Challenges of Interaction in Online Teaching: A Case Study

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ABSTRACT

This paper explores examples of the interaction between academics and students online, in particular the process of questions and answers generated as a result of the learning process. It highlights the type of questions online students are asking their educators and how they expect their questions to be answered. Also what type of questions the educators expect students to ask and how the educators actually respond to them. The extended hours support offered in some online deliveries results in students relying on individual educators to provide them with detailed support in relation to both administrative and academic problems. The feeling of instant access to educators also creates an expectation of immediate response, which creates a variety of different challenges. This paper examines some of these challenges, and the range of perspectives and disparities between those of the online students´ and the perspectives of the academic staff teaching them. The paper will discuss the issues involved with examples from an online tertiary educational offering in Digital Forensics.

KEYWORDS

Online Learning, Enquiry Based Learning, Student Interaction.

1 INTRODUCTION

Online education provides students with a different experience to the more traditional campus based approach. The development of new online courses is often achieved by placing available teaching resources developed for campus delivery into an online environment. This provides campus-based students with improved access to resources, but it has the potential to leave the target audience of online students with the challenge of exploring converted material with limited guidance. The student experience is then largely governed by an online learning environment such as Blackboard[1], Moodle[2] or Fronter[3], so both the synchronous and asynchronous online interaction, usually via text, occasionally via video with staff and fellow students becomes a vital component of the learning process. This can magnify the difficulties of collaborative work and online communication[4], and students may be compelled to deal with a range of different approaches by academics in dealing with questions posed by online students. What the student is asking and how the question is handled, will therefore make a direct impact on the outcome of the education, from the individual student's perspective. The focus of this paper is to emphasize the importance of interaction in the learning process and using a selection of examples to highlight some of the issues and challenges of guiding enquiry based online students as opposed to campus based students who will have physical access to their educators, and therefore have the advantage of

facial expressions and body language to further support interaction with staff[5].

2 LEARNING ONLINE

Previously online deliveries focused on content development, the use of the WCAG 1.0 guidelines[6] encouraging developers to focus on metrics. The focus has shifted towards content and a more pedagogical approach[7]. However, there are several ways of focusing on content, and defining teaching as a method of transmitting the knowledge of the lecturer[8] could leave the students interacting with large volumes of written material, which for some students does not provide a satisfactory learning environment[9]. Defining teaching as building an understanding, or knowledge, in order to gain experience rather than just the assimilation of facts has been suggested to provide a more successful learning experience[8]. Previous work[10] has suggested that e-learning consists of three main parts playing an important role in a student's daily life: The learning platform, the course content and the interaction (figure 1).

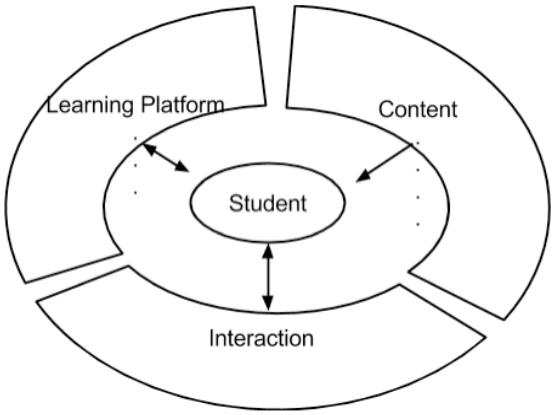


Figure 1. The three main parts in e-learning[10]

The interaction element of e-learning presents in part, an enquiry-based learning approach with students dealing with scenarios and problems as part of the learning process. Therefore the nature of the interaction is important and often takes the form of a series of questions and answers between staff and students (and between students). The examples in this paper are drawn from an online delivery of a Digital Forensics degree course. This is delivered online via the Moodle learning platform[2]. Content is provided as a combination of text, pictures and video for both tutorials and lectures material. Interaction is designed to include both teacher-student and student-student communication. This is achieved through forums, chats and blogs integrated in Moodle, a video streaming and recording system installed in lecture theatres and also the use of Skype[11]. The preferred form of communication for students appears to be text-based tools[4]. A key issue in the use of these tools is being able to express their views in a clear and unquestionable manner[12], and this can present a number of challenges including the generational gap often present between academics and students[4]. The enquiry-based question and answer process underlies many online learning courses with students encouraged to probe and query ideas and problems posed by staff.

