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To cite this article: Margaret Leahy & Denis Twomey (2005) Using web design with pre-service teachers as a means of creating a collaborative learning environment, Educational Media International, 42:2, 143-151, DOI: [10.1080/09523980500060308](https://doi.org/10.1080/09523980500060308)

To link to this article: <http://dx.doi.org/10.1080/09523980500060308>



Published online: 16 Aug 2006.



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Using web design with pre-service teachers as a means of creating a collaborative learning environment

Margaret Leahy* and Denis Twomey
St Patrick's College of Education, Ireland

This study involves a group of over 300 third-year Bachelor of Education students attending St Patrick's College of Education, Dublin, Ireland. Working in groups of not more than three, the students completed an assignment to create a WebQuest. On construction of the WebQuest the students were asked to reflect on the experience, considering issues such as collaboration, cooperation, planning, decision-making, time management, project direction and design. They were also asked to reflect on the impact of the exercise on their own learning styles and its influence on their concepts of teaching and learning. Finally, they were asked if the exercise had affected their ideas of how to use the Internet in school and if they envisage using WebQuests as part of their teaching in the future. Their reflections were facilitated by a questionnaire. Results of the project have implications for future course design.

Die Erstellung eines Webdesigns durch Lehramtsstudenten als Mittel, eine kollaborative Lernumgebung zu erzeugen

Diese Studie umfasst eine Gruppe von mehr als 300 Lehrerstudenten des St. Patrick's College of Education in Dublin, Irland. In Gruppen von nicht mehr als drei Personen füllten die Studenten einen Zusatz zur Erzeugung eines Webfragebogens aus. Im Verlauf der Arbeit an der Konstruktion des WebQuest wurden sie aufgefordert, über die Erfahrung mit Dingen wie Zusammenarbeit, Kooperation, Planung, Entscheidungsfindung, Zeitmanagement, Projektziel und Konzeption nachzudenken. Zusätzlich wurden sie angehalten, über den Einfluss dieser Übung auf ihren eigenen Lehrstil und auf ihre Konzepte von Lehren und Lernen zu reflektieren. Schließlich wurden sie befragt, ob diese Übung ihre Einschätzung, wie das Internet im Schulunterricht genutzt werden könne und ob sie sich vorstellen könnten, WebQuests im Rahmen ihres zukünftigen Unterrichts einzusetzen. Ihre Reflexionen wurden durch einen Fragebogen unterstützt. Die Ergebnisse des Projekts haben Auswirkungen auf zukünftige Lehrgangsentwürfe.

Comment utiliser la conception de sites Web avec des enseignants en formation initiale pour créer un environnement d'apprentissage collaboratif

Cette étude porte sur un groupe de plus de 300 étudiants de Licence en Education inscrits à l'Institut St Patrick de formation des Maîtres de Dublin. Travaillant en groupes de trois au maximum, ces étudiants ont mené à bien

*Corresponding author. St Patrick's College of Education, Drumcondra, Dublin, Ireland. Email: Margaret.leahy@spd.dcu.ie

un projet de création d'un WebQuest. Au moment de la construction de ce WebQuest, on a demandé aux étudiants de réfléchir sur l'expérience en cours et sur les problèmes de collaboration, de coopération, de planification, de prise de décision, de gestion du temps, d'orientation et de conception du projet. On leur a aussi demandé de réfléchir à l'impact de cet exercice sur leurs propres styles d'apprentissage et à son influence sur la façon dont ils envisageaient l'enseignement et l'apprentissage. On les a finalement interrogés pour savoir si cet exercice avait affecté leur façon de penser aux usages de l'Internet à l'école et si ils (elles) envisageaient d'utiliser WebQuest dans leur enseignement à l'avenir. Un questionnaire a facilité la réponse à ces questions. Les résultats de ce projet auront des conséquences pour la conception des cours à venir.

