Paper 11

Making Research Count via an Online Environment – An Action Research Study to Explore Effective

Strategies to Develop Research Skills in Students Undertaking a Masters in Public Health

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Abstract

Much has been written about the need for teaching to be research informed. To all intense and purposes the current teaching and learning strategy for the masters in Public Health incorporates the three aspects of the framework developed by Griffiths (2004) as it is research-led (by active researchers), research-oriented (students learn about the research process through taught sessions) and research-based (inquiry based activities are incorporated). However, despite having a curriculum that links teaching and research a number of challenges have been identified. Our student population is diverse and includes a large number of international students who have not previously studied in the UK. As a result many face difficult challenges in their studies. Their academic skills are variable and many struggle with basic concepts such as literature searching, evaluating the quality and content of the literature and referencing. Having successfully delivered a traditional face-to-face taught course for 2 years it was identified by a large number of potential applicants that a solely online mode of delivery was needed. To meet this need the online taught course was launched. This led us to question how we could deliver the research elements of the course so that both traditional and online students are afforded the opportunity to develop their research knowledge and skills. This paper explores some pedagogical challenges faced and identifies the need for the teaching team to constantly reflect on their teaching and learning strategies and evaluate feedback from students to enable them to gain the necessary research and evaluation skills required for 'real world' research.

Methodology: Action Research (AR) was the methodology of choice as it is a practical way of evaluating our own work to ensure that it is as we would like it to be. Participants (n=104) were all students undertaking a taught or online Masters in Public Health. Questionnaires were developed to gather data on highest entry level qualification, mode of learning, international or home student status, prior research experience, and student perception of research knowledge on commencing and completion of the course. Teaching and learning strategies were evaluated by the students. Assessment grades were used as outcome measures.

Findings

There was no difference in attainment between international and home students or by mode of delivery. Entry qualification does not seem to indicate outcome. Students perceived themselves to be relatively confident with their referencing, citing and ethical issues. They were less confident with their critical appraisal skills, data analysis and interpretation, and knowledge of research methodologies.

Discussion

Student feedback on effective and less effective teaching and learning strategies were evaluated and changes implemented are identified. Future challenges are discussed.

Background

Contemporary education seeks to engage students as active, self-directed learners, and foster the development and maturation of critical thinking and problem-solving skills. An emphasis on team learning is critical because deeper learning occurs when groups, not individuals, work together (Santanello & Gupchup, 2007). Elam & Duckenfield (2000) provide useful insights into defining a community of

learners where the "teacher as a facilitator" is used as a model and where people continually learn from one another. The Public Health Masters teaching team face specific challenges in developing a community of learners as the course is not only delivered via a face-to face- mode but also via a solely online environment. The major challenge identified is enabling the distance-learning students to engage with the attending students and the teaching team to enhance their learning experience.

Evaluation is necessary as a function in good teaching practice. The American Physiological Society (2002) suggests that evaluation is valuable as it provides both formative and summative feedback. The formative feedback helps guide future changes to teaching practice whilst the summative feedback can identify if stated goals and objectives have been accomplished. The Public Health Masters is coming to the beginning of its fifth year as a taught course, and its third year as an e-learning course. The course content was already deemed to be successful, however the course needs to be in a 'language that the e-learner understands'. This is not easy when the community of e-learners is mixed internationally and by educational background. There are three recognised steps to take:

1.   Determine how we will prepare the material so that the e-learner can make sense of it (encoding).

2.   Determine what obstacles exist that might prevent proper understanding (decoding)

3.   Determine the best ways to engage the learner (transmission)

Encoding and decoding required us to formally consider our methods of communication and how they have already changed over the short life of the course. Communicating with students taught in traditional ways does not present a problem whereas the introduction of the e-learning approach has identified many challenges for the teaching team; especially where the team was not totally conversant with the emerging e-technologies. Hence, it continues to be a steep learning curve. E-learning, as defined by Dongsong Zhang (2004), is learning and teaching via a solely online environment through network technologies. He believes that this use of technology is arguably one of the most powerful responses to the growing need for education'. Dongsong Zhang (2004) reminds us that higher education needs to meet the needs of today's workforce who, he describes as being highly educated with the need to continually improve on, and learn new skills, many whom will achieve lifelong judiciousness only through e-learning.

