Chapter XI

Using Situated Learning as a Design Strategy for Web-Based Learning

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Many writers argue for a place for the use the new educational technologies from the perspective of IT management (e.g., Holt & Thompson, 1998). This form of reasoning sees a technological, rather than educational, imperative as leading the move to embrace learning technologies. The technological imperative sees the need and place for information technologies in education being based on such organisational factors as opportunity, competition and efficiency. When such imperatives are driving change, the applications of learning technologies are more likely to be made through additive strategies which see existing strategies and methods being complemented by technology-oriented initiatives. Many writers argue for more integrated approaches which have the potential to redefine and transform the more fundamental aspects of teaching and learning (e.g., Collis,1997), that is, a pedagogical imperative.

Teachers are using the Web for a variety of reasons and the extent and scope of the usage differs significantly. A majority of current Web-based learning environments have evolved from face-to-face teaching programs in the additive form described above. Typically the first step in the evolutionary process is the creation of an electronic form of existing course content. This content usually takes the form of HTML with hyperlinks to related information within and beyond the immediate course. An added feature is often a communicative element enabling interactions between learners and the teacher. What is characteristic in much of this development is the absence of any particular Web-based instructional design. The purpose of this paper is to explore a possible Web-based instructional design model that seeks to make optimal use of the opportunities and advantages of the Web as a learning environment and which can return enhanced learning outcomes.

WEB-BASED INSTRUCTIONAL DESIGN

The majority of learning theories guiding technology-based instructional design today are based on constructivist principles which value the role of an active learner in the learning process working with information to derive meaning and understanding. In contemporary computer-based learning environments, activities are often embedded in curriculum sequences, so that computers become a learning partner, rather than a medium for direct instruction or a generic tool. The logic and reason behind this application of the technology stems from the need for effective learning tools not to represent the world to the learner but to assist the learner in building meaningful, personal interpretations and representations of the world (Jonassen, Mayes & McAleese, 1993).

There are several strong theoretical foundations to guide instructional design for the Web-based learning environment. For example, Spiro, Feltovich, Jacobson & Coulson (1991a) argue that there are special requirements for attaining advanced learning goals given the impediments associated with ill-structured features of knowledge domains. They describe the value of a criss-crossed landscape, multiple dimensions of knowledge representation, an d multiple interconnections across knowledge components—all elements of learning that care readily supported by hypertext domains and communication facilities of the Web. Jonassen & Reeves (1996) use the term *cognitive tools* to describe computer-based learning applications which assist learners in representing their own knowledge of the external world. Cognitive tools when used appropriately can engage learners in higher order thinking and learning providing opportunities for the acquired knowledge to be generalised to new and alternative problem spaces and contexts.

Until the invention of schools, nearly all formal knowledge and skill was transferred through apprenticeships (Collins, 1988). In the 1980s, teachers and researchers in education began to investigate the notion of apprenticeships and to try to distinguish those characteristics which were critical to its success. Their aim was to begin the process of developing a theoretical perspective for learning based on the apprenticeship model. Brown, Collins and Duguid (1989) were the first to use the ideas to produce a proposal for a model of instruction that has implications for classroom practice. In their model of situated cognition, Brown et al. (1989) argue that meaningful learning will only take place if it is embedded in the social and physical context within which it will be used.

We have previously used the concepts of situated cognition and situated learning as successful design strategies for technology-based multimedia and it has strong prospect for application in Web-based learning. Situated learning as a model of instruction has grown out of a general theoretical shift within the educational community from 'behavioral to cognitive to constructivist' learning perspectives (Ertmer & Newby, 1993, p. 50). It provides strong contexts for learning and is strongly supported in a Web-based environment by the information and communication capabilities of the technology.

Situated Cognition and Web-Based Instructional Design

Our previous research (Herrington & Oliver, 1995; 1998) identified nine discrete characteristics as critical elements in designing learning environments based on the principles of situated cognition and situated learning. The identification of these characteristics was enabled through a distillation of the extant literature describing this learning theory and those closely related to it. Through this process we developed a set of guidelines which could be used to inform instructional design processes associated with operationalising the situated learning elements for computer-based learning environments. In the following section, the nine elements are described and descriptions are provided of the ways in which each can be incorporated into computer-based learning materials.

