

WebQuest development in the blended classroom: What do students gain?

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This paper reports on the challenges and benefits experienced by undergraduate Production and Operations Management students who were required to develop their own WebQuests focused on one topic within the course scope. The research evaluates how student attitudes/perceptions, experiences and learning were affected as a result of their exposure to the development of a WebQuest. The project was a departure from typical WebQuest applications in that it is usually pre-service or in-service teachers who are required to develop their own WebQuests. Student groups were asked to select a topic from the course syllabus and develop a WebQuest which they would share with the class. Students had high initial resistance to the project, but by the end of the course, many students reported satisfaction with the depth and breadth of exposure, entertainment and variety that supplemented in-class coverage, materials to aid revision for final exams, improved time management and teamwork capabilities, enhanced information technology competencies, improved research skills, and a newfound confidence and excitement about learning. Furthermore, based on student self-reports it appears that the project also supported the development of several university-defined distinctive graduate competencies. The paper's recommendations include measures to promote exploration of additional non-traditional elearning modalities as substantial benefit could be derived by all involved.

Key words: WebQuest development, educational technology, blended learning, elearning, student attitudes, student experiences, graduate competencies, employability

Introduction

Teaching approaches that challenge students to extend themselves beyond lower-order competencies such as recall and comprehension are desirable, especially at the university level. By tasking students with a problem that stretches their capabilities, the educator ensures that just seeking out and comprehending information is insufficient. Instead, students must internalise the material, ruminate on it and convert it into some applied form that helps to break down the problem and solve it using higher order skills that may include analysis, synthesis, and evaluation (Bloom, Englehart, Furst, Hill & Krathwohl, 1956). Elearning approaches can add value in the classroom, as a part of a blended learning strategy (Al-Adwan, Al-Adwan & Smedley, 2013) and there are several tools that may be used to encourage higher order operations in the classroom, one such tool is WebQuest.

WebQuest is an internet-based teaching tool for project-based learning (Grant, 2002) and the inventor of the WebQuest concept, Dodge (1997) explains that WebQuests begin with a challenging inquiry-oriented problem that students must address by exploring suggested web-based resource links and completing a series of skill- and knowledge-building activities related to the subject. Research has revealed that students who complete assigned WebQuests improve their critical thinking (Sanford, Townsend-Rocchiccioli, Trimm & Jacobs, 2010), information literacy (Leung and Unal, 2013), and even time management abilities (Abbitt & Ophus, 2008; Allen & Street, 2007).

Because WebQuests allow students to incrementally build upon their existing knowledge as they proceed through the tasks set out in order to reach a solution to the problem, WebQuests' constructivist approaches may find applications in a wide range of settings and subject areas. While most WebQuests have been developed for use by primary and secondary school students, there have been some applications at the university level. According to Nordin and Alias (2013) web-based teaching and learning approaches, such as WebQuest, have the potential to promote high order learning. WebQuest research in several countries has looked at in-service teachers' WebQuest development across diverse fields, such as research (Krismiyati & Satya, 2012), mathematics (Abu-Elwan, 2007), education and education technology (Wang, Kinzie, McGuire & Pan, 2010), language development (Laborda, 2009; Sox & Rubinstein-Ávila, 2009; Alshumaimeri & Almasri, 2012), literacy (Ikpeze & Boyd, 2007), Information and Communication Technology (ICT) (Nordin & Hong, 2009), social work and family therapy (Lim & Hernandez, 2007) and physical education (Papastergiou, 2011).

WebQuests have been proven to enhance students' subject-specific competencies (Abbitt & Ophus, 2008) and by their very nature boost ICT competencies as students have to navigate the worldwide web to access resources. Fitting roughly into the period of history between the birth of the PC in 1981 and September 11, 2001, today's university students comprise mainly Generation D, a group Shih and Allen (2006) label "Digerati". It seems understandable, then, that our university environment is overrun with digital manifestations, be they the ubiquitous smartphones and tablets, the messaging, texting, emailing, and constant social network updates, the earbuds that seem permanently attached to some students' ears, or even the provision of Wi-Fi campus-wide, allowing students to browse the internet while studying or contributing in a lecture theatre. Making better use of university ICT resources as well as student-owned devices to support learning would be sensible in the light of financial challenges faced by many universities (Alsabawy, Cater-Steel & Soar, 2013). Through policy implementation, The University of the West Indies, St. Augustine seeks to incorporate more instances of blended learning into practice (Thurab-Nkhosi, 2013), and WebQuests are likely to support this as they can dovetail with readily available e-devices (Chang, Chen & Hsu, 2011).

WebQuests have previously been created by teachers and assigned to students who are required, often in groups, to take on a higher order task such

as developing some output or solving a problem. It is understandable, therefore, that student teachers tend to be the group who are tasked with developing WebQuests of their own and WebQuest development has been shown to contribute meaningfully to student teachers' attitudes, learning and higher order thinking (Aina & Sofowora, 2013).

The research in context

This research arose from the opportunity to use WebQuests in a Production and Operations Management (POM) course, to leverage perceived student ICT-dependence or enjoyment. This is in an attempt to turn student connectivity into increased student connectedness with the subject, as well as development beyond the subject area. The research went beyond merely asking students to learn by using teacher-provided WebQuests in the classroom. Instead, students were tasked with working in groups to create and use their own subject-related WebQuests as the major coursework assignment for the semester. The premise was that this would force students out of their comfort zones, requiring them to become creative in designing their WebQuest (viz. context, structure, and complexity), surveying and critically evaluating resources for inclusion in their group WebQuests, and selecting the technology to be used to build the WebQuest. In addition to promoting academic learning, it was felt that WebQuest creation might help develop some of the distinctive graduate characteristics reflected in the 2012-2017 strategic plan of The University of the West Indies (2012, p.47), namely:

- i. a critical and creative thinker*
- ii. an effective communicator with good interpersonal skills*
- iii. IT-skilled and information literate*
- iv. innovative and entrepreneurial*
- v. globally aware and well-grounded in his/her regional identity*
- vi. socially, culturally and environmentally responsible*
- vii. guided by strong ethical values*

The objectives of the student WebQuest creation research are as follows:

1. To evaluate how the WebQuest creation project impacted on student attitudes/perceptions, experiences, and learning.
2. To evaluate how the WebQuest creation project may have contributed to development of distinctive graduate characteristics, based on student self-reports.