Evaluating what we are doing to ensure that we develop approaches that facilitate effective communication with our 'virtual' students enabling their progression will offer insight into the e-learners requirements. To achieve these aims we have had to review our pedagogy. Beetham and Sharpe (2007, p3.) ask *'as educators and higher educational establishments are we prepared and ready to re-think our pedagogies and re-do our practices?* They further propose that contemporary pedagogy needs to encompass '*ways of knowing*' as well as '*ways of doing*'. Mayes and de Freitas (2007, p23.) observed that we are witnessing '*a new model of education, rather than a new model of learning*' as '*our understanding deepens…we see how learning can be socially situated in a way never previously possible*'. So as e-learning breaks new grounds, we are forced to consider pedagogical changes. Hughes (2008, p438) states that elements to this pedagogy must include an understanding that: '*technology, without the pedagogy can be a fetishised and empty learning, and teaching experience – stylized, but without substance, simply an electronic information push*'. Hughes (2008) also suggests that by emphasising the technology *per se* the UK has lost it way and as a result pedagogical debate has been held back. However, Laurillard (2007.p.xvi) suggests that '*a synergy knowing and doing, pedagogy and technology arrived at through ongoing conversations with our learners and peers, is a starting point for tackling the bridge building policy, strategy, research, and practice*'. Therefore when gathered together they will form an appropriate new pedagogy.

Recently K2 Academy for Higher Education Institutes (K2. 2009) has considered what structure a new pedagogy should take.   In the deliberation they have said that frequently the e-learning approaches focus on dialogue, interaction, collaborative activities and course content and secondary to this the importance of what is generated by the students. They suggested that student activities go unrecognised. They described this missing element as 'Social-Constructivism', a pedagogical perspective whereby learners construct their knowledge through discussions, thereby enhancing their own thinking skills without

acknowledgement. Constructivism goes beyond the study of how the brain stores and retrieves information to examine the ways in which learners make meaning from experience. Rather than the transmission of knowledge, learning is an internal process of interpretation. K2 proposes that this interpretation does not occur in social isolation but within the students own social systems. This perspective is closely associated with many contemporary theories, most notably the developmental theories of Vygotsky and Bruner, and Bandura's social cognitive theory (Shunk, 2000).

The pedagogy of *'Social-Constructivism'* would appear to be in line with this master's course as these students should be self-motivated and independent learners. However a blend of four main pedagogical perspectives would we feel, underpin the present programme more accurately. These are:

- **Cognitive perspective** - which focuses on the cognitive processes involved in learning as well as how the brain works. It considers the student as not being passive receivers but actively involved in their learning process. In fact, Shunk (2000) proposes that they can control their own learning.

- **Emotional perspective** - This focuses on the emotional aspects of learning, like motivation, and engagement. The emotional perspective involves enabling students to be self-aware, socially cognisant, able to make responsible decisions, and competent in self-management and relationship-management skills to foster their academic success (Teachers College, 2004).

- **Behavioural perspective** - This focuses on the skills and behavioural outcomes of the learning. The process of learning can then be defined as the relatively permanent change in behaviour resulting from experience or practice (Cunia, 2005; Hummel, & Hummel, 2006).

- **Social perspective** - This focuses on the social aspects, which can stimulate learning. Interaction with other people, collaborative discovery and the importance of peer support as well as pressure. This perspective considers the debate of nature and nurture (Rogers, 2003).