1. ***Authentic contexts***
   Situated learning environments reflect the ways in which the knowledge and learning outcomes are to be used in the real-life settings beyond the classroom. For this reason, a situated learning environment needs to provide an arena which preserves the complexity of the real-life context with 'rich situational affordances'. From a design viewpoint, the setting needs to provide learners with a variety of resources reflecting different perspectives and to incorporate a structure which does not fragment or overly simplify the environment (Brown et al., 1989; Collins, 1988; Gabrys, Weiner, & Lesgold, 1993; Harley, 1993; Moore et al., 1994; Palincsar, 1989; Resnick, 1987; Winn, 1993; Young, 1993).

2. ***Authentic activities***
   The learning activities that are designed for situated learning must have real-world relevance. This relevance can be achieved by the development of ill-defined rather than the more commonly used prescriptive activities. Authenticity is enhanced through the use of a single complex task to be investigated by students rather than a series of fragmented tasks. In some instances it is useful to create opportunities for students to define for themselves the tasks and the sub-tasks required to complete an activity. Authentic tasks require a sustained period of time for investigation and need to provide learners with the opportunity to detect relevant information from among that which is irrelevant. Such tasks can often be integrated across subject areas reflecting the complexity and ill-structured nature of most real-life problems (Brown et al., 1989; Cognition and Technology Group at Vanderbilt (CTGV), 1990a; Griffin, 1995; Harley, 1993; Resnick, 1987; Tripp, 1993; Winn, 1993; Young, 1993).

3. ***Access to expert performances and the modelling of processes***
   In real-life settings, learners often learn through interactions with those who are more experienced and with experts. Such interactions provide learners with access to expert thinking and modelling processes. Often learners learn through interactions with other learners with different levels of expertise and the opportunity for the sharing of narratives and stories. The design of situated learning environments benefits from the development of instructional activities involving the observation of, and participation in, what are ostensibly real-life episodes (Collins, 1988; Collins et al., 1989; Lave & Wenger, 1991; Resnick, 1987).

4. ***Multiple roles and perspectives***
   This fourth characteristic of situated learning stems from the depth of the knowledge that is gained from access to different perspectives and representations of the material that is to be learned. This form of learning activity is characterised by learners having to deal with information presented from various points of view or being given the opportunity to express different points of view through collaboration. Alternatively it is encouraged when learners are given the opportunity to immerse themselves within the learning environment through multiple investigations within a resource base sufficiently rich to sustain repeated examination (Bransford et al., 1990; Brown

et al., 1989; CTGV, 1990a; CTGV, 1993; Collins et al., 1989; Lave & Wenger, 1991; Spiro, Feltovich, Jacobson, & Coulson, 1991a; Spiro, Feltovich, Jacobson, & Coulson, 1991b; Young, 1993).

5. ***Collaborative construction of knowledge***
Much of the learning that occurs outside the walls of formal institutions takes place through activities and tasks that are addressed and attempted by a group rather than an individual. Collaborative learning requires the organisation of learners into pairs or small groups and involves appropriate incentive structures for whole group achievement. Whereas previously many computer-based learning environments were deliberately designed for individuals working in isolation, situated learning environments are characterised by activities with learners learning with, and from, one another in cooperative and collaborative ventures (Bransford et al., 1990; Brown et al., 1989b; CTGV, 1990a; Collins et al., 1989; Resnick, 1987; Young, 1993).

6. ***Reflection to enable abstractions to be formed***
Reflection is a learning strategy that encourages and enables students to consider and deliberate on both their learning and learning processes. It is facilitated by tasks and contexts with high degrees of authenticity. In computer-based settings, it is facilitated when students are able to return to any element of the program if desired, and to act upon the outcomes of their reflections. Other strategies that can be used to encourage reflection include providing learners with the opportunity to compare themselves with experts and with other learners in varying stages of accomplishment (Brown et al., 1989b; CTGV, 1990a; Collins, 1988; Collins et al., 1989; Resnick, 1987).