The structure and scope of the project emerged from the establishment of the following overarching research questions related to the above objectives:

1. How will university students' creation of a WebQuest in a Level 3 undergraduate POM course affect their attitudes/perceptions, experiences, and learning?
2. How might the use of a WebQuest contribute to the students' development of University-defined distinctive graduate characteristics?

The research paper reports on student opinions and experiences. The students judged their own academic and skills development, challenges, and future potential. The teacher's experiences and perceptions are not covered due to space restrictions. The research was conducted on a single class consisting 82 students from several demographic segments (young adults, mature students, working part-time students, full-time students, males, females, and students of diverse ethnic backgrounds). Except for a basic descriptive summary of some demographic data, quantitative analysis of student data is not reported in this paper.

Learning and teaching

Learning takes place throughout our lives. Each person has learning approaches and learning conceptions but these may vary with time and experience. Learners may perceive their learning as falling into one of five groups focused on knowledge acquisition, memorisation, building a store of knowledge or abilities that can be drawn from as needed, sense-making, and construction of new knowledge as a result of new interpretations of held knowledge (Säljö, 1979). Understanding student learning may be enhanced through consideration of student experiences (Kolb, 1984), student learning styles (Felder & Silverman, 1988; Fleming, 1995) or student predispositions (Gardner's, 2006; Myers & McCaulley, 1986).

Many educators recognise the value of using teaching approaches that appeal to their students' various learning approaches whilst simultaneously considering the heterogeneous elements present in a classroom –since the students in a single class may vary in several regards, including age, gender, specialisations, experience levels, and competence levels. Emmer, Sabornie, Evertson, and Weinstein (2006) advise that where diversity is high in a classroom, working with smaller groups and empowering them to take responsibility for their group's management, progress and output is likely to yield great benefit. Also, expanding the range of teaching styles or tools used in the classroom may help a teacher to reach more students. However, even where teachers are able to determine the 'types' of learners in their class, there is no way to simultaneously present material that appeals to all preferences (Felder & Brent, 2005). In their review of knowledge management and learning organisation concepts, Pun and Nathai-Balkissoon (2011, p.205) have similar views, and state, "knowledge is complex, multidimensional, and imparted in different ways to different people".

For decades now, educational approaches have been shifting from the traditional teacher-centred, chalk-and-talk approaches to more student-centred ones, with a host of methods and tools being touted as valuable additions to a teacher's toolkit. One aspect that is often discussed is the value of problem-based learning (PBL) as a constructivist teaching approach to helping students build upon their baseline knowledge and skills, in order to incrementally improve their interest and competency in a certain subject area or field of practice. Another change that took hold slowly and that is now growing is the phenomenon of online classes. Traditional classes held in brick and mortar classrooms are associated with higher sticker prices (Liu, 2013), and necessitate a fixed lecture schedule for students (Selingo, 2013). There are now innumerable offerings of fully online courses, where students can use computers, tablets, smartphones and other mobile devices to attend classes asynchronously or log in as a single online community that interacts at the same time with a teacher. There are pros and cons to in-class and online class delivery modes, and a third mode has emerged, combining both modes in what is considered a blended classroom.

Blended learning combines different teaching media, teaching strategies, and teaching environments (Graham, Allan & Ure, 2003), providing teachers with the ability to leverage more learning technologies in order to set up more flexible learning environments that can better suit user needs and preferences (Reid-Young, 2003). Because of challenges introduced by varying student skills, including their e-skills, blended learning's structure should be carefully planned and managed by the lecturer say (Draffan & Rainger, 2007). Li, Lou, Tseng and Huang (2013) point out that incorporating elearning modes into traditional class delivery brings several advantages to students, including the opportunity to learn anywhere and at any time, while having the ability to choose when to work collaboratively. Students may be required to attend fewer lectures physically, since some of the lectures are replaced by the requirement for students to use Information and Communication Technologies (ICT) to attend online lectures and/ or to critically review videos, podcasts, slideshows, text documents or other materials, and complete related activities set out by their lecturer. Some research has found that ICT, when used to deliver e-learning material, results in improved test performance (Chandra & Lloyd, 2008) and therefore supports learning. One web-based tool that can find a place in a blended course would be the WebQuest.

The research approach

This project was broadly interpretivist and drew data from student responses to an online questionnaire. Descriptive statistics were summarised and open-ended responses were collated, coded and themed (Creswell, 2014) by the researchers. The themes were combined to construct answers to each research question in turn. Finally, the research question was answered by combining the understandings gleaned from each sub area considered.

Participants

This study was conducted within a Level 3 POM undergraduate course in the Faculty of Social Sciences at The University of the West Indies, St. Augustine, Trinidad and Tobago. The class was offered to a combined group of day and evening student classes each week during a 13-week semester. A survey was administered online by developing a questionnaire and sending email invitations to all 82 students (63 female and 19 male) to participate by clicking on a link that took them to the survey. A total of 41 students (32 female and 9 male) completed the survey. Thirty of the respondents belonged to the 18-25 age group, five to the 26-34 age group, and the remaining six to the 35-54 age group. Thirty-one of respondents were full-time day students. As could be expected, due to the age distribution of the respondents, most had only a little work experience. Five had never held a job, 16 had worked a total of one to three months during school vacation periods, and seven had worked full time, for less than a year. Only 13 of the respondents had worked full-time for over a year. Even though a few students in the class were from other CARICOM islands, only students from Trinidad and Tobago responded to the survey. Some 21 of the students were in line for lower second class honours, with only eight expecting upper second class honours and none expecting first class honours. None of the students had heard about, used or developed WebQuests before this study.

