Webquest SAJOT

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Submission date: 22-Jan-2018 09:51AM (UTC+0200)
Submission ID: 905258956
File name: 80_Paula_Barnard-Ashton_Webquest_SAJOT_3109_247660773.docx (71.25K)
Word count: 4949
Character count: 29481

Using a WebQuest to orientate first year students to the University's online resources and virtual learning environment

ABSTRACT

First-year students present with diverse digital literacy skills. Orientation to online tools and resources via a WebQuest was introduced as a novel modality to allow students to work at their own pace. Occupational Therapy (OT) and Physiotherapy (PT) students over three consecutive academic years completed the WebQuest. A descriptive survey design was used to investigate the students' electronic media preferences and their perceptions of the WebQuest. The students reported preference for personal computing and home-based internet, and rated their electronic media proficiency as very good. The WebQuest was seen as beneficial to their learning and the difficulty level of the WebQuest was "just right". The majority of students felt that the WebQuest made the learning process more interesting, but were more ambivalent regarding their enjoyment of the WebQuest, possibly due to technical issues and experiencing it as being time consuming. Overall the WebQuest was a successful modality for orientating the students to the online tools and resources of the University.

Keywords: WebQuest; blended learning; e-learning; digital literacy; occupational therapy; physiotherapy

INTRODUCTION

Traditionally the first year Occupational Therapy (OT) and physiotherapy (PT) students have attended an orientation workshop in a computer laboratory which takes them step-by-step through how to access and use the Virtual Learning Environment (VLE), the online library resources, anti-plagiarism software and their student email accounts. Typically, students enter the higher education environment with a diversity of computing and technology experience due to varied high school exposure and socio-economic circumstances [1,2]. During the orientation workshops, the proficient students tended to be bored with having to wait for others to catch up, and the inexperienced students were stressed by perceived pressure to hurry up when they did not understand the work. It became obvious that the step-by-step, face-to-face approach was frustrating most of the students. The opportunities afforded by using a WebQuest were explored as a possible way to 'practice what we preach' by using interactive e-learning in the orientation session.

Blended Learning and Digital Literacy

Blended Learning (BL) is widely considered to be the integration of traditional face-to-face teaching methods with e-learning activities in a coordinated manner to address the learning outcomes of the course [3,4]. Health science education has adopted BL as a strategy to address the intense learning demands of the rapid technological advancement and ever expanding knowledge within the health professions [5]. Blended Learning as an active learning style is thought to improve a student's critical and analytical thinking, application of new knowledge in clinical practice, and reflective practice for higher order thinking [4]. Ocak and Topal [5] found that BL in an anatomy course allows for any-where, any time access to resources, which facilitated students' freedom to control their learning. While the students felt it was important that the online media should not replace cadaver dissection, and some students were limited by poor internet connectivity, they were generally positive about the BL course and were comfortable with BL being introduced in other courses. Evidence suggesting improved student performance in courses implementing BL is growing, particularly when correlating active participation in the online activities such as engagement in online discussion forums, with student assessment [6-8]. However, a frequently cited concern in the implementation of BL courses is the digital literacy skills of the students [9].

Papageorgiou and Callaghan [1] critiqued the marginalisation of some students entering the South African higher education system due to poor technology preparedness created by inequality within the high school system despite two decades of post-apartheid democracy and development. They strongly advised academics to be aware of advantaging some students and marginalising others when introducing information technology-dependent curricula, and recognise that students will need to develop these skills in order to cope in their professions once qualified. Snowball and Mostert [3] supported this concern when introducing BL as a response to the teaching and learning demands created by massification. Their study recommended evaluation of student digital literacy skills on admission, and the provision of additional support where needed. They demonstrated that first year students' skills developed rapidly, and uptake of participation on the VLE peaked prior to assignment and examination dates.

Digital literacy can impact online reading literacy. Wu and Peng [10] found that teenagers who had good online navigation skills and engaged in purposeful information seeking habits while online, were more likely to have better online reading literacy than those who engaged in more social online behaviours. Pak [11] became concerned with the digital literacy skills of her students who were typically from low socio-economic backgrounds. Of particular note was her observation that while modern students are proficient in social media related skills,

this does not correlate with academic digital ability. She created a WebQuest to address this gap within the context of an English language course. Leung and Unal [12] found that WebQuests support the development of digital literacy, irrespective of the topic and content, further supporting this teaching strategy.