Keywords: *Collaboration; Elementary education; Learning styles; Teacher education*

Introduction

The Revised Irish Primary School Curriculum (1999) embraces a constructivist philosophy of education, promoting a developmental approach to learning where each child is seen as an active agent in his/her learning. The approach accords equal importance to what the child learns and to the process by which s/he learns. The child's own knowledge and experience is regarded as a base for learning. The principle of guided activity, and discovery and the importance of the teacher in providing the most effective learning experiences for the child are central to the curriculum. Collaborative learning, learning through language, problem solving and the fostering of higher thinking skills are also pivotal elements. The three-year education course at St Patrick's College of Education, Dublin aims to prepare students for their professional work as primary teachers in a child-centred system.

The availability of Information and Communication Technologies (ICT) poses many challenges for pre-service educators. The Organisation for Economic Cooperation and Development (OECD), in a recent policy analysis document stated that teachers in the schools of the future need to be open to the use of new technologies and have the capacity to adapt to the constantly changing learning environments in which they find themselves (OECD, 1998). The challenge, however, is more than just to adapt and to integrate new technologies into practice, but to find ways in which learning can change fundamentally with the use of technology. As long ago as 1980, Seymour Papert postulated the idea of a computer as an 'object-to-think-with' (Papert, 1980, p. 23). He also pointed out that whenever new technologies were introduced in any area of society, they were often adopted as a new way to do old things (Papert, 1980). For example, motion pictures were originally conceived as presenting plays in front of a camera. It was not until the second generation of this new technology that people realised that the new technology afforded different ways of approaching reality, in effect changing the nature of the medium. Similarly with education, rather than expect technology to increase the effectiveness and efficiency of what is already done in schools, we should be asking how it changes fundamentally the way children think and learn and the way in which we teach. With these issues in mind, St Patrick's College has included courses in ICT for pre-service teachers since 1999. These courses are designed to enable students to become comfortable and effective users of various technologies in order to allow them to make informed decisions about technology in their teaching, and to be confident in applying technology when and where appropriate. It has been the aim of these courses to expose students to cutting edge technology and ideas in order to equip them for the ever-changing world in which they will be working throughout their careers. The courses consist

of a series of two-hour interactive workshops that are undertaken in the second and third year of the education degree.

Course design

While designing both of the courses offered (entitled Teaching and Learning with ICT, part 1 and 2), numerous topics and possible areas of study were discussed including educational software, tools-based software, Internet, email and use of technology in a range of curricular areas. Each year since their inception, the courses have been refined and reorganised to take account of the different situations pertaining at the time. In the first courses the skills level of some of the students was such that part of each workshop was spent familiarising them with computers and with their use. More recently students beginning the courses report a higher level of familiarity with technology. At this stage most of them routinely use the Internet and have an email address. This means that it is now possible to engage in more meaningful activities in the workshops to encourage students to investigate uses of technology promoting higher-level thinking and collaborative skills.

Students now use multimedia and Web authoring software to produce curriculum resources as part of their coursework. Specific instruction is provided in multi-media authoring and simple Web authoring techniques. The emphasis is always on creating relevant and engaging content rather than on complicated design. At present the collaborative design and construction of a WebQuest in a curricular area of choice is the major assignment for students following the second ICT course. The present study describes the reactions to such a course by a group of 365 third-year Bachelor of Education students who undertook the WebQuest assignment in the academic year 2001–2002.

The Webquest model

A WebQuest is an enquiry-oriented learning resource for children where some or all of the resources are found on the Internet. Bernie Dodge and Tom March (<http://WebQuest.sdsu.edu>) developed the model in 1995 at San Diego University. A well-constructed WebQuest would allow the student to engage with relevant material in a meaningful way and to extend and refine their knowledge of a particular topic (http://webquest.sdsu.edu/about_webquests.html). In his seminal article, 'Why WebQuests', Tom March lists many reasons for using the model, including motivation, authenticity and process approach. All of these support the constructivist view of learning (www.ozline.com/webquests/intro.html).