The WebQuest assignment

Students were placed into groups established by the lecturer, and asked to develop their own WebQuests on topics to be selected from within four focus areas, namely global operations strategy, process strategy, quality management and the design of goods and services. Students were provided with guidelines about WebQuest creation, including WebQuest design tips, and a WebQuest tutorial, links to sample WebQuests, and a detailed rubric against which they would be marked and which they were required to use to self-score. The lecturer remained a key resource for students, advising and directing individuals and groups during and outside of class hours, both in person and through email correspondence.

Each WebQuest was to be framed to engage a learner directly, and was to consist of the following sections as a minimum: introduction, task, process, resources, assessment/evaluation, and conclusion. The introduction was expected to set out an engaging situation in which the learner is embedded, and addressed as “you” in order to encourage the learner to feel connected to the challenge or problem being set out. The task was expected to be complex enough to require the learner to work toward solving the problem in a series of steps, which were to be outlined in the process section. Within the process steps, resource links were to be provided, and so a learner would follow the process steps, delving into the web resources while on the quest to complete the task/solve the problem. Students were cautioned that process steps were not to be focused merely on reading

material and regurgitating content, but rather on using the theory critically by making judgments, performing analyses, selecting tools, forming opinions, etc. In this way, by the end of the WebQuest, a learner should have done more than just covered the theory that could have been read in a textbook –they should have developed skills related to application of the learning to simulated problems. The resources embedded within process step were to be comprehensively presented in a resources section, and some guidance about how a learner’s performance on the WebQuest would be judged was to be given in the assessment section. Since, in this instance, the students were not educators, the lecturer did not expect detailed rubrics, and made this clear to the class. Students were finally expected to have a WebQuest conclusion, in which the learner was given a ‘wrap up’ of the challenge posed in the introduction.

It should be noted that students were not limited to creating their WebQuests as a website; they were allowed to use online or offline documents depending on their preferences, with the only proviso being that most resources were to be pointed to through the use of weblinks. Each group was required to complete their own WebQuest, preparing a complete set of work outputs from the WebQuest to present to the class. All WebQuests were shared with the class at the end of the semester, to aid with preparations for final exams.

Confidentiality

The lecturer communicated with the class to explain how the research would be used to study the effect of the WebQuest creation assignment on teaching and learning. Students were assured that their identities would be kept confidential and any statistics would be evaluated in aggregate form (Creswell, 2014). All of the students in the class provided written permission for their WebQuests to be used for teaching and research purposes.

Design of the survey questionnaire

To reduce cost and increase the ability to communicate with the class, it was decided that the survey would take the form of an online survey developed using the Qualtrics online survey system (www.qualtrics.com). Thirty-two questions were established in line with the study’s major research question (see Figure 1). The questions were screened using member checks to ensure that they were easy to understand and pertinent to the topic being explored. After slight amendments to the wording and order of questions in the survey, the questions were organised into groupings. Six questions focused on respondents’ demographics, two on their prior awareness of and experience with WebQuests, eight on their approach to creating the WebQuest, eight on the positive and negative experiences in creating WebQuests, six on the value of the exercise to their learning, future studies, and future work endeavours and two open questions allowing for additional suggestions and comments related to the exercise. Students’ self-assessments of their learning were used to inform this research. This was in line with Benton,

Duchon, and Pallet’s (2013) findings that students are able to fairly judge their own progress. Depending on the nature of student responses, some questions could have yielded insight into more than one of the sub areas being studied. For example, a question that asked students about their positive experiences in the WebQuest creation exercise could have potentially yielded responses about both curricular and extra-curricular learning.