7. ***Articulation to enable tacit knowledge to be made explicit***
A learning strategy that is closely allied to reflection is articulation. Articulation is critical to situated learning environments to make explicit the knowledge which has been gained. The purpose of the articulation is to create inherent, as opposed to constructed, opportunities for the learners to explain their understandings and constructed meanings. The tasks that are required to create the appropriate contexts for articulation are complex and involve collaborative groups, which enable first social then individual understanding. Strategies often used for this purpose include the public presentation of arguments by learners, an activity requiring articulation and defence of students' ideas and their learning (Bransford, et al., 1990; Collins, 1988; Collins et al., 1989).

8. ***Coaching and scaffolding by the teacher at critical times***
Situated learning settings often provide distinct roles for teachers as facilitators and coaches for the learners. In these roles the teachers are able to provide different forms of support for learning, particularly support in the form of scaffolding. The forms of design strategy that have been used for this purpose include the use of complex, open-ended learning environments where no attempt is made to provide intrinsic scaffolding and coaching. In such settings more able partners in collaborative environments are often able to assist others with scaffolding and coaching. Often designers of situated learning settings involving computer-based applications create opportunities

for articulation by requiring the teacher implementing the program to provide coaching and scaffolding assistance for a significant portion of the period of use (Collins, 1988; Collins et al., 1989; Griffin, 1995; Harley, 1993; Resnick, 1987; Young, 1993).

9. ***Authentic assessment of learning within the tasks***
The final characteristic of situated learning involves the ways in which the learning outcomes are assessed and evaluated. Many writers have argued the need for authentic assessment, assessment which is characterised by fidelity of context where students have the opportunity, as they would in real life, to be effective performers with their acquired knowledge, and opportunities to craft polished performances or products. Authentic assessment requires significant student time and effort in collaboration with others and, as with authentic learning activities, requires complex, ill-structured challenges that involve judgment and a full array of tasks with the assessment seamlessly integrated with the activity. Authentic assessments have multiple indicators of learning and require attention to the validity and reliability of the measures to enable appropriate criteria for scoring varied products (McLellan, 1993; Young, 1993; Young, 1995).

SITUATED LEARNING THROUGH WEB-BASED ENVIRONMENTS

Many writers are now suggesting design guidelines for those planning to develop on-line courses (e.g., Duschatel, 1997; Wild & Quinn, 1997; Berge, 1998; Collis, 1998). As one would expect, the advice is very broad and covers all aspects of instructional design from methods to integrate new technologies to on-line learning to potential assessment strategies. The plethora of advice being offered is often difficult to digest and apply due to the vast differences in the scope, extent and depth of the guidance provided. We can use the nine elements of situated learning as guiding principles to develop design strategies for Web-based learning by discretely considering their impact on the design and selection of the content, the learning activities and the learning supports. The following sections discuss how these factors can guide Web-based instructional design.

In our previous research into the design of effective technology-based learning environments, we developed a framework which identified and distinguished between the critical elements. Our research identified discrete roles for the three principal components: the learner; the multimedia materials and the teacher implementing the course (e.g., Oliver, Omari & Herrington, 1998a; 1998b).

