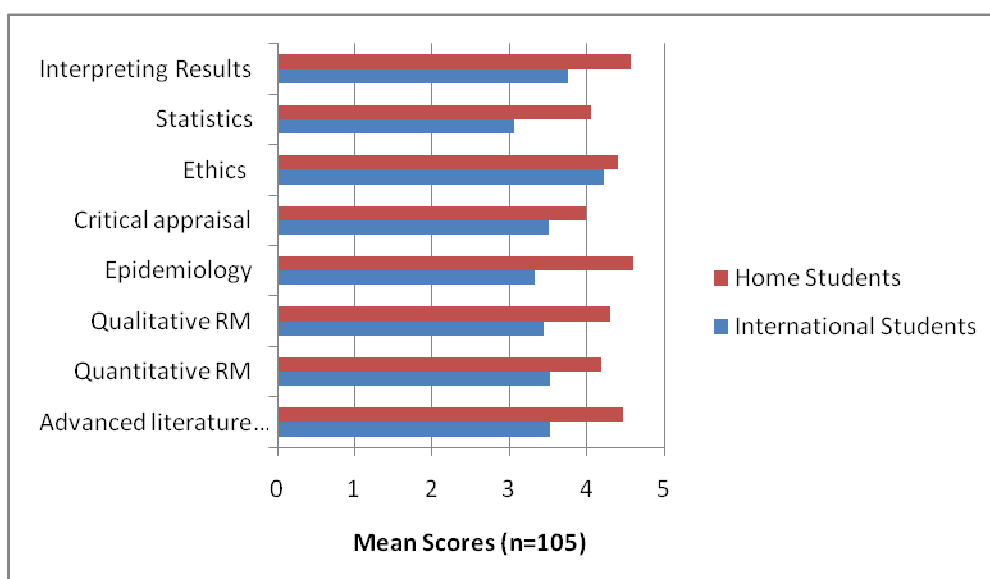| Characteristics (n)	n (%)	n (%)	n (%)
Gender (169)	Male 88 (52.1)	Female 81 (47.9)	
Duration of study (169)	1 year 121 (71.6)	2 years 48 (28.4)	
Mode of study (169)	Taught 120 (71)	Online 46 (27.2)	Mix 3 (1.8)
Student Status (169)	International 79 (46.7)	Home 87 (51.5)	EU 3 (1.8%)
Prior research experience (105)	Yes 49 (46.7)	No 56 (53.3)	

Table 1: Demographic Data

When exploring the highest academic qualification gained by students prior to commencing the course Chart 1 shows that the majority entered with a first degree (n142, 84%), 3 entered with a Masters degree and 1 with a Doctorate. 23 students (14%) entered the course with no degree but as they were all working within the field of public health they were accepted by virtue of their work experience. Perhaps not surprisingly, because of differences in education systems, fewer International students entered with Honours degrees. Whilst only 4 home students had completed a medical degree 16 of the International students had achieved this level of qualification. Level of education does not seem to impact on outcome. The mean score for dissertation grade was highest for those with a Masters degree students (12.50) and a Diploma of Higher Education (11.15) although there are no significant differences in dissertation scores by level of education (p, 0 .53).

Figure 1: Highest academic qualification at entry to the course by student status

Student perceptions of their level of confidence with a range of key research skills were gained on entry to the course. They were asked to rate on a scale of 0-10 how confident they felt with each of the research skills listed; a score of 0 indicates no confidence and a score of 10 indicates the respondent is fully confident. Mean scores were calculated (n=105), and can be seen in Figure 2. Analyses of mean scores indicate that the International students perceive themselves to be less confident with all the skills than the home students. The biggest differences in confidence were found with epidemiology (1.27, df 103, p, 0.010), statistics (0.990, df 103, p, 0.025) and advanced literature searching (0.953, df 103, p, 0.0244), but none reached statistical significance.

Figure 2: Mean Ratings of Student Perception of Research Skills on Entry to Course

Mean scores for research methodologies (RM) and dissertation scores were calculated. Mean score for RM were 8.53 (SD 3.05, n=77) for international students and 9.92 (SD 2.8, n=86) for home students. Dissertation mean scores were 10.61 and 10.31 (n=103) respectively. 2 way ANOVA with repeated measures shows that over time there was a significant improvement of grades from the early RM assessment to the final dissertation (F=23.12, df1,101, p<0.001). Moreover, there is a significant interaction which shows that the improvement of grades from RM submission to dissertation submission is seen in the overseas cohort. However, the between groups effects from the repeated measures ANOVA demonstrate there is no significant difference between overseas and home students on the combined average of the research methods and dissertation grades (F1.30, df 1,1001, p,0 .25).

Discussion

Lecturing staff on the Public Health Master's perceived that a significant number of international students were entering the course without the underpinning knowledge-base or experience of research methods. Hence, the quality of their work was judged to be low. As research underpins the whole curriculum it is important that students are facilitated to develop key skills that will enable them to successfully complete the course and evidence a high level of employability skills (Public Health Faculty 2009; Yorke 2006). This work has enabled us to explore some of these perceptions and to evaluate what actions can be taken to ensure that teaching and learning strategies are effective for all students.