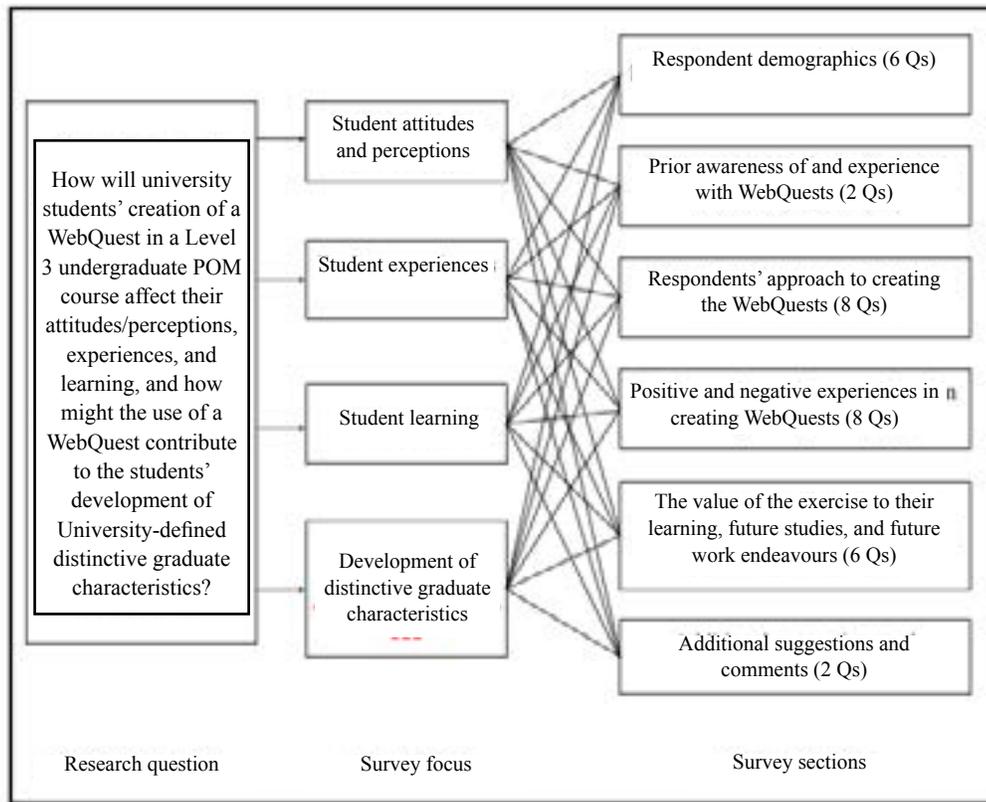


Figure 1. Linking the research questions to the survey sections

Survey distribution

When the WebQuest projects had been completed the invitations to participate in the survey were emailed to all students in the class. In line with the Qualtrics-recommended practice for online surveys, the email included a link to the survey as well as an opt-out link, explained the context of the survey and that the survey management software would anonymise the results. Reminder emails were sent to the class about two weeks after the initial survey invitation.

Research findings and discussion

Themes emerged when the student responses were coded and themed. Figure 2 indicates the major themes that were recognised within each of the four survey focus areas. Each theme is then briefly discussed.

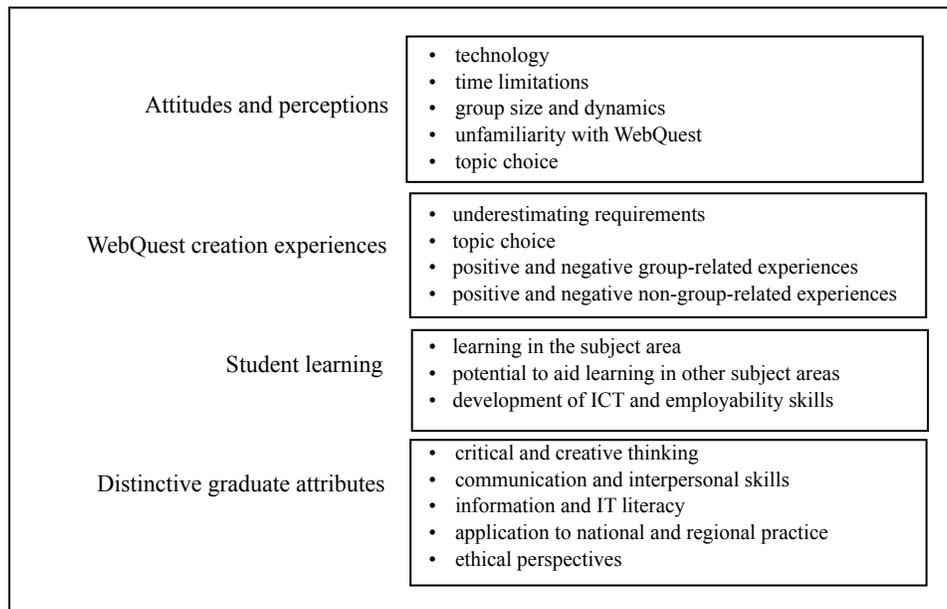


Figure 2. Linking the research question to the research findings

Attitudes and perceptions

At the project start, student concerns centred around five themes: unfamiliarity with the medium; unfamiliarity with technology; concerns about time limitations; group size and dynamics, and topic breadth and WebQuest content.

No students had heard the term WebQuest, nor had they ever used a WebQuest before the class. This would likely have been the reason that 26 of the 41 participants indicated they felt “intimidated”, “worried”, “concerned”, “not sure”, “completely lost” or “confused” when they were given the coursework assignment of developing a WebQuest on a topic of their choice within the course syllabus. Students noted that WebQuests were “a new format” and “a new concept” and they were not sure “what was expected” or “what the WebQuest required”. Twelve indicated that their own negative attitudes resulted in their taking four or more weeks to develop an understanding of the purpose and structure of a WebQuest. These negative attitudes manifested as procrastination, relinquishing of personal responsibility, relying on others to take the lead, and three students’ refusal to review the lecturer-supplied materials.

Participants also expressed fears that they would not be able to use the

software necessary to create the WebQuest. Although creation of a webpage is not mandatory when creating a WebQuest, students perceived the project as “difficult to create”, “complex”, and requiring “knowledge on web designs” or “the skills” that they did not have as they “are not IT students”.

Learning about WebQuests and building sufficient competencies to design and create their own WebQuests set a steep learning curve for students within a 10-week period. Time management therefore emerged as a stressor, with students noting that the project would “be very time consuming” and they were “not sure if (there would be enough) time to experiment/ play around (and) design a proper WebQuest”.

The course lecturer had established group compositions, in order to force interaction between students of different age groups, work experience levels, and faculty/ major backgrounds. Students expressed concerns about the large group size, difficulty arranging meetings with such diverse members, and experiencing communication problems (perhaps due to storming and norming challenges inherent in new groups). One student also expressed a fear of failing to contribute meaningfully to the group.

The desire to do good work led to students worrying about deciding on a WebQuest topic from broad options set out by the teacher, “putting the information together in the correct way”, “get[ting] the message delivered successfully” and feeling “unsure if [the] WebQuest would contain what is necessary for a good project”. Twelve students advocated for topics that were easy, 18 wanted topics to which they had previously been exposed, and eight just stepped back and let their group decide for them. Only 4 participants specifically set out to find topics that would challenge them, and wanted a topic that no others were doing. Twenty of the 41 respondents reported that they chose topics for which they could locate plenty of internet materials so that their WebQuest would be richly supported.