3 EDUCATIONAL CHALLENGES

3.1 Over-reliance on the Educator

Bachelor programs are divided into subject based courses or modules. Most online deliveries attempt to present a consistent learning environment that the students recognize from course to course and module to module. Placing the academic material in a common format and structure in the learning platform does this. Administrative elements; time schedules, submission requirements and required reading are also published clearly within each course. However staff may frequently encounter administrative questions from students regarding timing of lectures and purchasing textbooks. They may also pose questions that clearly indicate students have not read the learning material. For example, the students in our digital forensics program were given the task to prepare a two-minute presentation on the difference between single mode and multimode fibre optic cable. One

student posed the question; *"What is a fibre optic cable?"* despite this being covered in detail in the lecture material. Students are not using the online content, technology or other resources available to them, but rather rely on relationships developed with specific members of staff for the content and answers. While encouraging interaction with students, this is clearly an issue, as the students are not developing the necessary self-direction skills. This negotiation between guiding needy students and carrying the weight of too many requests is hardly unique to the online teacher, but it may be experienced as more intensified for online staff in an "always on" online environment[13].

3.2 Online Students not interacting with Other Students

Interaction with peers can also be an essential part of the online learning process. The use of forums, instant messengers, blogs and wikis are common elements in online courses and has been shown to make a positive contribution to learning[14,15,16]. These are commonly used to coordinate joint work, but it seems that digital forensic students are reluctant to interact outside specific tasks. Dillenbourg and Schneider[17] indicate that there is a difference between cooperative and collaborative learning, where cooperative learning is about splitting tasks into subtasks that members in a group solve independently. Ideally group work should require collaborative activity in that the members of a group interact to develop a shared solution to a problem[17]. Evidence from the online forensics degree reveals that students often do not interact unless there is a specific goal and that interaction is achieved via private messages, and not as collaborative interactions in order to agree on a best possible solution to the task in hand. It has been shown that this is a common course of action, to express critical comments privately and not publicly in discussion boards or forums[9].

3.3 Online Students do not reflect on their Actions and Interactions

Reflection is an essential part of the lifelong learner we strive to educate. Dunlap and Lowenthal[18] state that the lifelong learner should have the ability to learn, unlearn and relearn effectively to change and adapt to new challenges. Dunlap[19] also said in relation to lifelong learning that:

"They are able to learn and adapt because they reflect on the quality of their understanding and seek to go beyond what they know."

Experience from the Digital Forensics degree suggests that the intended interaction and reflection of the course blogs is frequently used to criticize the effectiveness of other areas of the delivery or student collaboration instead of focusing on the learning progression. This is in line with the findings of Curtis and Lawson[9] who proposed that the students would reflect more on the effectiveness of the medium, than on the task in progress. However, interactions online differ from face-to-face discussions in several important ways. Online interaction will lack the facial expressions and body language that are a component of face-to-face communication, and this may reduce the extent of the interaction[9]. Also, conversations through forums or blogs may be asynchronous, with delays in receiving a reply. The asynchronous communication has both positive and negative effects. The lack of spontaneity that comes with face to face group members (or in a live, synchronous chat), may well be offset by having more time to reflect and come up with a well thought through and considered response[9]. Although students used to more immediate forms of communication may not appreciate this fact (Figure 2).

