Learning from Experience, for Experienced Staff

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Abstract

Business needs in multinational corporations call for courses that involve problem solving and creating and sharing new knowledge based on workplace situations. The courses also need to be engaging for the participants. Blended learning at Shell International Exploration and Production involves these kinds of outcomes in courses designed around a workplace-learning model. Employees use a Web-based system to make contributions based on their own work experiences in preparation for a face-to-face session. These contributions then feed into classroom sessions that involve collaborative learning where the workplace problems and experiences of the participants are the focus. In this presentation one course is highlighted that demonstrates a number of game-type activities based on the participants' own workplace experiences. Implications for other courses outside of the Shell context are discussed.

Introduction and Problem Statement

In the workplaces of professionals in multinational corporations problems and challenges continually arise that involve creating new solutions and constructing new knowledge, and indirectly involve improving communication and understanding among colleagues who come from and work in different parts of the world. Key strategies involve capturing and sharing both the explicit and tacit knowledge of the experienced staff. Such learning can be either formal such as via participation in structured courses, or informal such as via mentoring and coaching in the workplace, experiential learning (Brookfield, 1995) and participation in "learning communities" (Wenger, 1998).

Both formal and informal approaches have their limitations as well as strengths. Among the strengths of structured learning are guided opportunities to learn while interacting with a new set of peers, broadening the learner's contacts beyond his or her workplace colleagues. Among the strengths of informal learning in the workplace is the anchoring of learning in problems and situations that are real and relevant to the learner and the business (Billett, 2001; Collis & Margaryan, 2003). Collaborative learning within courses that emphasize authentic work-based activities can integrate both these sets of strengths (Lim, Tan, & Klimas, 2001). Collaborative learning can also be structured to involve team-based games and competitions, as methods for engaging and motivating the learners. In this paper we describe a form of blended course emphasizing collaborative learning and learner engagement applied to work-based activities and illustrate it via the detail of one particular course for technical professionals in the oil industry.

The questions addressed in this paper are:
- Why is learning involving engaging work-based activities an appropriate response to key needs in a multinational organization?
- What does such a course look like in practice?
- What are the participants' reactions to such a course and the implications for the instructor?

Learning for Experienced Professionals in a Multinational Corporation

This section focuses on the importance for corporate learning of being directly relevant to business and workplace needs and at the same time being engaging and motivating to the participants.

Learning related to business needsOrganizations often do not see a direct relationship between business results and their investments in formal corporate learning because much traditional formal learning is limited in its transfer to the daily workplace (Smith, 2002). Partly this is because formal courses too often focus

on content delivery rather than on building upon the experiences of the participants for peer learning and problem solving (Billett, 2001). In contrast to content delivery, corporate learning should be characterized by knowledge sharing, capturing experiences from the participants, reusing them, creating new knowledge, and recognizing and solving workplace problems, in a process-oriented, collaborative manner (for a review, see Collis & Margaryan, 2003). These call for learning processes that are better fostered in collaborative learning situations focusing on work-based situations rather than in courses characterized by content delivery (Seufert & Seufert, 1999).

When supported by network technology, courses based on collaborative learning centered around real workplace problems and opportunities can begin or even be carried out in entirety when the participants are still in their workplaces. Participants can be directed to find out about the experiences of others in their workplaces and share them with others in the course via a course Web environment. These submissions can then be used as the basis for further collaborative activities if the participants come together in a classroom setting. Collaboration occurs in a variety of ways: among the course participants individually, within teams of participants with similar specialized experiences, or between teams with generically similar problems but from different backgrounds. Within the workplace, collaboration can also involve the participant's peers and supervisor and relevant others in the corporation. All these need to be integrated by the course instructor so that sharing and learning occurs. This approach to collaborative learning involves the use of Web-based course environments that include groupware tools such as shared archives, and tools for structuring, monitoring, and motivating overall course processes.