It was recognised that student attitudes early in the project were predominantly negative. These came about because students felt off-kilter, due to their unfamiliarity with this type of project, the relatively short timeframe, and perceptions that the project would entail a steep learning curve where they would have to depend on, trust, and develop working relationships with strangers, learn about a new medium, and develop new IT competencies. This coincides with Vaughan’s (2007) finding that students are challenged in the early weeks of the course by “technology related problems” and that “[i]nitially, students may be unprepared for the active learning role they must play in a blended course” (p. 86).

Students reported that, willingly or at the behest of their group/lecturer, they put in the work necessary to review lecturer-supplied guidelines and rubric, consult with one another and the lecturer, research the medium and potential topics, understand the rubric, and develop their WebQuests. Their experiences led to considerable shifting of the negative attitudes expressed at the project start. By the time the project had been submitted, 16 of the participants indicated that they enjoyed the course more because of the WebQuest project and only four felt that the WebQuest creation project reduced their enjoyment of the course. The study

did not attempt to correlate the positive attitudes with gender or age groups, although such quantitative analysis would be enlightening considering that 78% of the respondents were female and 73% of the respondents were from the 18-25 age bracket.

WebQuest creation experiences

To cope with their fears at the start of the project, students researched WebQuests, brainstormed and worked at the tasks within their groups, sought lecturer guidance, worked on the project diligently, immersed themselves in learning or enhancing their abilities with software applications selected for their WebQuests, and explored the lecturer-provided guidance and rubric. These actions reduced their fear considerably, leading them to note, for example “I was relieved”, “the task at hand [became] less stressful”, “it was easier than I expected”, “I began to like it”, and “I feel more comfortable now”. There was one student who remained uncomfortable throughout the process, however, due to the inability to trust the group. That student noted, “while I understand the purpose of working with a group, my fear was working with people [who would influence my] grade... I would much rather be responsible for my own success or failure.”

Students who enjoyed the process of choosing their topic reported coming together to share ideas and seek consensus on the eventual topic chosen. Students shared several positive experiences within the group setting. Students reported that they learnt to trust, depend on, and even like one another, and to use team member strengths to supplement one another’s weaknesses. This is evidenced in participant comments such as: “there was always a group member available to aid”, “Working with some friendly peers”, “they willingly and successfully helped me to understand”, “seeing...we can work as a group without drama”, “fun and hardworking”, and “everyone cooperated and work[ed] together”. This trust went far enough that the group built a strong and enduring identity, as can be recognised from remarks such as “Group members came together and helped each other throughout the course with assignments and studying not only for this course but [for] others”.

Comments such as “ideas that initially sounded bizarre but turned out to be genius in the end” showed that they learnt the value of being open to new ideas and approaches. The theme of respect for others was also carried in situations where conflicts arose. Students noted that they had the opportunity to work through their disagreements and reach “mutual ground”. Students also credited good leadership and communication for enhancing the smooth operation of groups. They recognised the value of their “encouraging team leader”, “friendly peers”, and the connectedness of each member to the group. Time management emerged as a common theme as well, with students raving about “always meeting most of our deadlines” and “everyone completing their parts on time”.

There were also some negative experiences within the group setting. Some group members complained about free riders who chose not to actively research or attempt the project work, or others who procrastinated instead of settling down to get the research done. There were some reports of students who held valuable skills, but who refused to apply them to the project undertakings. The lecturer's structuring of groups to include persons from the evening class, day class and different majors or faculties introduced challenges when groups tried to schedule meetings. This caused some members to miss meetings or to be late to meetings.

As is often the case, conflict management challenges arose where there were differences of opinion. Sometimes, good leaders were able to navigate their groups to resolution, but there were cases where group members complained that their leader was indecisive or discounted opposing opinions and caused members to feel undervalued. Similarly, some groups noted that where different ideas were being considered, it became stressful to navigate different perspectives, modes of thinking, and even design and layout preferences. There were also severe communication problems in at least one group. Here, communication was only flowing between informal subgroups, instead of among all members. While this problem was resolved after a few weeks, resentment remained for the entire semester and was reflected in the peer rating scores assigned by some of the members.

Several students applauded the use of a new teaching tool. One student said they "learned something new that I never even heard of" and others commented that they "loved the challenge" and that it was "very different from other projects done in previous courses". Several students enjoyed the experience specifically because it had stretched their capabilities and pushed them to grow. Others liked it because they were able to think critically. One participant was particularly proud that they had "learned to create a WebQuest on my own". Students also recognised that WebQuests advanced their research competencies, and listed the "opportunity to read a lot of information", "gathering truthful information", and "researching for videos and literature". Several others gushed about the opportunity to put information in their own way, enhance it based on personal preferences, and tailor it to make it relatable by other students. As with all assessments, the design of the activity or task influences the learning levels of the students, and so assigning a lower order WebQuest task would limit students' application of higher order skills (Rubin, 2013). Because students were engaged in actually designing their own WebQuests, they were put in situations where it was essential for them to be creative.

One student also felt that the WebQuests made learning "fun and interactive [giving] the ability to learn something new from my own [group] project but the other groups as well". Similar to what was found by Spian, Ismail and Abu Ziden (2012), students experienced enhanced interest and involvement as a result of the use of ICT as a part of the teaching approach. Overall, students were pleased that they learned the subject matter more deeply and across a greater breadth as a result of having to critically evaluate potential content for inclusion in their own

WebQuests. Their feedback centred around having “develop[ed] a new attractive fun way to learn topics, using “a different approach to a traditional project”, and using videos and [hyper]links to explore the material.