What is a WebQuest?

The concept of the WebQuest was pioneered by Dodge [13] as a tool to make online learning more engaging and efficient for students. Dodge's most cited definition is:

"A WebQuest is an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the internet." [13]

This simplistic and somewhat nebulous definition was expanded during a more recent interview with Dodge:

"A WebQuest is built around an engaging and doable task that elicits higher order thinking of some kind. It's about doing something with information. The thinking can be creative or critical, and involve problem solving, judgment, analysis, or synthesis. The task has to be more than simply answering questions or regurgitating what's on the screen. Ideally, the task is a scaled down version of something that adults do on the job, outside school walls." [14]

March [15] worked closely with Dodge in developing the process and attributes of WebQuests, as well as the educational theory supporting the use of this teaching strategy. The constructivist and technology-enhanced approach to learning formed the foundation of the attributes required to design high quality WebQuests [15,16].

The cornerstone of the well-designed WebQuest is the nature of the overall activity and tasks. The tasks should not merely require the student to present the information sourced from the internet, but rather apply it to a problem, challenge or skill[16,17]. The task stimulates the student's critical thinking, approach to problem-solving and judgement, and action in the task context is required [14,15,17]. Consequently, WebQuests are deemed to motivate students through presenting an authentic real-world challenge [16-18]. While most studies reflect the success of WebQuests, Kobylinski [19] surveyed the student experience of a WebQuest designed to develop the English writing skills of first year students, and found that the students perceived it to be ineffective and less motivating than their self-directed research into the topic. He however acknowledged limitations in the rudimentary design, restrictive format, and the cumbersome tasks involved in this particular WebQuest. It can thus be considered that the WebQuest may not have been suitable as an education tool in that context, or may have been poorly designed.

WebQuests can be categorised as short-term or long-term, depending on the duration and complexity of the WebQuest [13,17]. Short-term WebQuests, as applied in this study, can be completed in a few sessions, and focus more on knowledge gain and understanding than on higher order application [13,17].

While WebQuests are popular in secondary school education [20,21] and undergraduate teacher training [22,23], there is a paucity of investigation into the use of WebQuests in health professionals' education, which further seems confined to nursing education. Sanford et al. [24] propose two detailed examples of WebQuests which could be used in the continued professional development of nurses, but give no evidence of having executed either example in practice. Drozd and O'Donoghue [25] implemented a short-term WebQuest with 11 undergraduate nursing students. Four students did not complete the WebQuest, either due to poor computer skills or late registration for the course. The seven students who completed the WebQuest were positive about the learning process, the novelty and their knowledge gain. It was however emphasised that WebQuests should be launched face-to-face to ensure student understanding and technology access, and that direct alignment to the curriculum would make it more relevant. In an era in which BL is prominent in higher education, it is surprising that health professionals' education is relatively oblivious to this tool.

METHOD

The objectives of the study were to investigate:

- The students' personal computing access on entrance to the first year of study.
- Their experiences of the WebQuest in terms of constructs: two cognitive (benefit to learning and level of difficulty) and two emotive (enjoyment and making learning interesting).

This study used a cross-sectional, descriptive quantitative survey design to evaluate the use of the WebQuest to orientate the first year OT and PT students to the University's online resources. Ethical clearance was obtained from the institution's human research ethics committee (M141168), and all OT and PT students who engaged with the WebQuest were asked to participate in the study. Informed consent was electronically captured for the survey results to be used for research purposes after verbal explanation of the purpose of the study during the WebQuest introduction session.

Participants

Six groups of students participated in the WebQuest over three consecutive academic years:

- 2015 OT group: enrolment of 68 students (OT_{y1})
- 2015 PT group: enrolment of 61 students (PT_{y1})
- 2016 OT group: enrolment of 65 students (OT_{y2})
- 2016 PT group: enrolment of 55 students (PT_{y2})
- 2017 OT group: enrolment of 70 students (OT_{y3})
- 2017 PT group: enrolment of 64 students (PT_{y3})

Intervention

At the start of the academic year a two-hour workshop is allocated to introducing the first year students to the VLE and other university online resources. A WebQuest was designed using a 'Sherlock Holmes' [26] theme via storyboarding software [27] that is Sharable Content Object Reference Model (SCORM) compliant [28]. The WebQuest was imported into the VLE, and links to the required online resources were provided.