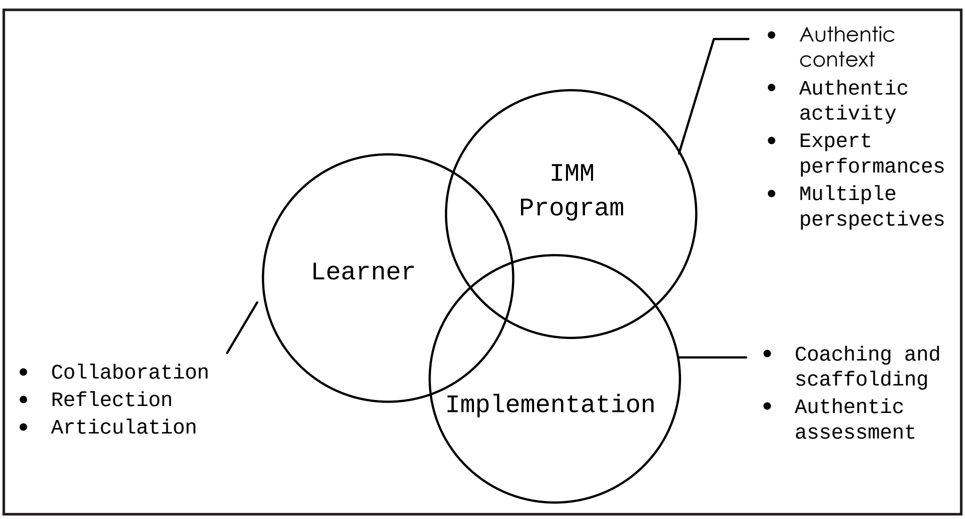
More recently our research and development with Web-based learning materials has led us to refine the components of the model described in Figure 1 to more accurately reflect the changed and varying roles for stakeholders in on-line and Web-based learning environments (e.g.. Oliver & Omari, 1999; Oliver, 1999). The original model was used to describe elements in a classroom-based learning environment and while many of these are present in on-line settings, slight but important differences do exist. For example, in on-line settings, the technology plays an important role in providing an array of resources for the learners, but the resources are not confined to multimedia and Web-based materials alone. In designing Web-based learning, teachers are required to develop learning activities and learning strategies that incorporate the various resources in ways that cause the learners to attend to the materials and to be cognitively engaged in their dealings with them. The role of the teacher in Web-based environments is also changed. In on-line settings the teacher's role becomes less direct and is often described as that of a facilitator and coach, given that they have to provide support in less evident forms than that usually provided by the classroom teacher. The revised model for describing situated learning in Web environments still contains the nine elements described earlier but these are now integrated across the whole learning environment and are less focused on the particular participants (Figure 2).

There are many ways in which the principles of situated learning can be applied to the design of Web-based learning settings. Situated learning can be achieved to some degree by the inclusion of any of these elements in a learning setting. The challenge for designers is to explore how all the nine elements might be incorporated so that they can act together to support student learning. While the constituent elements suggest the forms of learning resources, learning activities and learning supports that are needed, designers have considerable scope in the ways in which they apply these principles. One strategy that we have used successfully to embrace situated learning in Web-based environments is that of problem-based learning.

Problem-Based Learning

Problem-based learning is a curriculum approach which helps the learner frame experience as a series of problems to be solved and where the process of learning unfolds through the application of knowledge and skills to the solution of real-world problems, often in the contexts of real practice (Bligh, 1995). It supports learning through goal-directed activity situated in circumstances which are authentic in terms of the intended application of the learned knowledge. Problem-based learning and the use of authentic tasks have become an alternative to more content-oriented approaches to education. Problem-based learning builds on experiences and empirical findings that students learn more from a problem-oriented task than from a fact-oriented one. At the same time problem-based

Figure 1. The constituent elements of situated learning in interactive multimedia



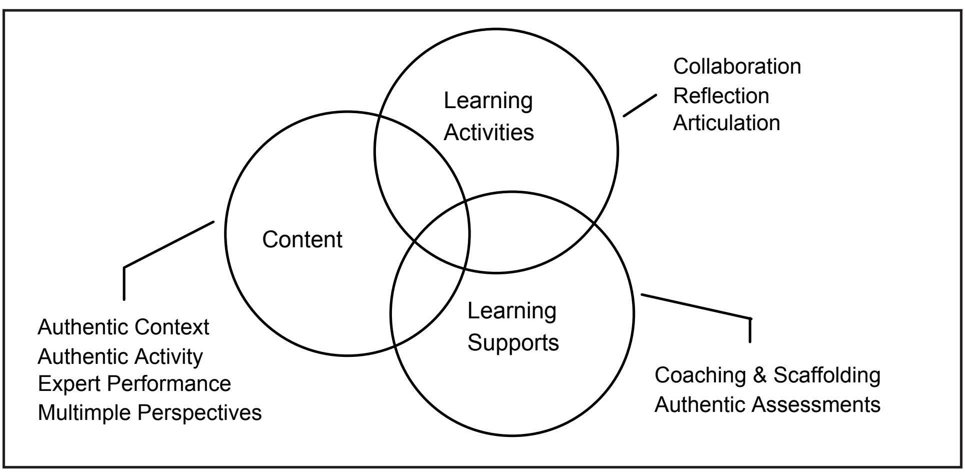
learning environments are frequently reported to increase student motivation, to develop their critical thinking skills and deepen their understanding of significant content (Sage & Torp, 1997).