Learning as engaging

Although professional learners acknowledge the importance of applying learning to improve their own workplace performance and also to eventually have a business impact, it is still important that learners feel personally engaged and motivated for individual learning activities. This is particularly an issue when part or all of a course takes place with the participants staying in their own workplaces; the dynamics of a well-designed classroom session, with peer interaction and the stimulus of being together in the same place, are harder to achieve when participants are fitting their learning activities around work pressures. Thus it is valuable that learning activities focused on the workplace occasionally involve elements of competition or team spirit or even moments of fun. Harris (1991) identifies a number of ideas for motivating learners including: (a) focus on teams and teamwork; (b) provide rewards, have "winners" and near-winners; (c) have learners participate, be actively involved, and make meaningful personal contributions that are valued by others; (d) stimulate learners to find and defend their own solutions perhaps within a timed competition among teams; (e) make learning visual and tactile, have things to look at and to handle; (f) stimulate tangible thinking as well as creativity; and (h) maintain a sense of energy and dynamism.

In the literature, there are a number of references related to bringing motivational elements into classroom sessions for adult professionals through game-type, motivating activities and also other discussions about how to design online learning to be motivating. Smith and Drakeley (2004) for example assume that Web-supported learning means an individual learning via interacting with a computer, and thus call for program designs within the software that involve elements such as game-type assessments, animations, and real-life stories. Sometimes motivation is brought in through the way a course is publicized in the workplace. Bailey (2003) describes a health-care setting in which employees were motivated to succeed in a mandatory online course through promotional strategies in the workplace such as posters and displays in public areas such as cafeterias, break rooms, meeting rooms, corridors and hallways; and by providing buttons to all successful participants and making the wearing of the buttons a focus of in-house communication campaigns. However, bringing a motivating environment into work-based courses that partially take place while participants are still in their own workplaces is not yet much discussed. In particular, designing a course so that Harris' ideas for motivating learners are combined with the need to deal with serious problems in a professional workplace is a challenge.

To integrate these ideas of making learning business relevant and making learning engaging, new course-design principles are needed. On one hand, these need to represent good design for any professional learning. Thus fundamental principles of good learning for adult professionals should apply. Merrill (2002) has identified five "first principles of instruction", which fit well with workplace-learning situations. He argues that "Learning is promoted when:

1. Learners are engaged in solving real-world problems.
2. Existing knowledge is activated as a foundation for new knowledge.
3. New knowledge is demonstrated to the learner.

4. New knowledge is applied by the learner.
5. New knowledge in integrated into the learner's world." (Merrill, 2002, pp. 44-45)

Merrill's principles aim clearly at business relevance. On the other hand, in order to add the engagement dimension, work-based activities related to real workplace problems should also be designed to involve aspects such as those identified by Harris (1991): team competitions with rewards, winners and near-winners; learner participation, active involvement, and building on personal contributions from the participants. Participants should find and defend their own solutions perhaps within a timed competition among teams. Tangible thinking as well as creativity should be stimulated and a sense of energy and dynamism should be maintained, both for portions of the course carried out within the workplace but also within a classroom component. An example of how this is being done in practice is described next.

Work-based Courses at Shell International Exploration and Production

Professionals in multinational organizations gain important practical experience and insights over time that can be used as the basis of engaging and business-relevant learning activities. In a large organization such as Shell International Exploration and Production (Shell EP), employees with the same general job title, such as *Production Technologist*, can vary considerably in their practical experience, depending on the part of the world in which they work. After five to ten years of experience in the company, these professionals often turn to the Shell EP Learning & Leadership Organization (LLD) for a course that will give them technical re-energizing and updating. An important issue for Shell EP LLD is how to make these courses meet the particular needs of the individual participants including their need for engaging learning while at the same time address strategic business goals such as knowledge sharing and building on experience. Shell EP has been developing and using different models of blended learning that have these issues as focuses. More than 50 courses have been redesigned and more than 80 distinct course events have run within Shell EP that demonstrate different ways that this model operates in practice (Collis, Margaryan, & Cooke, 2004; Collis & Margaryan, 2003).

Approximately half of the redesigned course events involving work-based learning supported by technology use a blend that combines a component in the workplace with a classroom component; the other half use only the workplace component. The workplace component is not "e-learning" but rather a series of work-based activities involving collaboration with others in the workplace or course and regular submissions into the course Web environments. The submissions, which can be graded if appropriate but always receive at least written feedback directly into the Web site, can be used as discussion points and resources by the other participants. Technology is thus important to facilitate this approach. A Web-based course-management system such as those commonly used in universities is a key tool (Collis, 2002). This system combines the benefits of a learning-content management system for reuse of participant submissions with tools for collaboration, sharing, and communication, all integrated in practice under the leadership of an instructor who him/herself has many years of experience as a technical professional in the company.