The pedagogy, which underpins the course, uses a combination of perspectives so that we might take into consideration the learning styles of the students. This need is re-enforced by the work of Rogers (2003) who reminds us that people learn differently at different times so age has to be taken into consideration. This is an important aspect with a postgraduate course where the age range is frequently 26-52. We had learnt over the last two years that the modern student has a different way of learning from the traditional learners. The computer learners want delivery within three clicks of a mouse, they need to read it on screen, listen to it or see it, using a book and reading is not part of their normal practice. The course content had already proved to be successful, but changing delivery for somebody sitting in front of a computer calls for different techniques. Sharpe and Oliver (2007) conceptualize e-learning as a *Trojan Mouse*; it is simple yet at the same time startling in its effect. They further argue that we must not just think in terms of which particular hardware and software we use but ensure that new technologies being used are effectively incorporated within the course.

One lesson we have already learnt is that our students are not a homogenous group and come with a variety of educational experiences and backgrounds. Whereas Brew (2006, p44) states that *"By the time students reach university, they have already had considerable experience in investigation, in project research, and in inquiry based learning at school"* Schroeder (2004) disagrees. He suggests that contemporary students entering HE have changed dramatically which has resulted in many experienced lecturers feeling both *'bewildered and frustrated'*. Schroeder (2004) proposes that many HE students display a lack of confidence in their intellectual abilities and are uncomfortable with abstract ideas. He further suggests they have difficulty with complex concepts, a low tolerance for ambiguity, are often less independent in thought and judgment and more dependent on the ideas of those in authority. They are also more dependent on immediate gratification and exhibit more difficulty with some basic academic skills.

Schroeder (2004) suggests that these students require a practice-to-theory approach rather than the more traditional theory-to-practice approach. As a result, the need for effective communication became apparent early on. Our experiences indicate that if the learners do not fully engage with the methods we

use to communicate and do not view themselves as belonging to *a 'community of learners'* (Lave & Wenger, 1991) they become disillusioned and drop out. This notion is further supported by Smith *et al* (2001) who argue that students who do not share a physical environment and work together only in an online environment face significant challenges in establishing a community of learners. They suggest that "*In the opening weeks of distance courses, there is an anonymity and lack of identity which comes with the loss of various channels of communication*" (Smith *et al.* 2001, p9). It is apparent that if we are to succeed meaningful communication needs to be established from the very beginning of the course. Although this looks a very simple task it has proved to be a challenge.

Kock (2005) estimates that an exchange of 600 words requires about 6 minutes for complex group tasks in face-to-face settings, while exchanging the same number of words over e-mail would take approximately one hour of effort. Therefore, a taught system enables immediacy in giving and receiving whereas the e-learners have a closed loop unless it is managed well. Another challenge is that what is being communicated to the e-learner is interpreted in the same way by all the learners as there are a number of reasons why the learner may perceive the information in different ways. For example, how they come to the course in terms of educational background, expertise, experience, knowledge and background in Public Health can be factors that affect how effective the information being relayed is interpreted. Equally, there may be cultural and environmental differences, which have an impact on commitment and the ability to sustain long-term commitment. When reflecting we often become aware of how we frequently live our day-to-day lives by assessing what we will skip (Varis, 2004). Therefore, we question how accurate communication can be achieved within our e-learning population. Can we really control confused perception issues and develop strategies to safeguard against confusion?

Hrastinski (2008) maintains that for e-learning initiatives to succeed organisations, and in particular Higher Educational Institutions, must understand the benefits and limitations of different e-learning techniques and methods. He continues by saying that research over the last decade has enabled recognition of the impact of different factors in relation to the effectiveness of e-learning. Hrastinski (2008) describes the concepts of *personal participation* and *cognitive participation* and how these can be supported by asynchronous and synchronous communication. Personal participation describes a more arousing type of participation appropriate for less complex information exchanges, including the planning of tasks and social support. Cognitive participation describes a more reflective type of participation appropriate for discussions of complex issues.