Promoting learning through problem-based activities provides considerable scope for designers looking to employ situated learning as a design strategy in their Web courses. It facilitates learners solving authentic problems which reflect the way in which the learned information will be used outside classroom settings. Authentic problems tend to be ill-structured with multiple solutions. Students are able to use a multitude of perspectives in the problem solution, and many solutions exist for the problem. This form of learning, it is argued, can provide better forms of learning transfer between the university setting and the workplace, as well as enhancing students' abilities to continue to learn beyond the classroom setting (Herrington & Oliver, 1998). It is this potential which often motivates the use of problem-based learning and exploration of the factors which influence its success.

Problem-based learning has become very popular in university programs across a range of courses including business, education and science. In medicine and biology, for example, learners are often required to deal with large amounts of information in ways which reflect the forms of practice for which they are training. Whereas in traditional courses students would have been exposed to the information in such activities as lectures and workshops, in problem-based environments students are required to use the information in meaningful ways as they will be required when they graduate (e.g., Prawat, 1993; Fenwick & Parsons, 1998). Such forms of learning draw heavily on communication and collaboration among learners. The context in which the activity takes place has a strong influence on the forms and types of learning achieved (Vernon, 1995).

Problem-based learning can be supported well through Web-based technologies by virtue of the information access and cognitive support which they can provide. Use of the Web provides access to a raft of information and resources that can be used in the problem solution. The conferencing capabilities of the WWW also add considerably to its capacity to support problem-based learning. Learners using electronic conferencing can establish a sense of community among themselves and teachers can become more accessible to

Figure 2. The constituent elements of situated learning for Web-based learning



learners. The same applications can return disadvantages in some ways. Increased electronic communication can limit the capacity of teachers to deal with students. In electronic conferencing, the content of the discussion can be poor and not all topics relevant to the courseware may be discussed. A number of researchers are now exploring ways to support technology-based teaching and learning and in particular to support computer conferencing and asynchronous communication (e.g.. Masterton,1998).

At our university we have been exploring the use of problem-based learning as a design strategy for Web-based learning for several years now. The problem-based learning creates a powerful setting to create a situated learning environment. The following sections describe one such example and illustrate the various elements and components of the teaching.

RONSUB: A PROBLEM-BASED LEARNING ENVIRONMENT

The format we chose for our Web problem-based learning environment was a set of learning activities based around a weekly problem-solving activity. We developed a Web-based learning system, RonSub, to manage and coordinate these activities. The system enables students in a course to be arranged into workshop groups of about 20 students. Within each workshop, students are formed into smaller groups of four or five for the problem-based activity. Each of these small groups is required to develop a solution to a weekly problem, an activity that necessitates them to explore the topic, locate relevant information and resources, consider the various options and outcomes and to create a response which is informed and well argued. The solution is posted through the Web to a bulletin board and accessible to other students in that workshop. Once posted, solutions are then read and assessed by both the tutor and other groups in the workshop, an activity that requires students to read the solutions of about four other groups and to consider the arguments and information presented. From one week to the next, a record is kept by the system of the marks received by each group for their problem solution and at the end of the

Figure 3. The Problem: The solution to the problem is submitted to the Web bulletin board using a simple form.

course, this cumulative mark can be used in the students' assessment.

The following section describes the main features of the RonSub system which was developed according to this specification. The screens provide examples of the electronic environment developed for the course and the forms of interaction supported in a typical week for both students and their teachers.

The weekly problem is given in the on-line course notes along with a number of initial references and information sources, both online and in print. Students are expected to read the various sources and consider an appropriate solution. The students can then meet together to plan their problem-solving strategies; many, however, prefer to use e-mail for this purpose. The Web problem-based learning environment is controlled by a menu system which is password protected and provides closed access to students within the various workshops to the system. The students work together to solve the problem, some collecting information, others analysing the problem setting and considering the options. A solution is developed with a word limit of 250 words. The students pass this between themselves to polish and refine it. At the end of the week, the solution is posted (Figure 3).