The Applied Production Technology course

The course "Applied Production Technology" is a course for Production Technologists in the oil industry with five to ten years' experience in the company. They will have developed different types of expertise depending on the situations in which they have worked, although all involve skills related to the technologies that are used to bring oil from where it is found to production. Production Technologists deal with problems involving well engineering, the planning of production volumes and capacities, the design of well/reservoir interfaces, sand control, artificial lift methods, and production-system optimalization, among others. The following sections describe the general design of the course and give examples of the engaging aspects of the work-based learning activities that link the workplace to the classroom and build on the experience of the participants.

Course design

The course begins with a three-week period of interaction and submissions via the Web-based course environment while participants are still in the workplace, through a variety of activities in which participants identify their own workplace needs as well as their own experiences that will be relevant to others in the course. This is followed by a two-week classroom session in which frequent team-based activities occur based on the submissions that were made by the participants when they were still in the workplace. These activities are engaging in each of the ways that Harris (1991) describes. The Web-based system continues to support the interaction and reuse of submissions. During the classroom session, differences in experience among the participants are capitalized upon in game-type activities.

When participants begin the course, they receive the URL of the course Web environment in which a large number of course resources are available and in which each participant has access to his or her own personal biography page. All course resources and activities, as well as submissions and feedback messages from the instructor, are integrated into a "Roster" (see Figure 1).

Figure 1. Portion of the roster of the Web environment supporting the production technology course

In Figure 1, the icons to the right of matrix cells with activity instructions indicate links to all the submissions of the participants as well as the feedback given to those submissions by the instructor. The instructor can determine if the participants can see each others' submissions or not.

Via a "News" page and a "Course Info" page as well as the "Roster" the participants can read information about the course and a general welcome from the instructor. An excerpt:

> *"Think of the course as a way for you not only to learn but to demonstrate that you are a real production technologist. The contributions that you make in the course will help others (perhaps through the magic of technology, for years to come). For this new version of the course, I want to get away from having me and the other instructors lecture to you for hours on end. At this point in your career as a production technologist I think you deserve something more fun. So, I am going to try to keep you very busy and working hard. I will also give you some additional incentives.. Your "carrot" is that at the end of the course, I will reward those people that have done well on the course with a certificate that will say something nice about their accomplishments, their team abilities and their attitudes in the course. Your "stick" is that the course will have several competitive team events. You don't want to embarrass your team, do you? No, I didn't think so…Thus here is your checklist of pre-classroom activities to complete before you arrive…"*

In addition to five-ten hours' worth of reading materials and one activity involving an orientation to the Web-based environment, 14 work-based activities are then described, each requiring a submission from the participant into the Web environment.

Work-based learning activities

Within the first week of being introduced to the course Web site, each participant is shown a list of the five main specialist areas involved in the Applied Production Technology course, and asked to indicate to the instructor the area or areas in which he feels he or she has somewhat specialized knowledge or is otherwise quite experienced and knowledgeable, but also the area in which he or she most needs new or more knowledge. The instructor uses this to group the participants into different sets of "specialists" that are called upon

throughout the course. The "specialists" will be providing questions to be answered by experts, short stories about their own experiences, and will contribute data for class problems. The specialist roles come up in many of the different learning activities of the course. Several different types of these activities are described next. Each has two parts: a portion done while still in the workplace, and a portion done in a team environment during the classroom component of the course.

Completion-type selection challenge: In production technology, completion design involves the steps and decisions needed to minimize the unit technical costs of a well. It involves many aspects of well design. Some course participants will have had more experience than others at completing the design of a well. These "specialists" for this activity and submit via the course Web site a problem related to completion design that they have been involved with, as well as their solution. A Word template is provided to ensure that the necessary information is provided, such as characteristics of the rock formation, fluids, and reservoirs involved. Then in the classroom session, one of the submitted stories is chosen and the "specialist" sits with the instructor to describe the situation to the other participants. The other participants break into teams and have a certain amount of time to construct and present a solution. The specialist and the instructor score the results and give feedback. This is repeated for each of two additional specialist submissions selected by the instructor. The team with the highest score at the end of the three rounds is the winner.