The students were provided with a rubric outlining what was required in the WebQuest, and a mark breakdown for each element. Students reported that they used this rubric to “get an idea of what’s expected” and “as a guide to ensure we were on the right path” so they knew where “more emphasis should be placed” and so they could “push harder for a good grade”. One student used the rubric as “a guide to ensure the person doing the WebQuest (would gain) max knowledge”

The actual building of the WebQuest was a huge challenge for students, as they had to learn about the scaffolding process needed to build an effective WebQuest, choose some software in which to develop the WebQuest, source, evaluate, edit, and present significant amounts of web-based information, make the work user friendly, attractive, and understandable, and in some cases learn to use new software and deal with technical glitches like “getting the hyperlinks to work”. Students noted that the WebQuest introduced a heavy workload for the life of the project, and that they felt “pressure of doing something [they had] never done before” especially in the early stages of the project.

Student learning

As a result of the creation and use of their group’s topic-specific WebQuests, students pointed to learning that related to learning of specific subject areas, as well as technology and employability skills. With regard to the subject area, students felt that they “cover[ed] most of the content” about their chosen topic on account of the deep research that they did before they could select their resources for inclusion in the WebQuest. Students also noted that the exposure to real life situations advanced their understanding of the material presented in class. Those students who accessed the WebQuests prepared by other groups noted that they had the added benefit of “summaries of different topics” in addition to the deep appreciation of their chosen topic. Some were so enthusiastic about the breadth of their research that they spoke of having voluntarily assimilated material additional to the course content. In their accounts of their experiences in the group setting, students had shared that they had relied on one another for support in understanding different perspectives as well as in assimilating content that they could not grasp on their own. As students got to know one another, their experiences aligned with the statement: “Research confirms that cooperative and social learning increase involvement in learning” (Sorcinelli, 1991, p.17).

With regard to the content covered, students felt that they were able to engage in “interactive learning and revision” and that they were able to learn the material better. Some of the reasons provided by the respondents were : “it was a very exciting way to represent the topics...”, “it was [a] very helpful and fun way to learn”, “videos helped me to understand the content better”, “I learnt different topic areas in a more interactive way”, “I got a more in depth understanding of the

topic”, “you had hands on application”, and “it provided background information for topics to be covered in class”. Some students found that the WebQuests benefitted them most in covering specific topics, saying for example that their WebQuest “helped a lot because now I fully understand the quality tools”, “helped with concepts concerning quality and efficiency”, and led them to “websites... to get additional information”. Many students commented that the breadth of their reading had given them a “basic understanding” of the course material in just the first few weeks of the course, while they were scanning the material for a possible topic, and this allowed them to explore the subject much deeper as the semester continued. Some students felt that the groups’ WebQuest presentations provided “summaries of different topics” which aided revision and helped them “learn theories and parts of the course content that were related to other groups and the application of the theory in real life examples”. There were dissenters to this viewpoint, though, since several students thought that the large effort invested in creating a WebQuest on just one topic reduced their exposure to the other topics.

Students suggested that WebQuests could be applied in a wide range of subject areas “because it is very simple to understand and it gives all the information on the topic”, “can help students to study for any particular course since there are links, pictures, video...to enhance the student’s knowledge”, “as well as activities to test knowledge”. Students suggested that the WebQuests could aid in the teaching of several management and other courses, namely organisational behaviour, accounting, finance, business ethics, human resource management, marketing, business strategy and policy, statistics, mathematics, economics, chemistry, IT, MIS, and international management courses.

In terms of ICT skills, students developed a strong grasp of what WebQuests are, as well as competencies related to use of a range of software programmes that they used in accessing online and other materials, building their WebQuests, and communicating with others about the WebQuest they had developed. When asked to suggest other ICT application projects that they would have preferred, only three students felt the WebQuests could have been improved upon - with all three suggesting the making of a video. Table 1 shows the number of students who reported deriving software competency improvements from the WebQuest project. Those who developed new competencies reported that they had begun to use the functions for the first time. Many more students reported that they had improved their competencies rather than developing competencies for the first time. The reasons for this report were made clear to the lecturer by one group of students who, at the end of the course commented on their deeper use of programmes and tools such as Microsoft Word, PowerPoint and Publisher, which they had previously used for word processing, but had begun to use to enrich documents by creating puzzles and quizzes, and by embedding graphics and hyperlinks. Certain students were also able to use the Internet and blogs to create webpages for each step of the WebQuest process. Unfortunately, deeper analysis of the data is not possible due to the limits of the survey conducted.

Table 1: Software competencies improved through the WebQuest development project

Competency developed	Developed new competence	Improved competence moderately	Improved competence significantly
Use word processing software	0	6	3
Use publishing software	4	4	5
Develop a website	7	8	4
Use presentation software	1	8	5
Find use, or download video material	1	6	7
Evaluate web resources to suit learner needs	4	11	6
Select web resources for various learner styles	4	14	5
Create hyperlinks	7	5	7

In terms of employability skills as evidenced in the discussion on student experiences earlier in the paper, students learned through practice about group dynamics, including leadership, conflict management, trust and honesty, delegation, responsibility, accountability, peer evaluation, and collaboration. They also enhanced their critical thinking, creativity, communication, and time management abilities. They reported that they felt more excited about learning new things, were not setting mental barriers about what they could or could not learn, and that they had grasped the importance of being open to divergent and new ideas. This could indicate a shift toward them becoming enthusiastic about lifelong learning. The employability skills mentioned above would contribute to distinctive graduate attributes (Bridgstock, 2009) and these are discussed in the next section.

Distinctive graduate attributes

Based on the student self-reports discussed earlier in this paper, it appears that students were able to enhance five of the seven ideal graduate characteristics defined by the University. These are briefly discussed below and Appendix 1 more fully outlines the learning, experiences, attitudes and perceptions related to each graduate characteristic.

Critical and creative thinking

The development of students' critical and creative thinking came about because students were required to locate and then wade through large volumes of information, of varying quality and relevance to their topic, in order to select the most appropriate to appeal to an audience of their peers. They proposed several alternative topics and alternative WebQuest concepts, then logically rationalised and argued their viewpoints before reaching a decision on the direction their project would take. They used the lecturer-provided rubric to critique and improve their work on an ongoing basis.