All things being equal, synchronous e-learning better supports personal participation and asynchronous e-learning better supports cognitive participation. The initial decision faced was to determine which of the two basic types of e-learning communication would be more effective in enabling the learner? Romiszowski & Mason (2004) suggest that e-learning initiatives mainly rely on asynchronous means for teaching and learning which we could support. Haythornthwaite (2002) argues that three types of communication need to be considered in order to sustain e-learning communities - content-related communication, planning of tasks, and social support. She further states that communication related to the course content is essential for learning. Hence, it would appear that achieving this is vital to success.

An key area that the teaching team decided to explore was how did the student group develop their research skills so that they could complete successful dissertation and meet the requirements of the Key Area 8 'Public Health Intelligence; collect, generate, synthesise, appraise, analyse, interpret and communicate intelligence that measures the health status, risks, needs and health outcomes of defined populations' (Faculty of Public Health). Having set a first degree as a minimum entry requirement our expectation was that the students would come with a basic understanding of the research process. This proved not to be the case and our early perceptions immediately indicated that among the total student group there was a lack of academic skills. For example, basic referencing, quality of literature used, critical analysis skills were identified as being particularly problematic.

We identified our key challenge as **'**how do we ensure that **all** our students gain the research skills required for '*real world*' practice'. Once we discovered for certainty that the attending students were have difficulty with developing research skills we began to ask what strategies were needed that will be equally effective for our online students? To all intense and purposes our current teaching and learning strategy incorporates the three aspects of the framework developed by Griffiths (2004) as it is research-led (by active researchers), research-oriented (students learn about the research process through taught sessions) and research-based (inquiry based activities are incorporated). How should we take forward our investigation?

Methodology

An action research (AR) approach was adopted. 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, p162] 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

he First Action Research Cycle

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:

- are some students displaying more problems than others? For example do international students have similar levels of academic skills as home students who have already experienced the UK HE system? Are there differences in ability and expectations within the students who enroll for the online method of course delivery? Does qualification level at point of entry impact on the outcome?

- if attending students have difficulty with developing research skills is this the same for the online students and, if so, what strategies can we use that will be equally effective for the all students?

- how do we ensure that all our students gain the research skills required for '*real world*' practice?

Carrying out the Research

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.

Data Collection Methods:
Data was gathered using a variety of approaches and incorporates both quantitative and qualitative data collection methods:
Quantitative data:
- Questionnaire based tools;
  - Student demographics – academic level on entry, research experience, mode of delivery being undertaken, 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 as indicators as to whether their perceptions of their skills were evidenced in their academic assessments and whether their knowledge and understanding had developed over time.

Qualitative data:

- Semi structured interviews of a sub section of students at the start of the course and those who have completed. These have not yet been undertaken and will be conducted by an independent researcher in the near future.

All students enrolled on the Masters course since 2006 have been asked to participate in this study. To date the sample size is 104.

Results

Table 1 illustrates that the majority of students (71%) undertook the course via the traditional taught approach and studied full time (72%). Two students opted to continue their studies during late pregnancy and post birth via the online mode of delivery.

Table 1: Demographic Data

| Mode of delivery n=104	Traditional taught 74 (71%)	Online 28 (27%)	Combined[1] 2 (2%)
Course duration n=103	Full Time (1 year) 74 (72%)	Part Time (2years) 29 (28%)	
Origin of student n=104	International 46 (44%)	EU 3 (2%)	Home[2] 51 (54%)

[1] undertook some elements of the course online due to pregnancy

[2] not necessarily educated in the UK

Figure 2 shows entry qualification by international or home status (n=104). Analysis indicates that there is no significant difference in entry qualification between groups. When groups are combined 73% (n=76) of student's entered with the course minimum entry requirement of a degree. It is worth mentioning that of these the majority (n=49, 64%) had gained an unclassified degree, and therefore, may not have completed a final research project / dissertation during their studies. A further 11% (n=12) entered with a medical degree. One student had already completed a Masters degree. Perhaps surprisingly 14% (n=15) of students did not meet the minimum entry requirement and were enrolled with just A levels or a Diploma in Higher Education (Dip HE). However, although the numbers are small, there is no indication that these students performed any differently to those with higher level entry qualifications and all completed the course with no referral work. Interestingly of the 7 students who failed their dissertation on first attempt 4 have an honours degree, 2 a medical degree and

1 an unclassified degree. Failures were evenly spread across the international and home students (n=4 & 3 respectively).