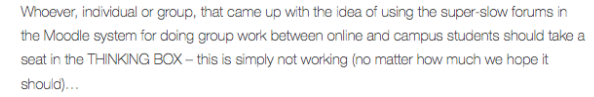

Whoever, individual or group, that came up with the idea of using the super-slow forums in the Moodle system for doing group work between online and campus students should take a seat in the THINKING BOX – this is simply not working (no matter how much we hope it should)…

Figure 2. Blog post 1

The reflection element of the blog where the learner deliberates their work to date to develop a greater understanding[19] and thus obtaining the ability to learn, unlearn and relearn that characterizes a lifelong learner[18], is clearly missing.

3.4 Academic Response

A potential result of the high levels of interaction due to over reliance on the educators is a decrease in the quality of the response. This can be exacerbated by the generational gap between our students and the staff[4], since many online students are millennials[20,21]. Taylor[22] also describes millennials as individuals who *"expect high grades without any significant effort and expect direct personal attention from staff on demand."* It may also be a result of the differences in the way online interaction is being perceived[23]. Teachers also become frustrated due to the perceived lack of interest from students in finding their own answers. This can create a barrier for both asking and answering questions as staff attempts to limit their responses to information sources in an attempt to encourage student initiative in searching for information. In teaching digital forensics there are also a number of responsibilities that an educator has, and these need to be reflected and implemented in an online teaching environment. Whilst educators across the computing disciplines have similar responsibilities the nature of digital forensics and the nature of the environment that graduates are likely to find employment in mean that issues – such as encouraging ethical and professional behaviour and the need to sensitize students to the moral dilemmas they will encounter in their professional lives – will require a very specific approach. Similarly taking into account the legal domain and the ever-changing technical environment that digital forensics takes place in; students need to be aware of the importance of the potential and actual challenges and problems they will encounter.

3.5 Creative Interaction

In the early 20th century, Dewey[24] argued that improving the reasoning process was the main function in education, considering the teacher as a guide through creative interaction. This requires positive interaction between staff and students. In an environment where educators are dealing with what they perceive as the wrong questions and students frustrated by the lack of instant response, maintaining a positive interaction can be challenging. Waldner, McGorry and Widener[25] found that educators who can master the combination of technology (online learning techniques) content and pedagogy would have more effective expertise in promoting engagement among students. This still relies on student engagement, the students' willingness of learning how to learn, making an effort to find answers themselves. Campus based student-teacher interaction required both student and teacher to be available at the same time, within scheduled timetables or office hours. If not, the students would have to use their own resources to find solutions[13]. The Internet has made it easy and convenient for students to throw questions of all sorts and at all times at the educators, educators struggle to answer them in a way that upholds the students sense of care, which according to Deacon[26] is more important in an online environment than in face-to-face-classes.

4 EDUCATORS EXPECTATIONS

4.1 Educators Expect Proper use of Resources

A basic requirement of a learning environment is to ensure that administrative material, timetables, schedules and deadlines are available for the students. The students that enrol in online courses may be mature students, often managing other obligations like family and work, in addition to their academic tasks[27]. These pressures could lead to the students pursuing the more direct route of asking the educator. The possible access to

teachers 24/7 enabled by mail, smartphones, and instant messengers and online learning systems, does not mean that the teachers should be available 24/7, but students might feel that the immediate access they have to their teachers, requires an immediate response[13]. Long-Goding[27] argues that face-to-face orientation *"can facilitate the development of effective and efficient learners by addressing the strategies associated with success in the online environment"*, so one could incorporate a visual tour of the resources present in the course pages in such orientation, in order to guide the students in where to find answers to different practical questions.