Communication and interpersonal skills

Students' communication and interpersonal skills were taxed as groups were structured by the lecturer so that they faced opposing viewpoints from students of the full-time (day) as well as part-time (evening) class, with some students having several years of work experience, some having only short-term work experience, and others not having worked. In their efforts to tailor their project to fit class needs and preferences, students reported that they often had opposing viewpoints about content, design, and structure that they needed to juxtapose against other alternatives, and that they had to argue for or against. Because of the challenges they faced in carrying out the WebQuest creation project, students were able to recognise, further develop, and value critical attributes of good leaders and team members, including trust, fairness, decisiveness, collaboration, accountability, responsibility and conflict management experience.

Information and IT literacy

The WebQuest project was fundamentally a technology-based project, and it furthered students' information and IT literacy significantly. Students developed several abilities beyond the course content, including competence in using several software programmes, IT manipulation skills, and research and critical evaluation and selection of information accessed via several different device types (including PCs, laptops, smartphones and tablets) in a range of media formats (including video, audio, electronic literature, and hardcopy). Because they were developing a WebQuest, and not just using one created by someone else, they also learned to evaluate the usability and aesthetics of the WebQuest.

Application of learning to national and regional practice

Some of the topics selected by the groups were focused on the local or regional setting, while others were focused on international companies. All projects encouraged user application of learning to national and regional practice through exploring factors such as change drivers and labour, supply chain and infrastructural considerations. These issues were all course-related content, but they were explored more effectively because the WebQuests pointed students to videos, websites of best-in-class companies and other interesting information resources not commonly used in traditional chalk-and-talk lectures.

Ethical perspectives

Students had the opportunity to further shape their own ethical perspectives, as copyright issues, including plagiarism limitations, as well as ethical dilemmas inherent in operations management decision-making, were navigated in order to source and use materials for the WebQuests. Students reported difficulty carrying out their confidential peer evaluations due to peer pressure to maximise individual scores, and this exercise was supported by a simple rubric that among

other considerations, encouraged students to award the highest scores to those group members who had attended meetings, and contributed consistently and meaningfully. The lecturer also distributed a rubric to help students continuously evaluate and enhance their work. This project rubric also highlighted the role of transparency as it helped students to understand the lecturer's requirements and ascertain the fairness of scores awarded to the various projects.

Conclusion

Since WebQuests are generally created only by teachers and teacher trainees, this paper has extended the field of WebQuest research by allowing management students to create WebQuests for use by themselves and their peers, rather than using a teacher-supplied WebQuest. Students' WebQuest development enabled them to explore topics deeply and critically and, through the WebQuest produced, share their learning with their peers, using a range of media. This WebQuest-development research has revealed that while a project tasks students to cover course content, the structure of the project can lead them not only to develop new subject-relevant competencies, but also to become more open-minded and enthusiastic about their ability to learn new things that enhance their technological and wider life skills.

Many students who engaged in creating their own WebQuest on a topic within the POM syllabus came away from the project with deeper and broader exposure to their selected topic, and greater confidence and desire to learn new things in the future. There were, however, students who felt that the WebQuest creation required too much time and effort, and required them to work on developing competencies that were not course-relevant. Students reported that the project led to their enhancement of several existing competencies and/or development of some new ones, particularly in the areas of IT, research, communication, and teamwork, all extraneous to the core course content. These 'extras' were critical aids to the students' enhancement of five of the seven ideal graduate characteristics, as identified in the University's Strategic Plan (UWI, 2012).

Recommendations

Consider using WebQuests to deepen learning

This research was done in the Department of Management Studies within a class of students from the Faculty of Social Sciences and the Faculty of Science and Technology. The course, Production and Operations Management, has a theoretical element as well as practical and numeracy elements, and similar courses find homes in the Faculty of Engineering. Further, students suggested several courses in which they believed WebQuest use could enhance understanding of theory and/or development of skills. These subject areas included core management courses, mathematics and finance courses, and even chemistry.

As previously discussed, on account of its constructivist methodology, a properly crafted WebQuest can influence students to delve deeply into course material and emerge with greater understanding and application ability as a result of having tackled significant problems or projects. It may be worth considering whether existing or new teacher-developed WebQuests can aid the teaching of various courses or the structuring of project-based learning (Garry, 2001) in various faculties. Lecturers may also consider going the route taken in this research and letting students develop their own subject-related WebQuests as coursework projects. Student WebQuests entertain as they teach. Lecturers could find the work related to teaching a new medium to be worth the extra effort, because entertaining or interesting WebQuests capture student attention on account of their uniqueness, while guiding students to develop a solid grasp of the academic theory and practical skills.

Use WebQuests to develop extra-curricular competencies

Employers sometimes provide feedback to universities about the desire for enhanced employability skills or life skills in their new-graduate hires. As recognised in this paper, WebQuest development has the potential to enhance qualities and competencies as varied as oral and written communication, teamwork and leadership, creativity, confidence-building, and use of a range of software applications as well as the internet. Lecturers who seek to help students develop extra competencies even within an already bulging course schedule may find that WebQuests are well worth their extra effort.

Develop a repository of contextualised university-level WebQuests

Few current WebQuests can be found to support teaching of university-level courses. Therefore, there is a need for tertiary educators to create and share WebQuests, particularly those juxtaposing the regional and international contexts, for use in teaching. In this particular context, the region might benefit from the creation of a repository for Caribbean university-level WebQuests. A regionally based university-level repository of WebQuests might offer the opportunity for students to enhance their learning in a contextualised manner.