*Figure 2: Entry Qualifications by Mode of Delivery*
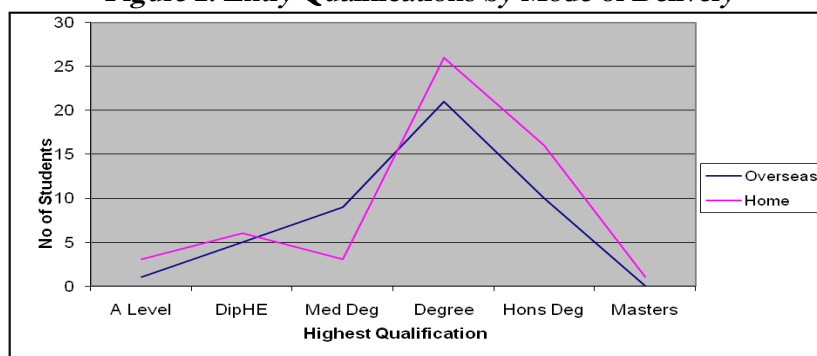
Research Methodology Unit Content

Students were asked about their satisfaction with the content of the research methodologies unit. Of the 57 respondents only 9 (15%) were totally satisfied with the teaching material and did not feel any change was needed. One key issue identified by 20 students (35%) was time and the need to have additional timetabled sessions. 10 (17.5%) identified a need for more coverage of statistical analysis. When exploring the research skills students felt they needed to develop on entry to the course just under half of the respondents indicated that they wanted to develop all skills (n=104). Interpreting data was identified by 22%. When the participants who have completed the course were asked which skills they did not feel they had been able to develop sufficiently all identified that they had not developed data analysis skills (n=47,100%).

Skills Development

Student perceptions of their research skills on entry to the course were gained. Students 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. This questionnaire was introduced as a data collecting tool with the 2008-9 cohorts (n=57). Mean scores were calculated and the ratings can be seen in Figure 3. The factor students rated themselves as most confident at is referencing (M=7.21) and producing a bibliography (M=7.21). Statistics was perceived to be the aspect of research that they felt least confident with (M=4.96). The analysis also indicates that they feel relatively unconfident with their critical appraisal skills (M=5.25) and knowledge of quantitative (M= 5.44) and qualitative (M=5.35) research methods.

Figure 3: Student Perception of Research Skills: Mean Ratings on Entry
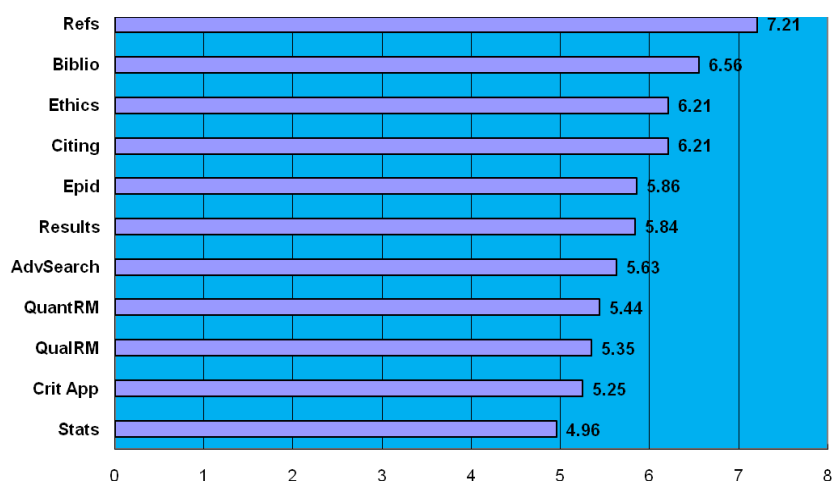
Outcome Measures – Assessment Grades

Assessment grades were used as outcome measures to ascertain whether there was a difference in performance by international students versus home students. Table 2 illustrates the grades for the Research Methodologies assessment which is completed in the first term of the course. There is no significant difference in grades between international and home students. Table 3 illustrates the grades for dissertations by origin of student and again there is no significant difference between groups. However, it is worth noting that although all failures were found in international students overall the sample size is very small so presumptions cannot be made. When grades and mode of delivery were explored, once again, there was no significant difference between groups.