The Web provides many supports for the problem-solving process in the form of resources and tools for communication and collaboration. Once the solution has been posted, the members of a group can then see the solutions posted by others in their workshop. Students are required to read the solutions of others and to choose the best solutions from the other groups.

The learning system supports peer assessment through a simple voting mechanism, the results of which are uploaded into the system database. In each workshop, the group which receives the most votes achieves a score of 5, the second group receives 4 and all other groups which have submitted a solution receive 3 marks. The tutors of each workshop can now mark the solutions of their groups. In this instance, the tutors give marks out of 5. When all groups have been scored by their peers and their tutors, the marks for the activity can be

Figure 4. Assessing the Problem Solutions: The Coordinator and Tutors can view the overall results for all Groups and Workshops.

Title	Group 1		Group 2		Group 3		Group 4		Group 5		Group 6	
Workshop 1	View	3, 1(3) : 6	View	4, 2(4) : 8	View	3, 1(3) : 6	View	5, 2(5) : 10	View	2, 0(3) : 5	n/a	
Workshop 2	View	2, 2(4) : 6	View	4, 1(3) : 7	View	3, 2(5) : 8	View	2, 1(3) : 5	View	2, 1(3) : 5	View	3, 1(3) : 6
Workshop 3	View	4, 1(3) : 7	View	4, 2(3) : 7	View	4, 0(3) : 7	View	4, 3(5) : 9	View	5, 2(4) : 9	n/a	
Workshop 4	View	3, 2(3) : 6	View	3, 0(3) : 6	View	4, 0(3) : 7	View	4, 2(5) : 9	View	4, 2(4) : 8	n/a	
Workshop 5	View	3, 1(5) : 8	View	3, 0(3) : 6	-	-, 1(-) : 0	View	3, 1(4) : 7	View	2, 1(3) : 5	n/a	
Workshop 6	View	4, 2(4) : 8	View	4, 0(3) : 7	View	3, 0(3) : 6	View	5, 2(5) : 10	View	4, 2(3) : 7	n/a	
Workshop 7	View	5, 0(3) : 8	View	4, 1(5) : 9	View	4, 1(4) : 8	View	5, 0(3) : 8	View	4, 0(3) : 7	n/a	
Workshop 8	View	3, 1(3) : 6	View	4, 0(3) : 7	View	4, 1(4) : 8	View	5, 2(5) : 10	n/a		n/a	
Workshop 9	View	-, 2(4) : 4	View	4, 1(3) : 7	View	3, 2(5) : 8	n/a		n/a		n/a	
Workshop 10	View	4, 2(5) : 9	View	5, 1(4) : 9	View	3, 1(3) : 6	View	3, 0(3) : 6	n/a		n/a	
Workshop 11	View	3, 1(3) : 6	View	4, 3(5) : 9	View	4, 2(4) : 8	View	4, 2(3) : 7	View	3, 0(3) : 6	n/a	
Workshop 12	View	4, 0(3) : 7	View	4, 1(5) : 9	View	3, 0(3) : 6	View	3, 0(3) : 6	View	4, 1(4) : 8	n/a	

Table 1. Elements of situated learning with supporting on-line activities and affordances.

Learning Elements	System Features
Authentic contexts	• content presented in ways reflecting intended use • the problems give relevance and meaning to the coursework
Authentic activities	• real-life problems are presented to the learners • problems require open-ended inquiry • the problems are non-structured learning activities
Expert performances	• sample solutions are provided to guide learners in problem-solving processes • access to Web sites of experts and experienced others add to the information sources
Multiple perspectives	• access to multiple Web sites for information • a variety of media sources, e.g. print, video • groupings provide different perspectives • best solutions present alternative perspectives
Collaboration	• group-based activities encourage collaboration • the open-ended problems require group-based decision making
Reflection	• the open-ended questions require definition and description • peer assessment necessitates reflective processes
Articulation	• group-based problem solving requires students to create solutions to open-ended problems • summarised solutions necessitate articulation and explanation of learning
Coaching and scaffolding	• Students are supported by other group members • materials are available to model problem-solving processes • e-mail access to tutors provides learner support
Authentic assessment	• Assessment strategies assess the processes of learning as well as the products • peer-assessment ensures students became critical reviewers of others' work

viewed. The system shows students the results for each problem solution in a graphical form.