4.2 Educators Expect Reflective Interaction

Students are more likely to be successful when they feel connected towards the institution and the teachers and also towards the other learners[27]. Several platforms for interaction among students could be provided, in order to enhance the feeling of community. Synchronous chats allow for asking direct questions during lectures, and it also allows students to make contributions to the lectured topic. These can be combined with forums used for asynchronous discussions, questions and material related to the topic being taught. Staff also hopes for students to consider and reflect on learning material, the students' own work and on comments and suggestions from their peers. The ability to critically think about actions taken, reassess the situation and evaluate conclusions is a vital part of learning, and programs should therefore involve means to both encourage and evaluate the students' ability to reflect on their progress in the subject. Norman[28] said, *"It is strange that we expect students to learn, yet seldom teach them anything about learning"*. Starting a new semester with new students, an approach of "*there is no such thing as a stupid question - just stupid answers"* can be used to deal with the initial process of adapting to the system. However this does not mean that the students can or should skip the process of trying to find the answers to questions themselves: If an IT student asks why a system crashes after installing new hardware on their home computer, the educator is unlikely to be familiar with the specific hardware configuration and will have to research the problem, on the manufacturer's website, forums and probably using common internet search engines. This is a process the student could perform instead of asking the educator. The interaction with the student may resolve the hardware issue but does not further the learning process. As Garrison and Cleveland-Innes[29] put it: *"Meaningful engagement does not simply correspond to sending lots of messages."* Even though Twigg[30] argues that it is important to help students feel that they are a part of a learning community by having an expanded support system, the students should also contribute to their own learning by performing basic searches on the topic first.

5 WHAT DO STUDENTS EXPECT FROM EDUCATORS?

5.1 They Expect Educators to be Available at all Times

As the Internet and various communication methods has made it possible for students to "reach" their educators at any given time, they often explore this possibility. They may get out-of-hours answers if staff is online, but that is the exception rather than the rule. Even though every message is presented in the same format, they might require a different type of response - such as face-to-face meetings, tutorials presented for the whole class - or a technical help desk[13]. As previously mentioned, Deacon[26] states that creating the sense of care is more important in an online environment, but the constant negotiation between caring and handling too many cares[13] is in the experience of the authors more intense for online teachers than for their classroom-based colleagues.

5.2 They Expect Educators to Answer All Types of Questions

Questions ranging from *"how do I login to the course pages?"* and *"when do I get the student loan?"* to *"how should I write this coursework"*, *"what is the correct answers in the summary-quiz?"* and *"do you think the police have my iPhone under surveillance?"* can be posed. Some of these questions can be answered immediately; some of the questions would require more research and others are simply not relevant to the course. The preference of asking staff rather than reading the learning material can result in further problems as this can result in the student not examining the assessment schemes provided along with all coursework. Students may with a degree of justification, equate effort to grades, but not unless the student has addressed the question set in the assessment.

6 POSSIBLE SOLUTIONS

A various range of solutions have been considered to address the identified problems. In most teaching environments, there will be a mixture of staff with different specialties, experience, and philosophy regarding online education. This can result in content published within each online course differing in a way that is both confusing and frustrating for online students. The presentation of the material also differs based on the experience of the lecturer both within education in general, and online education in particular.

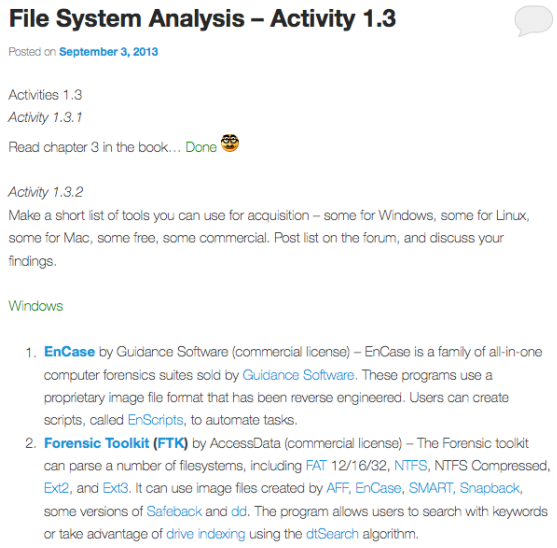
In the Digital Forensics Degree a standardized course structure has been adopted, but as in most universities, the majority of courses are developed and presented by individual educators[30], so the actual use of the template with the standardized structure may vary between staff members. However all the practical information the students need to complete each course - such as where to download coursework, when it is published, when the deadline is, when lectures start, how to find the live streams, is located the same place and in the same format for every course in order to make it easy for the students on a daily basis. This is clearly not enough as the students continue to ask questions that indicate that this information has not been read. In the online Forensics Degree this has been supplemented with a face-to-face orientation at the start of the semester (even if over a live video link), to visually point to where this information can be found.