[Insert Figure 1 here]

This short-term WebQuest consisted of 12 tasks which included updating their VLE profile page, downloading and reading important documents such as the 'social-media policy', accessing the professional course 'Libguide' on the library portal, watching a video on plagiarism (Figure 1), writing a paragraph about plagiarism and submitting it to the plagiarism detection online program, and completing a word puzzle and a quiz. The objectives of the WebQuest were that the students would:

- gain the skills of navigating and engaging with the VLE and the library portal
- become familiar with important policy and professionalism documents
- understand academic issues around plagiarism (which is a requirement in all course assignments) and apply the principles in a written task with similarity feedback generated by the online plagiarism detection programme

The WebQuest was introduced to the students in a computer laboratory by one presenter and three facilitators who collaborated on the design of the WebQuest. The introduction ensured that all students could access the VLE and open the WebQuest. It could be completed within the 2-hour workshop time, but students were given the opportunity to ether complete it there or leave and do it in their own time. They were free to work individually or in informal groups, but all students were required to complete the WebQuest within six-weeks, although no marks were associated with the activity.

Extraneous variables

While all effort was made to control for extraneous variables, the facilitators of the intervention noted that the OT_{y2} was in an unfamiliar computer venue which led to a delayed start to the session. Poor projection visibility in this venue created additional difficulty in following the introduction presentation. This caused a general level of frustration and apathy among the OT_{y2} students.

Survey

A purpose-designed survey instrument was created using REDCap [29], which securely captures and allows management of the data via a web-based interface. The survey consisted of:

- two demographic questions to verify cohort allocation;
- two multi-option categorical questions related to the students' personal computing environment;
- students' rating of their electronic media proficiency on an ordinal scale from 1 (very poor) to 10 (excellent);
- four nominal scale questions and two optional, short answer questions to investigate their experience of the WebQuest.

The survey was the final task of the WebQuest, but students were given the option to 'skip' the task should they not consent to participate in the study.

The data from the four groups were descriptively analysed using non-parametric statistics. Categorical data were analysed for significance using the Freeman-Halton extension of the Fisher exact probability test (FE) or the Chi-square test (χ^2) as appropriate, based on category frequency. The p-value was analysed using the Chi-Square test (χ^2) if over 80% of categories had a frequency <5, and the Fischer Exact (FE) when less than 80% was evident. Ordinal data were analysed using the Kruskal-Wallis k=3 Test [30,31]. A p-value ≤ 0.05 was considered significant. The short response data were coded and analysed for patterns of frequently cited experiences using MaxQDA version 12.1.4 software [32].

Limitations of the Study

The limitations that were evident during this study were:

- The computer laboratory venue was not consistent between the groups which implies that the computers the students used to access the WebQuests may have had inconsistent processing power and internet bandwidth speeds.

- The study was not designed to compare the use of a WebQuest to a control teaching method, such as the traditional step-by-step workshop, as the survey questions relating to the student experience would not be applicable to both contexts, leaving little to compare.
- The study is confined to a single university setting. While the study was conducted over three years with relatively consistent findings, replicability is limited due to the WebQuest design being specific to the VLE and online resources available at this particular university. A similar WebQuest could however be modelled on the same tasks for use at other Universities.

RESULTS

The WebQuest was completed by 383 first year OT and PT students over a three-year period (2015-2017), of which 65.3% completed the survey. The response rates per group were n(%): OT_{y1} 57(83.8%); PT_{y1} 38(62.3%); OT_{y2} 44(69.3%); PT_{y2} 40(72.7%); OT_{y3} 47(67.1%) and the lowest response rate PT_{y3} 23(35.9%).