Further research into WebQuest applications

This paper is based on qualitative research done in a case setting over the course of one semester. It is based on student participation in a WebQuest development group project pursued over the course of the semester. This paper was unable to present the lecturer's perceptions and experiences but these could add value for others who may be considering including WebQuest work in their classes. The findings of this paper are based on student self-reports, which were largely qualitative in nature. Quantitative research would also be useful to investigate issues such as the effects of WebQuests on exam scores, and the impact of WebQuests on student engagement by demographic group.

Finally, peer-reviewed publications recounting WebQuest experiences in university classrooms in the region, and especially in Trinidad and Tobago and the wider English-speaking Caribbean, are limited. The sharing of cases of successful WebQuest development and use by university teachers and students could help enhance the recognition of the medium as a valid option, and illustrate how best WebQuests can be tailored to fit various needs.

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Appendix 1: Distinctive graduate competencies aided by the WebQuest development project

Themes	Learning	Attitudes and Perceptions	Experiences
A critical and creative thinker	<p>“...a different approach to a traditional project (report...)”</p> <p>How creative WebQuest design was important in order to keep the attention of the class.</p> <p>Learnt the chosen topic at a deeper level than was required for the class.</p> <p>Aesthetics were instrumental in making the WebQuest appealing to users. Use of font and colour, as well as layout and language were all carefully adjusted to maximise appeal and usability.</p> <p>It was difficult figuring out how to present the material simply so that it could be grasped by all users.</p> <p>Students used a teacher-developed rubric to self-assess their projects and make improvements prior to submission.</p>	<p>Because the WebQuest was a new medium, several students felt that the assignment was an insurmountable challenge. By the end of the project, they felt invigorated by their achievements, and eager to tackle more entirely new things. (e.g. The web-quest challenged me and I loved the challenge, it was unlike anything I had done before and I’m truly grateful)”</p> <p>“Inputs that seemed unorthodox or absurd end up being the most creative and interesting in the end.”</p> <p>WebQuest are “an attractive, fun way to learn topics”.</p> <p>The interactive nature of WebQuest enhanced student ability to learn and revise.</p> <p>WebQuests make learning easier especially for visual learners.</p>	<p>Students:</p> <ul style="list-style-type: none"> • Researched WebQuests, screened several example WebQuests, and identified the key elements that constituted a WebQuest • Learned when to approach the lecturer for clarification, and learned to work on their own and within their groups to make decisions. • Idea brainstorming and critical selection • from very broad topics provided by the lecturer, students narrowed their focus and decided on the topic to be tackled by their group • built the scaffolding for their WebQuests • constructed the WebQuest lesson • completed a sample solutions portfolio • learned how to be critical in agreeable ways • learnt that there comes a point when the group leader must be decisive in order to address resistance and unweildiness in order to move a project forward • iteratively refined elements on the way to the end product

<p>An effective communicator with good interpersonal skills</p>	<p>Learned: The value of “having an open mind and supporting apparently bizarre ideas that turned out to be genius in the end” Team collaboration and trust yield synergistic benefits as group members began collaborating in other courses as well. Large groups are difficult to manage and in a large group structure and accountability become paramount. That people respond to pressure differently. Some became tense and over-sensitive as the project deadline got closer. Some students noted that they feel more confident as team members and/or leaders, and willing to not only share, but also stand behind their opinions.</p>	<p>“...allow me to utilize different (types) of presentation” Different background of group members (day/evening class, part-time. Full-time, different majors with clashing timetables) made it difficult to time the group meetings.</p>	<ul style="list-style-type: none"> • Students learned to work in groups selected by lecturer, where members came from different majors, age groups, work experience levels, etc. • Teamwork skills, leadership, motivation, work allocation to sub-groups, trust, dependability, collaboration, sharing critiques, conflict management, rewarding and penalising group members commensurate with their contributions • Handling bad attitudes, free-rider mentalities • Different ways of thinking and different priorities were hard to manage • Inventorying team skills and allocating duties to maximise benefits from member strengths • Time management is critical: instead of getting stuck discussing unfamiliarity and fears, group members shifted to researching and making an initial attempt. Team members who procrastinated delayed the entire group's progress
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IT-skilled and information literate	<p>Research skills: Students vetted information including: Webpages Videos Peer-reviewed Journal articles Text books</p> <p>Students created WebQuests using a range of different applications including: Powerpoint Blogs Websites Microsoft Publisher Microsoft Word</p> <p>Students developed or improved their ability to: Use word processing software Use publishing software Develop a website Use presentation software Find, use, or download video materials Evaluate web resources Create hyperlinks Communicate orally Make presentations to large groups Communicate in writing Work in teams Function in leadership roles Manage self/manage time Formulate tasks Logically structure processes/ activities Make activities accessible to users by telling a story Reference sources Edit and summarise</p> <p>The technology sometimes did not work, and this was frustrating</p> <p>"...a new and different approach to learning"</p>	<p>Several students noted that they are more open to using technology and learning new technology now.</p> <p>4 students were of the view that it was an onerous task to have a students learning a new medium in order to do the project. All other respondents had a positive outlook about having learnt to create and use WebQuests themselves. Those who did not support the assigning of the WebQuest project suggested that projects could have required students to develop a video or a PowerPoint slideshow to the class.</p>	<p>Student fears centered around: Use of new education medium/not having the know-how Use of new technology, including software</p>
Globally aware and well grounded in his/her regional identity	<p>The student-developed WebQuests used examples of local, regional, and multinational companies (including Angostura and Toyota) to illustrate applications of the theory covered in the text, and to build an appreciation of how best practice should influence the way students judged existing practices, or sought to change them.</p>		
Guided by strong ethical values	<p>As required in the project rubric, students were required to adhere to accepted citation styles. Peer rating forms were completed by each student, using a rubric that rewarded or penalised their group members based on contributions made</p>	<p>"...in the world of work where I may have no control over the people who I am put to work with (, I) need to have a level of professionalism and show some form of leadership."</p>	