In order to free staff from the being connected at all times and feeling obliged to "care" for students 24/7, forums have been integrated into the learning platform as an arena for questions related to the topics in each course. The forums are however asynchronous, and sadly, many of the students do not recognize the time to reflect and think things through[9] as beneficial. The lack of immediate responses in asynchronous discussions makes the use of forums unpopular for those who require instant assistance[31]. This can result in them being unused, the forum requires interaction to be a successful feature of the learning environment. If there is no initial interaction then students are unlikely to contribute. This is particularly the case if there are limited student numbers on a particular course. A solution may be to make certain elements mandatory at the beginning of the course.

We provide several platforms for interaction among the students, in order to enhance the feeling of community. During live-streamed lectures, we use a teaching-chat in Skype where all educators related to the course and all students participate.

Obligatory use of blogs as reflective journals is implemented and in order to clarify what elements are being assessed students are provided with a detailed assessment sheet containing the four main areas of assessment: Usage, Relevance, Reflection and Interaction. Under the reflection part - in order to achieve high marks - it is stated that postings should *"demonstrate a clear student progression in the subject area over time"*. Students often use the blog as a place to respond to activities - with no reflection involved at all, as shown in figure 3.

To address this issue, lectures on reflection and the use of blogs are included in the first course all students go through in the beginning of the first semester, to explain why we use blogs in assessing the courses and how they should use the blogs. Students in more "creative" programs appear to grasp the concept of reflection more readily than the case is for the students in the Digital Forensics program.



File System Analysis – Activity 1.3

Posted on **September 3, 2013**

Activities 1.3

Activity 1.3.1

Read chapter 3 in the book… Done

Activity 1.3.2

Make a short list of tools you can use for acquisition – some for Windows, some for Linux, some for Mac, some free, some commercial. Post list on the forum, and discuss your findings.

Windows

1. **EnCase** by Guidance Software (commercial license) – EnCase is a family of all-in-one computer forensics suites sold by Guidance Software. These programs use a proprietary image file format that has been reverse engineered. Users can create scripts, called EnScripts, to automate tasks.
2. **Forensic Toolkit (FTK)** by AccessData (commercial license) – The Forensic toolkit can parse a number of filesystems, including FAT 12/16/32, NTFS, NTFS Compressed, Ext2, and Ext3. It can use image files created by AFF, EnCase, SMART, Snapback, some versions of Safeback and dd. The program allows users to search with keywords or take advantage of drive indexing using the dtSearch algorithm.

Figure 3. Blog post 2

Staff training is also essential including specific training and guidelines with best practice for interacting with students online and addressing the needs for a standard consistent approach in addition to participation in research into learning processes in general and online learning in particular.

7 CONCLUSIONS

It is vital that instructors provide online guidance, structure discussion topics and devotes considerable time supporting students in online learning[32]. Therefore the planning and development of online learning should include careful attention to student interaction, both synchronous and asynchronous online interaction, and various channels; blogs, via text, forums and via video as these are a vital component of the learning process. What the student is asking and how the question is handled, will make a direct impact on the outcome of the education, from the individual students' perspective. We cannot expect that students will simply know how to learn online or that faculty staff will know how to teach in this environment, so training for both is essential[33]. The online learning environment and the students' interaction with material, staff and other students via this environment then largely govern the student experience. The role of the instructors in constructivist approaches to learning is to provide rich learning environments with, according to Lane[34], extensive social interactions, self-assessment and independent work for the students. In developing flexible and dynamic learning activities that encourages student to think, plan, execute and reflect about the topics that are being taught, it is possible to refocus effort from developing static learning material in an ever changing educational environment, to the time needed to support students *"struggling to make new information fit into what is already known, and how to apply it in real-life"*[10].

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