The students' preferred device for accessing electronic media and their connectivity preference at the start of their undergraduate career is reflected in Table I and Table II respectively. There were no significant differences in computing preferences when compared year on year within each profession, and between profession groups per year, except when comparing the preferred computing devices of the third year OT_{y3}: PT_{y3} $p=0.023$ where the OT_{y3} had significantly higher preference for personal computers/laptops. This indicates that the groups are comparable in terms of technology preferences. The majority of the students preferred using their personal computer/laptop (64.8%) and had access to home based internet (66.8%). Of note is the nominal number of students (<1%) who have no access to a device or the internet.

[Insert Table I here]

[Insert Table II here]

In rating their computer or electronic media proficiency (Table III) there was no significant difference between the groups, with a total mean rating of m=7.61 on a 10-point scale, with a mere 19 (7.6%) students rating their proficiency at five or less over the three years of the study.

[Insert Table III here]

Two cognitive constructs were investigated in terms of the students' perception of benefit to learning (Table IV) and how difficult they felt the WebQuest was (Table V). More than half of the students (56.2%) rated the benefit to learning as good, and two-thirds perceived the level of difficulty of the WebQuest to be 'just right' (65.2%).

[Insert Table IV here]

[Insert Table V here]

Two emotive constructs were investigated in terms of the students' perception of enjoyment of the WebQuest and whether it made the learning process more interesting (Table VI). The students were relatively evenly distributed between being undecided (39.4%) and enjoying (44.6%) the WebQuest, with the OT groups showing significantly different profiles of enjoyment from one another. Most students (62.9%) considered that the learning process was made more interesting through the WebQuest.

[Insert Table VI here]

Across all four constructs there was no difference in the results of the PT groups. The OT_{y2} and OT_{y3} were similar, but significantly different from OT_{y1} for both cognitive constructs and the emotive construct of making the learning process more interesting. The OT students' enjoyment of the WebQuest appears to wane each year with a significant difference noted between each year.

The two optional, short open-ended questions explored aspects the students' 'liked' versus 'disliked' aspects of the WebQuest. Students across the groups commented that this was a novel way to learn, with it being like a game, which made it fun. They liked that it was self-paced learning, that taught them relevant and useful information that they would be able to apply in their course.

> *"People are more positive about learning when they see the learning process as a game and I think [the] WebQuest was successful in allowing people to have fun while still learning valuable information." (Student 140 PT_{y1})*

"Instead of the controversial lecturer standing in front of the class type of learning it actually was a total contrast of what learning is and that made it very intriguing". (Student 262 OT_{y3})

"1) It was self-learning versus just being lectured. 2) Involved a lot of participation from my part. 3) I was not spoon fed which made the learning more meaningful" (Student 145 PT_{y2})

Students reported that the WebQuest instructions were confusing or unclear, it was too time consuming and that they did not enjoy reading the long policy documents. There were reports of technical difficulties particularly with the OT_{y2} and OT_{y3} cohorts: internet connectivity; the browser freezing; students finding it difficult to navigate between the tabs; and the WebQuest not saving their progress.

"It was more the technological difficulties that gave problems such as internet connection." (Student 71 OT_{y2})

"It took up quite a bit of time simply because internet was slow and some features did not work on some devices. It was a lot of work just to go through things which were rather easy to figure out anyway. Although innovative and fun, when it started to waste time, the originality turned into an irritation." (Student 274 OT_{y3})

DISCUSSION

Blended Learning (BL) in South African universities is challenged by concerns that some students enter higher education with poor digital literacy skills due to unevenly distributed access to technology resources during their high school career [2]. Of interest in the present study and consistent with other research is the high percentage who choose to use a personal computer/laptop and access electronic media via home-based internet, as well as the number of students who have more than one computing device and more than one modality of internet access [11]. Surprisingly, less than half the students indicated the use of a mobile device and mobile data as a preference. This does not imply that they do not have mobile devices, merely that they prefer other modalities for accessing electronic media, which may be a reflection on the high cost of mobile data in South Africa [33]. It therefore supports the need for access to stable university-funded bandwidth. Despite common concerns about the digital literacy of first year students [1,2], the study groups were confident about their electronic media proficiency, which primes them for blended learning. Drozd and

O'Donoghue [25] highlighted that the success of a WebQuest may be impacted by the students' access to computers and digital literacy skills, however, in this study, less than 1% of students were limited by access, and a small percentage of students felt that their electronic media proficiency was poor/average (7.6%). The readiness of these students suggests that WebQuests are a viable BL strategy in this population, but the difficulty of the WebQuest may be a factor. Overall, the students felt that the level of difficulty of the WebQuest was 'just right' (65.2%).

