Supporting Learning With Creative Instructional Designs

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Abstract

This chapter discusses learning and instructional designs that seek to scaffold student learning and optimize the quality of students' learning experience. It attempts to show that sound learning and instructional design is at the heart of effective and efficient learner support. Creative instructional designs are learning and teaching strategies that serve to suitably scaffold learning. Some of these widely used designs are story-centred learning and problem-based learning. These designs comprise learning activities that are motivating for the learner, and incorporate the sorts of activities with which learners are likely to be engaging, in their professional practice. In the absence of careful attention to sound learning and instructional designs, attempts at learner support are likely to remain a reactionary event to a never-ending series of learning problems. Indeed many of these problems reported by learners, such as loss of direction and focus in learning, can be eliminated with creative approaches to learning and teaching. This chapter attempts to show how this has been achieved in several courses and contexts.

On Supporting Learning

A great deal of work has gone on in supporting student learning in open and flexible educational settings with various technologies (cf. for example, Bates, 1990; Collis, 1996; Khan, 1997). These authors survey several technologies including print, radio, audiocassettes, telephone, computer-based applications such as electronic databases and CD-ROMs, computer-mediated communication technologies (i.e., e-mail, computer conferencing, bulletin boards, audio and video conferencing, broadcast television, and the Internet). Many of these technologies are ideal vehicles for content delivery and supporting communication, but in themselves, they are lacking in the capability to support or "scaffold" student learning activity.

A "learning scaffold" is best described as a "transitional support strategy" which is put in place to guide student learning in desirable directions, or to enable the development of desirable cognitive skills in students. The expectation is that when this learning scaffold is removed from the context, the targeted skills become part of a learner's repertoire of learning skills. Parents or human teachers are excellent examples of learning scaffolds. Among other things of course, they are there to provide advice and support when these are most needed. At some point in the child's cognitive development, these types of support are progressively removed until they are no longer accessible or accessible to them only in limited ways. Children go on to live and function in society independently of the support and advice previously provided by their parents and teachers.

Learners in open, distance and flexible learning environments who work independently with self-instructional study materials, need help with the organization and management of their learning, as well as the skills to critically reflect on information they may have gathered. While a great deal of work has gone on in supporting student learning in such

settings with various forms of technology and local centre-based support, work is sorely lagging in the area of cognitive supports for student learning in open, distance and flexible learning environments (cf. for instance McLoughlin, 2002).

Existing work on supporting student learning with various types of learning and study strategies (cf. for instance the works of Weinstein & Mayer, 1986; Schon, 1983, 1987; Candy, 1991; Schmeck, 1988), suggest that the development of learning strategies (for example *learning how to learn*) can influence learning. These researchers have identified several categories of learning strategies, namely *rehearsal, elaboration, organizational, self-monitoring and motivational* strategies. They argue that these strategies provide a pedagogically sound framework for supporting *"learning how to learn"*, and employing these strategies can help with the cognitive processes and learning outcomes. However, while these sorts of learning strategies can be taught to learners independently, they are likely to be more potent when they are integrated into the learning context.

Goal of this Chapter

This chapter discusses several attempts at integrating powerful cognitive strategies into developing practical models of learning and instructional design. It argues that modeling the student learning experience in this way comprises the most pungent form of learner support, as these are able to provide learners with the kind of cognitive scaffolds they need to make learning, effective, motivating, and meaningful.

However, good course design cannot, by itself, offer all the support that students will need. It is one critical attribute of a sound educational experience. Another key attribute in this equation is the presence of a committed teacher or tutor who serves to provide the kind of facilitation that is necessary to make learning an interactive process (cf. for instance the chapter by Gilly Salmon, in this volume). Indeed there are numerous ways of supporting student learning, and more is not necessarily better. Being able to provide learners with the support that they must have and at the time they need to have it has implications on resources. This chapter shows how course designers can proactively set up opportunities for the engagement of learners, tutors and teachers in the educational transaction, in order to ensure a supportive educational environment.

Story-centred Learning

Research in learning and cognitive sciences has shown that the most effective way to teach new skills to learners is to put them in the kinds of situations in which they need to use those skills, and to provide mentors (i.e., expert practitioners) who are able to help learners as and when necessary (Schank, & Cleary, 1995). Through this engagement, learners come to understand when, why, and how they should use targeted skills on the job. They receive key lessons just-in-time, which is when they want the information, when it will make the most sense to them, and in a way that they will be most likely to remember the information for later use when they need it in their work.

Schank and Cleary (1995) have argued that the design of such a learning experience takes the form of a storyline in which students play a key role such as being a manager of an e-business or e-learning organization. These roles are carefully selected to reflect those that students of such a program might actually do in real life, or might need to know about because they will very likely manage or collaborate with others who might be performing

those roles. Students work in small groups in these scenarios with the help of detailed information about the simulated context, together with project details. Supporting materials and resources are also available, and online mentors are available to answer questions and point students in the right direction on a needs basis (Schank, 1990; 1997). This is the main point behind the story-centred curriculum (SCC) popularized by Roger Schank and his team (Schank, Fano, Jona, & Bell, 1994).