Guidelines for the activity include: Allow questions for clarification at the start and during the team work but brief the "specialist" not to describe his solution in any way. The "specialist" who contributed the challenge may have some difficulty deciding which team has the best reply as their solutions will vary considerably so the instructor has to take the lead in the scoring. Score each presentation relative to the previous ones so that a sense of excitement builds. Therefore do not score the first one too highly. Allow discussions and comments among the teams as each challenge is presented. Some of the best ideas come from this.

Production Technologist Quiz Bowl: Via the course Web environments, participants read the following: *"How much PT knowledge do you have? These questions are an example of those that I will quiz you with during the PT Quiz Bowl sessions during the classroom component of our course. They are derived from materials in P264 (a course the participants had already taken) and this course. You will see many of them again when I ask your team these questions during our classroom sessions. Test yourself now and see how many you can answer. Use this also to determine your weak areas so that you know which parts of the course to concentrate on most".* Attached to this is a spreadsheet with about 60% of the potential questions. The questions are general-knowledge sorts of questions with well-defined answers ("Name five different types of sand control"). In the classroom sessions, the instructor creates a feeling of a television quiz show, building up a sense of excitement about the Quiz Bowl. Beamed on the wall is a large title (see Figure 2). The instructor sits on a stool to the right of the title screen and acts as the quiz-show presenter. Each of the teams has its own session, as the team "in the hot seat" for the Quiz Bowl.
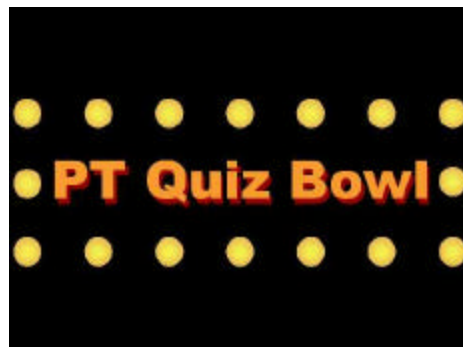

Figure 2. Creating the atmosphere for the Quiz Bowl sessions

In a rapid-fire manner, the instructor/quizmaster gives a question to each member of the team. If that person can answer within a timed count-down, then the team gets two points. If the person called upon cannot answer but someone else on the team can, then the team scores one point. The scores are tallied after each question, to build up the excitement. There are 20 questions in all, so a total possible score of 40 per team. After each team has had its session (about an hour each), the winning team is rewarded. The purpose is to encourage

a general-knowledge review in a fun atmosphere in which those with specialist knowledge about a question can help their team to earn at least one point. During each session, someone has the job of keeping a "parking lot" of issues needing explanation after the Quiz Bowl session is finished.

Peer assist and peer review challenges: This activity is based on the premise that each experienced person wants to have a chance to share what he or she knows. Previous techniques requiring a presentation from each participant took too much time (there are approximately 25-30 participants per course cycle) and there was little chance for discussion. Prior to the classroom sessions, each participant submits a problem that is challenging him or her in the workplace. The instructor gives the following instructions via the course Web site: *"The problem you bring must not be trivial and should not be beyond the scope of your role in the business to solve. You must understand the problem very well as you will need to explain it well. At least three weeks before the classroom session, submit your Peer Assist problem in the Web environment, with enough of an explanation that I can understand the problem You may provide as much detail as you like (as an attachment if you prefer). All participants will be able to see everyone else's Peer Assist problem."* During the classroom sessions, the teams meet together, with each team member explaining his or her problem and the others giving challenges and support. Brainstorming techniques are emphasized: The instructions as given in the Web site are: *"Each person takes five minutes to write down any brainstorm ideas for solving the problem on sticky notes. Then an open session starts with all contributing their suggestions and working on the solutions. Keep things moving. Be respectful. No ideas are bad ones. Maintain an environment of friendly challenge and useful support."* If multiple viable suggestions are found, they can be compared by placing them on a matrix grid (see Figure 3).