Analysis to date suggests that, on entry to the course, the international students perceive themselves to be less confident with research skills that the home students yet identify having had more experience of research than the home students. The lecturers perceptions that the international students are not achieving as well as the home students is partially supported by the mean RM score, although this is not statistically significant. However, by the end of the course the mean dissertation scores of the international students are higher than those of the home students and although, again, not statistically significant it is now known that there was a significant interaction which shows that the international students assessment scores improve significantly over time. However, what the findings do not indicate is why this may be. In other words it is not possible to identify whether the students who achieve the lower grades do so for the same reason. International students are limited to the number of hours they can work and therefore may, potentially, have more time to concentrate on their studies yet find this difficult because of the lack of the required skills. Conversely, perhaps the home students are attempting to study whilst working full time and time management, not lack of skill, is the key reason they do not achieve their full potential. In order to try and identify any underlying factors that may impact on learning further exploration is necessary. Carr & Kemmis (2002) state that by concentrating on the micro level, insights into different learning opportunities and learning processed should be revealed. By incorporating additional questions about work/life balance into the data gathering questionnaires and providing students with the opportunity to express their views on external factors that may have the potential to impact negatively on their study a deeper understanding may be gained. Similarly student engagement and motivation will be evaluated by accessing course statistics to determine how frequently individual students access online teaching and learning material and explore if those who engage more achieve higher grades. Although the findings suggest that there is no difference in attainment between the home and international students at the end of the course, we have identified a need to explore our students' personal and educational backgrounds in greater depth. Likewise by determining where undergraduate qualifications were gained will illustrate how many of our home students were educated outside of the UK.

Shroeder (2004) offers his perception of contemporary students entering HE today and what is being observed amongst the Public Health Master's students within our institution emulates these perceptions. Although they identify a relatively high confidence level in terms of referencing, ethics and citing authors it is clear from assessments that this confidence is somewhat misplaced. Students are displaying less confidence with research skills such as qualitative and quantitative research methods, critical appraisal skills and statistics. Preliminary findings suggest that knowledge and understanding of the research process is a challenge for a large number of students, regardless of where they were educated. When questioned about the skills they felt they had not achieved at the end of the course, all still identified a lack of understanding and confidence with data analysis. Although it could be argued that perhaps our students are not unique in identifying this as a particularly challenging skill it does highlight the need for the teaching team to explore how this can be addressed.

If, as Schroeder (2004) suggests, contemporary students need a more practice to theory approach this is something that that needs to be considered within the teaching strategy. Students have identified that additional taught research sessions are needed. However, timetabling issues mean this is not always possible and this approach may not benefit the online students. In order to facilitate more autonomous and critical thinking learners perhaps the best way to approach this is to utilise the e-technology available and increase the range and number of online tasks that all students can complete with the aim of enhancing their learning. Students have already positively evaluated video and podcast material used and as a result more of this type of material has been incorporated into online teaching material. Additionally more 'workshop' type of activities has been introduced in the classroom setting whereby students are given public health practice related material and work in groups to critically analyse and discuss in terms of research (practice-theory). However, this presented another

challenge - how could this approach be adapted for the online students? One solution identified, and implemented, was to provide all students with the same tasks and get them to engage with online discussion and present their conclusions via the course Wiki. As well as engaging the students in self-directed and critical learning this also facilitates a much wider community of learners as the online students, the taught students and the lecturers can all interact electronically. In addition, further online activities have being introduced this year in light of student feedback. These include such things as more online discussion forums, and the inclusion of games (such as crosswords and hangman) as educational tools. To date these have been positively evaluated.

A key priority now is to further develop our online material in order to advance the development of research skills, particularly in areas such as data interpretation, data analysis and critical thinking, as these have been identified by students as being particularly challenging. These have also been identified as challenging skills that are not being developed sufficiently throughout the course and if we agree with Olcott (2010 p34), who suggests that "poor fundamentals equal poor results", it is vital we work at rectifying this. In line with the AR process the research cycle will need to be repeated and data gathering tools refined to allow for new ideas to be implemented and evaluated.

Interestingly, preliminary data analysis suggests that qualification level at point of entry is not necessarily an indicator of outcome. Students who do not have a first degree but have the required level of relevant work-related experience to access the course generally achieve on a par with those educated to a higher level. This leads us to ask whether where they were educated and the type of degree gained is more important. In light of this finding this may be something that needs to be explored at an institutional level as it may have implications for policy in terms of entry criteria for Masters level study. Only by constantly reflecting on, and evaluating our teaching practice will the student experience be enhanced and our pedagogical knowledge improved. This AR study is only just beginning to 'unpick' some of the issues and challenges identified in relation to the effectiveness of our teaching practices and the impact these have on student learning.

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