The story in this instance is the simulated context in which the student plays a major role. The story in this curriculum serves as the essential scaffold. These researchers argue that stories have always been a part of human existence. Humans have always told stories, and the most powerful of all stories shape the way in which we relate to our world. Furthermore, we tend not to forget these life-changing stories. There is good reason then to make powerful stories the centre of educational practices. These stories must involve students as well as their peers, because that is how their work situation is most likely to be. A story-centered curriculum is goal-based, and the goals are those that the student has for entering school and following a curriculum in the first place. A story-centered curriculum is also activity-based. Students work through these activities to learn the critical skills they require in order to complete their mission and successfully accomplish their goals (Naidu, Oliver, & Koronios, 1999). This is what is at the heart of the concept of "learning-by-doing". Learning designs such as these focus attention on improving the quality of the student learning experience. They ensure that the student learning experience is situated in authentic learning activities that reflect real life situations, that it is meaningful, and therefore inherently motivating for the student.

Problem-based Learning

Problem-based learning (PBL) is a widely used approach to learning and teaching that uses an instructional problem as the principle vehicle for learning and teaching. The analysis and study of this problem comprises several phases that are spread over periods of group work and individual study (Barrows & Tamblyn, 1980; Schmidt, 1983; Evensen, & Hmelo, 2000).

Distributed problem-based learning refers to the use of this strategy in a networked computer-supported collaborative learning (CSCL) environment where face-to-face communication among participants is not essential. It starts with a case or vignette that is presented to learners online. Learners study this vignette individually. As part of this analysis they generate explanations for the occurrence of the problem. Based on this exercise they identify what they know and do not know about the problem and make decisions about individual research. As the next step, this individual research is carried out and its results are reported to the group via the collaborative learning environment. Following this, a re-evaluation of the problem takes place and the first perceptions are probably revised. All of this is followed up with the preparation and presentation of a critical reflection, which is a personal synthesis of the discussion that has ensued.

The bulk of the learning task in this model takes place in a networked electronic environment (cf. Naidu & Oliver, 1996). For each one of the topics addressed in the course, the learning experience in this electronic environment may unfold in stages over a defined period such as four weeks. In the first week students are required to articulate their first perceptions of the problem as presented to them. They develop some hypotheses which are their conjectures regarding the problem including its causes, effects and

possible solutions, outline how they were going to go about searching for evidence to support their hypotheses and then collect that evidence. They “post” these comments on the electronic environment so that everyone can read each other’s approach to the understanding and resolution of the same problem. In the second week, after reading the initial reactions and comments of others on their own thoughts, students re-examine their first perceptions of the problem. They expand and refocus their conjectures regarding the problem and if necessary revise their hypotheses and data gathering strategies, and post these on the electronic environment. In the third week, as a result of the online discussions students are able to identify new or related issues, revise their conjectures regarding the problem and perhaps make modifications to their problem resolution strategies. In the fourth week they prepare and present their own “critical reflection record” on the electronic environment. This comprises their final comment on the problem situation and how they sought to resolve it.

Critical Incident-based Learning

This learning design reflects growing interest in building learning environments that focus on supporting groups of learners engaged in reflection on critical incidents from their workplace (Wilson, 1996). Reports of knowledge sharing during tea and lunch breaks abound. In the casual and friendly environment over a cup of tea or coffee, the personal experience is transformed into a powerful instructional event. This gives rise to the notion that there is much potential for the storyteller in supporting learning.

A design that embodies the essence of this focus is reflected in the “Critical incident-based learning” (Naidu & Oliver, 1999). It is so called because it integrates reflection on and in action, and may also include collaborative learning, and computer-mediated communication into a model of instruction. It is inspired by knowledge of the fact that practitioners regularly encounter in the workplace critical incidences which present them with learning opportunities. It serves to teach learners to recognize these critical incidences as learning opportunities, reflect on them critically, and then finally share these reflections in a computer supported collaborative learning environment.

A critical incident (from the workplace) presents a learner with a learning opportunity to reflect *in* and *on* action. Learners can do this by keeping *learning logs*, which is a record of learning opportunities presented. The log records how one approaches the incident, their successes and failures with it, and any issues that need to be resolved (e.g., things not fully understood or concepts that didn’t make sense). The critical attribute of the learning log is that it concentrates on the process of learning. It is not a diary of events nor is it a record of work undertaken, rather it is a personal record of the occasions when learning occurred or could have occurred. The learning log also relates prior learning to current practice and is retrospective and reactive in action.

Learners engage in this process of critical incident-based learning in a phased manner. Phase one in the process comprises identifying a critical incident. Learners can do this by identifying a critical incident from their workplace. They describe the "what, when, where and how" of this critical incident including its special attributes and more importantly the learning gain they derived from this incident. Phase two comprises the presentation of the learning log online. This would outline to the group the critical nature of the incident and the reasons for the actions taken by the practitioner during the encounter with the critical incident. It includes reference to what should or shouldn’t

have been done and the learning gain derived from the incident. Phase three comprises the discussion of the learning logs posted on the systems by all students. Learners attempt to make insightful comments and observations about other's learning logs with the hope of learning from the pool of experience that lies there in front of them in this shared electronic space.