Table 2: Research Methods by Grades Origin of Student

	A	B	C	D	Fail	Total
International Students	1	12	11	17	3	44
Home Students	1	30	10	14	0	55
Total	2	42	21	31	3	99

Table 3: Dissertation Grades by Origin of Student

	A	B	C	D	Re-Sit	Diploma*	Total
International Students	1	8	3	7	4	0	23
Home Students	3	8	2	4	3	1	21
Total	4	16	5	11	7	1	44

*Did not complete dissertation and awarded a diploma

Reflection and Evaluation

Lecturing staff on the Public Health Masters perceived that a significant number of international students were entering the course without the underpinning knowledge base or experience of research methods. Hence, quality of their work was judged to be low. Likewise, it was perceived that as developing research skills within the taught cohort was challenging the students studying via the online mode of delivery would be disadvantaged as they are limited by the amount of opportunities available to gain the face-to-face support from lecturers and/or peers. 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). If, as suggested by Beetham and Sharpe (2007), contemporary pedagogy needs to include '*ways of doing*' as well as '*ways of knowing*' it was important that these perceptions were fully explored. In order to ensure that teaching and learning strategies are effective for both taught and online students it was necessary to appraise what actions needed to be taken to. This study has enabled us to start this process, to rethink our pedagogies and evaluate our practice.

By using a combination of pedagogical perspective we are accommodating the range of learning styles and learning experiences that our students present with. Although four main pedagogical perspectives underpin the current programme there is still a lot of work to do in relation to the social perspective. This pedagogical approach focuses on the social aspects of learning and in particular interaction with others, collaborative discovery and peer support. It is vital facilitate effective communication strategies so that the students feel that they belong to a '*community of learners*' (Lave & Wenger, 1991) and are not learning in isolation. Romiszowski & Mason (2004) suggest that e-learning initiatives mainly rely on asynchronous means for teaching and learning, however, recent improvements in technology and increasing bandwidth capabilities have led to the growing popularity of synchronous e-learning (Kinshuk, 2006). We aim to develop not only synchronous communication (to develop and support social participation) but also asynchronous as this supports cognitive participation which assists the students to control their own learning (Shunk, 2000).

Analysis to date suggests that both international and home students achieve at the same level, which is in opposition to the perceptions of the lecturing team. However, what the study has not determined 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. There may be cultural and environmental differences, which have an impact on the ability to sustain long-term commitment and motivation. Interestingly Varis (2004) observes that we frequently live our day-to-day lives by assessing what tasks we will skip. Potentially, contemporary students, who are often juggling busy working and family lives with their study commitments, may well decide to 'skip' the study. By incorporating additional questions about work/life balance into future questionnaire, 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. At present there is no evidence to suggest that the online students are achieving any differently from the attending students. However, the numbers of online learners is relatively small and as we re-visit the AR cycle with future cohorts, and sample size increases, this may change

Although the Public Health Masters students 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. When questioned about skills they felt they had not achieved at the end of the course, unfortunately, all still identified a lack of understanding and confidence with data analysis. This highlights 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 rather than a theory to practice approach this is something that that needs to be considered within the teaching strategy.

Students identified that additional taught research sessions are needed. However, this is not always possible and would 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 online technology available and increase the range and number of online tasks that students can do to enhance their learning. Students have already evaluated video and podcast material well 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 relevant published material and work in groups to critically analyse and discuss in terms of research and its implications for public health. The challenge now is to explore how this can be adapted for the online students. One solution may be to re-evaluate how the Wiki is utilised and make this much more prescriptive so that specific research related tasks guide student learning activity. This year new online activities are being introduced 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.