The program chooses the best solutions from each workshop, based on the marks achieved, and creates a page which students can view. In this way, students can see the solutions of students from other workshops and consider other alternative to the problem, a useful activity to encourage reflection. The course coordinator and tutors use a different menu system to gain access to the data from the learning system. They can view the results for each group and can see the results across all the workshops (Figure 4).

The Components of the Web-Based System

The problem-based learning setting that we developed for our students was designed to include the constituent elements of situated learning. In some instances, the on-line setting facilitated the inclusion of these elements as natural parts of the learning environment while in other instances their presence had to be achieved through careful and deliberate instructional design. In the finished product, it was evident that the problem-based learning setting was able to provide the necessary framework and structure for learning that we were seeking. Table 1 shows the various elements within the on-line learning environment and their relationship to the situated learning elements described earlier. The table clearly shows the capacity of a problem-based environment to create the necessary conditions for implementing a situated learning setting and exemplifies the elements that are more easily incorporated. The flexibility of the Web as a learning tool, however, makes it possible to supplement the learning environment in many ways to provide for those elements that are least evident.

The problem-based learning environment that we have described is but one example of how a situated learning strategy can be applied using the Web. We developed a customised setting that met our needs and the needs of our learners. Other teachers will necessarily make entirely different decisions and create quite different settings depending on the needs of their courses and their learners. What we have tried to illustrate in this example is that the Web offers many opportunities for teachers and designers, and many of these opportunities provide strong support for developing environments that incorporate the various elements of situated learning.

SUMMARY AND CONCLUSIONS

This paper has described the concept of situated learning and discussed how it can be used to guide the design of Web-based learning. It provides an example of a Web-based situated learning environment developed by the authors in a university setting. The setting incorporated a problem-based learning environment supported by a customised on-line system which managed and coordinated the problem-solving activities of the students. The problem-based learning activity was organised around small collaborative groups within with a larger cohort. There are other examples of situated learning being used as a guiding principle for Web-based design. Pennell et al. (1997) provide an excellent example of yet another design strategy for implementing this form of learning on the Web.

There are many ways to create Web-based learning environments and the example described in this chapter is quite different to those that are typical today. Typical Web-based learning environments tend to revolve around course content presented and delivered in an electronic format (e.g., Dehoney & Reeves, 1998). The design of such environments is often the same as the design of conventional environments and the Web is used as a presentation medium for the content to be delivered and learned. In the example described in this paper, the focus of the design and development was towards a Web-based setting to engage and motivate learners to explore, inquire and reflect on information and content. The bulk of the effort and activity in the design of the environment was towards creating engaging learning activities and learning supports. Very little time and effort was given to the development of Web-based content.

When the effectiveness of the learning setting is considered, there appear to be many advantages to be derived from the learning setting we have described. From a theoretical perspective, there are quite powerful learning advantages to be achieved from activities that are undertaken in these circumstances. Situated learning supports student learning in many ways and in particular it supports the knowledge construction as distinct from knowledge transmission. The value of situated learning has been demonstrated clearly in classroom settings through empirical research (e.g., Brown et al., 1989). Its effectiveness has also been demonstrated in computer-based learning environments (e.g., Herrington & Oliver, 1998). Web-based learning presents new opportunities for exploring yet other applications of this powerful learning strategy and our current research is focused on discovering the learning enhancements achieved through applications in this medium.

Using situated learning as a design strategy for Web-based learning enables teachers to craft learning activities that take advantage of the unique opportunities and affordances of the Web. The Web is a powerful medium with many attributes for learning. It provides a vast source of information for learners. It provides many opportunities for communication and collaboration. It provides learners with access to a variety of learning tools and the means to apply these tools for knowledge construction. Using design strategies such as situated learning in the development of Web-based learning environments provides teachers with the means to pedagogically re-engineer their existing courses to ensure that the maximum learning benefit can be obtained from use of this medium. Each of the discrete constituent elements in the situated learning model is a powerful adjunct to learning and this paper has shown that the Web provides a learning medium in which all the elements can be combined into a single learning environment.

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