Each WebQuest follows a definite structure allowing the children involved to engage in collaborative role-play situations using the Internet as a resource. Typically a scenario is outlined and the children are presented with tasks supported by Internet resources. That approach can help develop higher-order thinking skills among the participants, as they have to summarise and synthesise the information found on the Web within a meaningful context clearly specified within the WebQuest.

The process of how they might work is also specified and an evaluation rubric is supplied to allow the children to measure their performance. By engaging in the tasks described and using

the Internet resources identified by the designer (teacher), the children are enabled to use the vast array of useful and educational material. Since the teacher has already visited and evaluated each site, the children are able to have easy access to appropriate and meaningful materials without the need to engage in search engines and other methods that can lead to unsuitable or inappropriate sites being visited.

The study

Students of St Patrick's College are graduates of a second level system that largely subscribes to an instructional model of teaching and learning. Entrants to the college are among the top 10% of second level graduates and so have been very successful in this system. Working collaboratively in active learning environment hence represents new challenges to the students.

Although the assignment was presented as a task to the learners it was envisaged that the construction of a WebQuest would engage the students in meaningful, active learning, where they would intentionally and actively process information while pursuing an authentic task together. It was hoped that within the confines of the assignment they would set their own goals and regulate their activities and efforts in order to achieve those goals and through collaboration and dialogue the understandings of all students would be enriched. On construction of their WebQuests, the students were asked to reflect on the meaning and importance of the experience in a larger social and intellectual context and were asked to consider issues such as collaboration, the challenges posed and the subsequent impact on their concepts of their own learning style (Jonassen, Peck, & Wilson, 1999). They were also asked to reflect on their concepts of teaching and learning, on issues to do with planning and design, time management and project direction.

The reflection was facilitated by a questionnaire that was presented to the students during the final workshop of the series. By that time, they had almost completed the assignment and were in a position to address the issues raised. The questionnaire was comprised of 12 questions. In each case, the students were given the opportunity to add their own comments. Each student completed the questionnaire on his/her own and was thereby free to enter positive or negative comments about his/her partner as appropriate. Examples of student WebQuests along with a copy of the questionnaire used in the study are available at (www.spd.dcu.ie/ict/ifip2002).

Summary of findings

The completed questionnaires were returned by 316 students. The following discussion summarises the answers received to each question. Given that the students were asked to comment on the answers, many gave more than one reason for specific answers. The information obtained did not lend itself in several instances to accurate statistical analysis and is consequently described in approximate terms.

How did you decide on topic?

The first assignment of the course in question was to evaluate five Web sites on a chosen topic from the curriculum. Approximately 30% of students used the evaluations as a basis for

constructing their WebQuest. A similar number of students chose topics previously covered in other areas, generally related to areas studied in academic subjects, curriculum studies, curricular specialisms and topics previously covered or being prepared for teaching practice. The reason cited for use was that information was readily available. Over a quarter chose a topic based on personal interest or on current interests and trends among children. Two smaller groupings of approximately 10% each tried to come up with original ideas or used a topic on which Web sites were easily found. Finally, as well as describing a primary means of choosing a topic, almost one-third of the students intimated that they also took guidance from the examples provided on the course Web site, had brainstorming sessions with their partner, or used the Revised Primary School Curriculum Guidelines as an aid to defining their choice of topic.

Were you happy with the method used to employ partners?

Friendship grouping was used to select partners: 98% of students expressed satisfaction with this method. However, the students generally reported choosing to work with friends as they thought that they could work well with them. Those who were unsatisfied expressed a preference for working alone, and would have liked that option or an option for larger groups. A very small number cited difficulty in finding a partner.

How did you divide the tasks associated with the construction of the Webquest?

Seventy-seven per cent of students worked together with their partner on all aspects of the project. In 14% of cases partners undertook certain tasks before coming together while the remaining 9% of students employed a combination of both.