This study is beginning to address the research questions posed. Findings suggest that knowledge and understanding of the research process is a challenge for a large number of students regardless of where they were previously educated. However, it is worth noting that many students, who have migrated to the UK and are now classified as home students, may well have completed their education in another country. There is now the need to now explore in greater depth where higher level education was achieved to clarify if, in fact, those educated overseas do face more challenges in relation to prior skills and knowledge. Likewise, the mode of learning does not seem to impact on outcome. Interestingly data suggests that qualification level at point of entry is not necessarily and indicator of outcome. 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.

In line with the AR process the research cycle will now be repeated and data gathering tools refined to allow for new ideas to be implemented and evaluated and for research questions to be developed further. One key priority is to develop more online material in order to facilitate 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. Only by constantly reflecting on, and evaluating our teaching practice will the student experience be enhanced and our pedagogical knowledge improved.

References
American Physiological Society. (2002). Retrieved October 28, 2009. http://www.the-aps.org/education/promote/promote.html

Beetham, H., & Sharpe, R., (2007). *Rethinking pedagogy for a digital age, designing and delivering e-learning.* London. Routledge.

Brew, A., (2006). *Research and teaching: Beyond the divide.* New York. Palgrave Macmillan.
Carr, W., & Kemmis, S., (1986). *Becoming Critical: Education, Knowledge and Action Research.* London. Routledge Falmer.

Cunia, E., (2005). *Behavioural learning theory. Principles of Instruction and Learning:* Valdosta, GA: Valdosta State University. Retrieved October 30, from. http://chiron.valdosta.edu/whuitt/col/behsys/behsys.html.
Dick, B., (2002). *Action research: action and research.* Retrieved October 19, 2009. from http://www.scu.edu.au/schools/gcm/ar/arp/aandr.html
Dongsong Zhang, J., Zhao, L,. Zhou, L., & Nunamaker Jr., Jay. F., (2004). Can E-Learning Replace Classroom Learning? *Communications of the ACM,* 47(5) (May) pp. 75–79.

Elam, K., & Duckenfield, M., (2000). *Creating a Community of Learners. Using the teacher as facilitator model cited in Santanello. C, & Gupchup, V.* (2007). A Student Orientation Program to Build a Community of Learners American Journal of Pharmaceutical Education, Retrieved October 21, 2009. from. http://findarticles.com/p/articles/mi_qa3833/is_200701/ai_n18705740/pg_11/?tag=content;col1
Faculty of Public Health., (2009). Working to Improve the Public's Health. Retrieved September 28, 2009. from. http://www.fph.org.uk/about_faculty/what_public_health/9key_area as pdf

Griffith, R., (2004). Knowledge production and the research-teaching nexus: the case of the built environment disciplines. *Studies in Higher Education* 29 (6): 709-726.

Hrastinski, S., (2008). Asynchronous and Synchronous E-Learning *EDUCAUSE Quarterly,* vol. 31, no. 4 (October–December).

Haythornthwaite, C., (2002). Building Social Networks via Computer Networks: Creating and Sustaining Distributed Learning Communities, in *Building Virtual Communities: Learning and Change in Cyberspace*, K. Ann Renninger and Wesley Schumar, eds. (Cambridge University Press, Cambridge) pp. 159–190.

Hughes, J., (2008). *Becoming an eportfolio teacher.* In Cambridge, D., Cambridge, B. & Yancey, K. (Eds.) Electronic Portfolios 2.0: Emergent Findings and Shared Questions. Washington, DC: Stylus Publishing.

Hummel, W., & Hummel, J., (2006). *An overview of the behavioural perspective. Educational Psychology Interactive.* Valdosta, GA: Valdosta State University.
K2 Academic., (2008). Retrieved October 28, 2009. from. http://www.k12academics.com/e_learning.htm.