Similar to Aina and Sofowora [18], the OT and PT students perceived the WebQuest as beneficial to their learning (70.3% rated it as 'good' or 'excellent'). For a WebQuest to be successful it needs to be authentic and real-world [15] which is validated in the student comments that the content of the WebQuest was meaningful and valuable and 62.9% felt the WebQuest made the learning process more interesting.

Studies of the benefits of using WebQuests seldom consider the students' perceived enjoyment as a construct to investigate, rather adding minor anecdotal comment on observed indications that students have enjoyed it [25,34]. The notable finding in this study is the apparent disconnect between the students' positive responses to the constructs of benefit to learning and making learning interesting, to the more ambivalent shift when asked about enjoyment. There were very few negative responses, but students were divided between being undecided (39.4%) and being positive (44.6%) concerning their enjoyment of the WebQuest. The frustrations expressed by the students, particularly the technical difficulties experienced by OT_{y2} and OT_{y3} cohorts, and that all cohorts felt that the WebQuest was too long with too much reading, possibly accounts for the shift in enjoyment, as was described in the quote by Student 274 OT_{y3} above. It is important to recognise that enjoyment is subjective and may not be directly correlated to students' finding the process interesting or learning from the experience.

The students' primary frustration was that some of the policy and guideline documents they had to download were too reading-intensive. This possibly relates to the point at which required reading skills and comprehension 'ratchet up' between secondary and tertiary education, and the diversity of academic preparedness of our students, many of whom have experienced socio-cultural inequality [2]. They showed reluctance to engage with large documents, despite hyperlinked navigation of the document contents. These documents represent the prescribed readings that would be required throughout their undergraduate careers. This reflects the students poor online/electronic reading literacy compared to paper-based reading literacy, and the impact of navigation and information seeking skills on reading [10]. Selection of prescribed readings should thus take readability into account, and

University documents could be designed to be more user-friendly. The online/electronic reading literacy of the students was not the focus of the study but has impacted the students' enjoyment of the WebQuest and indicates a possible area of concern in their academic readiness.

CONCLUSION

A WebQuest was designed to introduce first year OT and PT students to BL and online tools and resources available within the University. The students indicated higher than anticipated access to computing devices and off-campus internet access and perceived their electronic media proficiency to be very good. Of concern was the students' reluctance to read lengthy documents possibly indicating that the online/electronic reading literacy of the students impacted their enjoyment of the WebQuest. Students found the WebQuest to be too long, indicating that revision of the tasks and scheduling appropriate time for completion should be explored. The WebQuest is considered to have achieved the desired skills and learning objectives, and the students experienced it as an interesting, creative and fun way to learn.

Considerations for the future within this context include: The WebQuest should be contained to a single laboratory session to combat the technical issues. Consideration should be given to reducing the overall length of the Webquest, and exploring design modifications which support ease of reading task instructions, while maintaining the learning objectives. A task on navigating large electronic documents to find pertinent information may be a valuable future addition. This study indicates that a dialogue should be opened with the University's central services involved in developing and publishing rules and guideline documents, regarding the readability and complexity of the documents they publish.

Considerations for implementation of WebQuests in health professional education: Exposing students to a WebQuest early in their academic career provides lecturers with the opportunity to explore the use of WebQuests in their BL modules, and is shown to improve the students' digital literacy [12]. Short-term WebQuests create a fun context to learn and explore real-world issues within the context of the curriculum. In designing a WebQuest for health professionals' education, endure that it has a fixed duration (one to two weeks) to drive consistent participation. Consider the availability of electronic devices and allocate time in a computer laboratory if you suspect that your students' access to the WebQuest content will be influenced by the need to pay for mobile data. Students are entering higher education with a high level of computer and electronic media proficiency, which is creating more opportunities to use BL activities such as WebQuests to design for 21st century learning.

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PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12

PAGE 13

PAGE 14