Indicate your level of satisfaction with the experience of working in collaboration with another student

Eighty-seven per cent of students stated that they were 'satisfied' or 'very satisfied' working collaboratively. They reported that each partner brought his/her own strengths to the group and that they supported each other by offering advice and suggestions or by solving problems together. The friendship groupings also facilitated finding times to work together both during and outside college hours. Nine per cent of the students stated that they remained neutral about the experience of working collaboratively with a partner and three percent expressed dissatisfaction. The reasons given for dissatisfaction generally suggested that students preferred to work alone or that they found it difficult to find times to meet with their partner. In three cases there had been difficulties with partners and while those experiences were not positive, the students remain open to the notion of collaborative work.

Did you have any difficulties in designing the project?

Over half of the students cited difficulty designing the project. Of those approximately half were technical difficulties and half were planning difficulties. Technical problems were mostly associated with the design, construction and editing of links, or with inserting and aligning graphics. A small number (approximately 5%) reported having difficulty moving from

Netscape Composer to Netscape Editor. Technical problems were solved by asking friends, a tutor and by trial and error. Planning difficulties tended to centre on designing the story framework of the WebQuest, deciding on the task and the related process, and on creating an evaluation rubric.

Did the completed WebQuest follow the original plan?

Sixty per cent of students stated that their WebQuest was following or had followed the original plan; 34% deviated from their original plan. Several comments related to planning and stressed the importance of good planning. Some reported that their initial ideas had been overly ambitious, while others stated that the initial ideas had developed as the project progressed and the WebQuest had to be modified accordingly. Six per cent of students did not respond to the question.

Did working with a partner to build a WebQuest challenge your preferred style of working?

Given that the students have traditionally completed individual assignments, working collaboratively created many challenges. Over half of the respondents indicated that working with a partner challenged the student's preferred style of learning. The reasons cited related mainly to work habits, personality types and the lack of experience of working collaboratively. It has been previously mentioned that several students felt they had to learn how to work cooperatively and it appears that the learning experience was demanding for most of them. Interestingly, a small number noted that working collaboratively meant that ideas were challenged and subsequently developed, and this was also demanding. Many students reported tensions over the organisation of the work schedule. Some students expressed a preference for setting aside frequent fairly short blocks i.e., periods of up to one and a half hours for work purposes while others preferred to spend periods of several hours duration.

Personality traits were tested. Those students who claimed to have dominant personalities intimated that they found it difficult not to assert their own ideas while many students who worked with dominant partners noted the stress of having to assert their own ideas. Conflict and how to resolve it was also frequently mentioned as a challenge.

For those students (42%) who reported that their preferred style of working was not challenged, it appears that working with a partner offered a sense of security, that the technical weaknesses of one partner were compensated for by the other. Where both partners lacked technical confidence, they were able to support each other. Compared to the first group the students lacking technical confidence noted that difficulties were resolved more quickly in pairs, and the project as a whole was easier to complete. They also felt that having ideas challenged and developed complemented rather than impinged on their working style.

Describe what you learned from the project about own style of learning

Despite having no experience of working collaboratively, over a third of students reported that they had enjoyed working in a group. They found that they worked well with others and that they had learnt from their partner. Comments from the students include:

My natural tendency is to work individually but found I enjoyed the experience of group work and learnt from it.

Work well individually, however if a person with the same ideas and work mode is present I work well collaboratively.

I had never really engaged in partner work before but through this project I found collaborative learning to be both insightful and helpful as our ideas could be shared and discussed.

However almost one-tenth of the students stated that they found that they had to learn how to work collaboratively and especially how to compromise.

Realised I need to develop my ability to work cooperatively especially if I expect children to work like this.

Having undergone the experience over 20% of students stated that they preferred to work individually. Some of them indicated having a tendency to dominate and/or finding it hard to compromise. Small numbers (groups of up to 3%) indicated specifically what they had learned about their individual learning style, including attributes such as being a perfectionist, being open, flexible, willing to share, learning best through trial and error, their need to plan well before starting a project and so on. Almost 20% of students did not respond to the question.

Has your experience of constructing a WebQuest had any impact on your existing ideas about teaching and learning?