Kinshuk. , J, (2006). Improving Adaptively in Learning Through Cognitive Modeling. In M. Ikeda, K. D. Ashley & T. W. Chan (Eds.), *Lecture Notes in Computer Science* (Proceedings of the Intelligent Tutoring Systems: 8th International Conference, ITS 2006, Jhongli, Taiwan, June 26-30, 2006 4053, 813, Berlin/Heidelberg: Springer.

Kock, N., (2005). Media Richness or Media Naturalness? The Evolution of Our Biological Communication Apparatus and Its Influence on Our Behaviour Toward E-Communication Tools IEEE *Transactions on Professional Communication*, 48(2) (June), pp. 117–30.

Lave, J., & Wenger, E., (1991). Situated learning: Legitimate peripheral participation. Cambridge. Cambridge University Press.

Laurillard, D. (2007. Foreword in Beetham, H. & Sharpe, R. (2007). (Eds.) *Rethinking Pedagogy for a Digital Age. Designing and delivering e-learning.* London. Routledge.

Mayes. S., & de Freitas. T., (2007). in Beetham, H., & Sharpe, R., (2007*). Rethinking pedagogy for a digital age, designing and delivering e-learning*, London. Routledge.

McNiff, J., (2002). Action research for professional development – concise advice for new action researchers. Retrieved October 23, 2009.from. http://www.jeanmcniff.com/booklet1.html

Norton, L. S., *Action Research in Teaching and Learning: a practical guide to conducting pedagogical research in universities.* London:Routledge.

Reason, P., & Bradbury, H., (Eds.) (2001). *Handbook of Action Research: Participative Inquiry and Practice.* Thousand Oaks CA. Sage: pp 512.

Reynolds, R.., Caley, L., and Mason R., (2002). *How Do People Learn?* London. CIPD.

Rogers, A., (2003.) *What is the Difference? A new critique of adult learning and teaching.* Leicester. NIACE. 85.

Romiszowski, A., & Mason, R., (2004). Computer-Mediated Communication, in *Handbook of Research for Educational Communications and Technology*, ed. David H. Jonassen (Mahwah, NJ: Lawrence Erlbaum), pp. 397–431.

Santanello. C., & Gupchup, V., (2007). A Student Orientation Program to Build a Community of Learners American Journal of Pharmaceutical Education. Retrieved October 29, 2009. from http://findarticles.com/p/articles/mi_qa3833/is_200701/ai_n18705740/pg_11/?tag=content;col1

Schroeder, C.C., (1996.) *New students – new learning styles,* Retrieved October 23, 2009. from http://www.virtualschool.edu/mon/Academia/KierseyLearningStyles.html

Sharpe, R., & Oliver, M., (2007). Designing courses for e-learning, in H. Beetham & R. Sharpe (Eds) *Rethinking pedagogy for the digital age: designing and delivering e-learning.* Routlege Falmer London.

Shunk, D. H., (2000). *Learning theories: An educational perspective* (3rd Ed). Upper Saddle River, NJ. London Prentice-Hall.

Smith, G. G., Ferguson, D., & Caris, M., (2001. Teaching College courses online vs. face-to- face. *T.H.E. Journal, 28*(9).

Smith, M. K., (1996; 2001, 2007). 'Action research', the encyclopaedia of informal education, Retrieved June 2, from http://www.infed.org/research/b-actres.htm.

Teachers College., (2004). *Expert Sources.* Columbia University Columbia University Press.
Varis, T., (2004). Social perspective of e-learning in the national education system. *Revista de Universidad y Sociedad del Conocimiento (RUSC)* UOC. Vol. 1, n. 1.

Yorke, M, (2006), Employability *in Higher Education: what it is – what it is not Learning & Employability (Series One)* The Higher Education Academy, Retrieved September 30, 2009. from http://www.heacademy.ac.uk/assets/York/documents/ourwork/tla/employability/id116_employability_in_higher_education.