Finally, phase four is about the coalescence of theory and practice, that is, bringing theory to bear upon practice and practice to inform theory. This last phase in the process has to do with learners making the connection between what they are being presented as part of their formal education and what they are being confronted with as a part of their daily work. This process leads to a summary reflection, which seeks to identify the extent to which learners feel that the theory enabled them to cope with the critical incident they encountered at their workplace. It also reflects the adequacies and inadequacies of their theoretical knowledge, and any enlightenment they may have gained from reflecting on the learning logs of their peers and from the reflections of others on their own learning logs.

Design-based Learning

Designing as a means for acquiring content knowledge is commonly used in practice-based disciplines such as engineering and architecture (Newstetter, 2000; Hmelo, Holton & Kolodner, 2000). The obvious benefit of a design task is its inherent situatedness or authenticity. In design-based learning activities, students' understanding is "enacted" through the physical process of conceptualizing and producing something. The structures created, functions sought, and the behaviours exhibited by the design solution also offer a means to assess knowledge of the subject matter. As such a student's conceptual understanding or misunderstanding of domain knowledge can be ascertained from that artifact. The failure of that artifact, for example, may suggest an incomplete understanding of the subject matter.

A big advantage of using a designing task as the basis for studying a body of subject matter is the variety of cognitive tasks required to move from a conceptual idea to a product. These include *information gathering*, *problem identification*, *constraint setting*, *idea generation*, *modelling* and *prototyping*, and *evaluating*. These tasks represent complex learning activities in their own right, and when they become the environment in which knowledge of the subject matter is constructed, students have the opportunity to explore that content in the different phases and through different representations (cf. Naidu, Anderson, & Riddle, 2000).

The complexity of design activities makes them excellent vehicles for knowledge acquisition. Moreover, design complexity requires iterative activity toward better solutions that can support refinement of concepts. Design complexity also dictates the need for collaboration. A workable team possessing different kinds of knowledge and skills can tackle complexity more successfully than an individual. On student teams, one student might have good research skills, another domain knowledge, another drawing and representation skills, and another construction skills.

Role Play-based Learning

Role-play simulations (RPS) are situations in which learners take on the roles of particular characters in a contrived educational game. As a result of playing out these roles, learners are expected to acquire the intended learning outcomes as well as make learning enjoyable. Role-play is a commonly used strategy in conventional educational settings. It is less widely used in distributed web-based learning environments although the technology is available now to support the conduct of role-play simulations on the Web (Ip & Linser, 1999; Ip, Linser, & Naidu, 2001). The essential ingredients of a web-based RPS are a) dynamic goal-based learning; b) role-play simulation and c) online web-based communication and collaboration. Let us consider each one of these in turn.

First, goal-based learning is acknowledged as a strong motivator of learning. Typically, goal-based learning comprises a scenario with a trigger or a precipitating event. This event may be presented as a critical event and usually requires an immediate response from students. In RPS, each learner assumes the persona of different stakeholders in the scenario and may pursue different goals as constructed by the learners and negotiated with the moderator. Furthermore, during the "game play", the goals of the learners may evolve as the game environment changes (Naidu, Ip, & Linser, 2000).

The second critical ingredient of this learning design is role-play. Students are organized into teams to play out particular roles within the context of a given crises or situation. In order to play out their roles effectively they need to investigate and carry out research. The third critical ingredient of this learning design is the Web which houses the virtual space for the role-play, enables communication and collaboration among students, and between the students and the facilitators.

Concluding Remark

A major suggestion of this chapter is that supporting student learning needs to be seen as a *proactive* process rather than a *reaction* to learning problems that are encountered by students. This is easily achieved by carefully designing learning environments that require students to engage in meaningful, authentic and motivating learning activities. This is not to suggest that students' learning experiences ought to be choreographed to the extent that in doing so, one runs the risk of killing off creativity and independence on the part of learners. It suggests providing learners with a plot to follow, which will enable them to acquire the necessary skills, and within which learning achievement can be reliably and validly ascertained. Furthermore, good course design could not, by itself, offer all the support that students will need to have. It is but, one critical attribute among many, of a sound and supportive educational experience.

The act of designing powerful models of learning and instruction comprises putting together into an integrated whole, what is known about what works as far as learning is concerned. While models of instruction such as problem-based learning have been widely used to support learning for a very long time in a variety of contexts, there aren't any particular fixed approaches to these processes. In fact there are very many iterations of the generic problem-based approach to learning, and all of them are probably just as powerful for their particular educational settings. This leads to the conclusion that the design of learning and instructional environments is – to a large extent – a creative process, not unlike architectural or engineering design. In all of these instances, the

designer is engaged in putting together a conceptual model that integrates what is known about what works in that particular setting. When this design task is expertly performed, its operationalization, and the chances of its success are optimized. In the context of learning, this would mean a powerful teaching strategy, which when combined with strong facilitation by teachers and tutors, is likely to lead to a successful learning experience for the students.

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