Over 70% of students answered the question. All of the responses related to collaboration and group work. The following comments capture the essence:

As a learning process, it was useful because of the ease with which we as teachers put children into groups without considering the potential difficulties which they may encounter in working together.

Others noted that:

Different learning styles can cause difficulty in collaborative learning and teachers must take this into account when assigning children into groups.

Perhaps the most insightful comment of all was:

Because this group work was part of an assignment and it was important to do well we were forced to work collaboratively and it was a valuable experience for us in learning how to collaborate and for forcing us to think what happens when we assign children to work in groups. We assume that they can just work together naturally but I now know that it just doesn't happen like that.

Do you envisage using your own WebQuest or any other WebQuest at any point in the future?

Ninety-one per cent of students intend using WebQuests in their teaching in the future, 2% are unsure and 7% do not ever intend using a WebQuest in their teaching.

Discussion of findings

The course was designed to foster a collaborative learning environment that embodied constructivist-learning principles. It was successful in this regard since it encouraged students to reflect on the issues involved in creating a successful learning environment. As one student commented:

For two and a half years we have learned about constructivism but this was the first time we had the experience of working in a true constructivist environment.

The main findings emerged on the issue of collaboration, the challenges it posed to the students and the subsequent impact on their concepts of their own learning style and their concepts of teaching and learning.

This was the first occasion that most of the students were ever asked to participate in a graded group assignment. So the challenges described earlier are not surprising. Also, given that the students were within the top 10% of second level graduates in Ireland, where they only completed individual graded assignments, it is reasonable that they are highly competent at producing individual work and understandable that, having completed their first graded group assignment, up to 20% of students expressed a preference for individual work. It was heartening to note the number of students who might conduct group work when they begin teaching.

Using friendship groupings was a successful method of grouping the students, comparing very favourably with a previous experience where the partners were chosen randomly. At that time, students reported widespread dissatisfaction with having to work with someone they did not necessarily know and with the difficulties of making arrangements to meet with such persons. For the future the option to work in slightly larger groups (three/four persons) or individually should be permitted both for comparison purposes and to facilitate all student life styles and personality types.

Another issue concerns time management. The fact that almost four-fifths of students worked together with their partner on all aspects of the project shows poor division of labour. While it is not possible to make definitive assumptions from the information available, possible explanations include lack of confidence in technical ability and the lack of experience in working on a graded project with other people. Other reasons may be personality traits or perhaps poor understanding of the concept of collaboration.

Finally, given that over ninety percent of the students say they intend to use WebQuests in their future teaching, it is a positive indicator that most students are willing to embrace technology in a collaborative learning environment.

Conclusion

The compilation and analysis of the questionnaire was an invaluable exercise for us as designers and implementers of the course. Armed with the information gleaned from the research there are a number of issues we hope to address in future courses. These include providing the students with an opportunity to implement their WebQuest with a group of children. This would allow students to systematically observe children engaged in collaborative activity and to evaluate the use of WebQuests as a tool for teaching and learning. We also envision holding a workshop subsequent to the WebQuest assignment due date where the challenges of collaboration and how those challenges can be resolved or discussed. The forum would include topics such as planning, conflict resolution and time management, and should endeavour to provide strategies to deal with those issues. We also foresee that the session would enable students to make connections with other modules on the course, i.e. teaching studies, curriculum studies, classroom management, etc. We also anticipate exploring the option of allowing more flexible

grouping arrangements, for example working in groups of three to four persons or working individually to complete a WebQuest.

Notes on contributors

Margaret Leahy is a lecturer in ICT in Education at St. Patrick's College of Education, Drumcondra, Dublin 9. As a teacher in mainstream and special education her research interest lies in ICT and literacy development. She has given numerous in-service courses in ICT for primary teachers.

Denis Twomey is a lecturer in Digital Learning at St. Patrick's College Drumcondra, Dublin 9. He spent over 20 years as a primary teacher, during which time, he introduced numerous digital technologies into his teaching. He has a particular interest in multimedia and web technologies in primary classrooms and was instrumental in introducing the webquest model to Irish pres-service teachers.

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