High

Potential Value:

Low
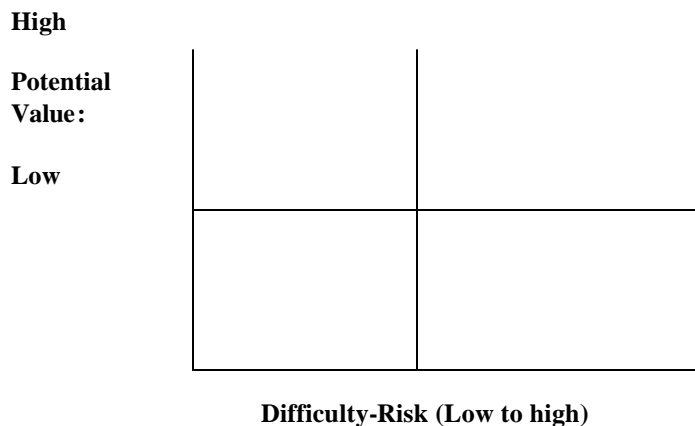
Difficulty-Risk (Low to high)

Figure 3. Matrix for comparing peer-assist suggestions

Each team posts its findings in the Web environment so that they can be referred to later in the actual workplaces of the participants. Each participant submits a reflection to the course Web environment that discusses *"(a) a summary of the help you received from your peer assist, (b) your new thoughts on the way forward, and (c) any points for improving the process for your next peer assist."* During the peer assists, approximately one in three students comes up with a fresh idea or an actual solution. The participants also practice key principles of peer assists and reviews: the value of proper brainstorming techniques, of giving and accepting peer help, and the value of external perspective. The participants are very pleased with this activity.

PT Live! **:** The instructor set a goal of removing all the lectures from the classroom sessions because in his opinion, *"lectures are not very interactive; for experienced staff there is very little certainty that the content is at the right level; the participants are not at all responsible for success; when given by a variety of guest lecturers the quality of the lectures varies considerably; and the instructor had very little ability to influence the guest lectures"*. Thus, instead of giving an intensive lecture, each guest lecturer makes his notes available ahead of time via the course Web environment. The instructor invites the participants who are serving as "specialists" for the topic to submit questions to the guest lecturer ahead of time, again via the course Web environment. "*In order to call yourself knowledgeable about a topic, you are supposed to be able to carry on a conversation with an expert in the field. Have you ever seen one of those interview shows on television? Well that's what you are*

going to do yourself. You are going to interview Mr. X when he comes to one of our classroom sessions. Prepare a set of questions for the interview. These need to be really good, interesting questions. They need to be 'open' questions, meaning the answer is not a one-word answer. [some examples are given]. You will need about 10-15 good questions for the topic. Submit these via the course Web environment at least three weeks before the classroom session. We are going to provide these questions to the interviewee." The classroom session is run like a television talk show, where the instructor serves as the host. The guest is given the opportunity to start with a 10-20 minute overview of the topic, with no questions during this time. Then the host controls the entire flow of the session just as a talk-show host would: basing the interview on the questions submitted in advance by the "specialists", working these into a logical flow and balance. There are short "commercial breaks" in which music is played and the instructor/host can decide whether to continue with a question or wrap up the question to move to other questions. "Call-in questions" from the audience can also be possible. The objective is to have the participants and the guest experts think about the topics ahead of time, get out of the experts what the participants want to know via the opportunity for much deeper questions than would occur during a traditional lecture, keep the lecturing short, and potentially create re-usable content.

   Creating workplace assignments for an introductory course: Production technologists in Shell EP first take a previous course (called P264) before they can enrol in the Applied Production Technology course. The purpose of the Creating Assignments activity is to re-study the topics and processes in P264 course, and in particular the new set of workplace activities that have been created and are available in the P264 Web environment, and then do the following: "*Have a look at these workplace assignments for P264. Do they look familiar? I hope they do as you should have done several things like this in your career so far. And these relate directly to the competence profiles of production technologists. There are the assignments we have made for the new P264 course. Now then. Let's help out the PT 'newbies' in P264. Pick one of the assignments and write: (a) the three worst mistakes people make doing this type of task, (b) the three best tips you can think of to help them do the assignment, and (c) at least one additional thing you want to tell them about doing this sort of task. Do your best as I intend to use your advice on the P264 workplace activities as content for that course.*" This activity, while not in a game spirit, involves creativity and engagement through being able to use one's own experience as input that will be studied by others. In addition, the assignments for the P264 are enriched with experienced-based insights, beyond what the instructor may have had time to add to the write-ups of the activities.

   These are only some of the work-based activities in the Applied Production Technology course. In all of the activities certain characteristics are present. The activities allow for differentiation in the ways that participants contribute to the course. Repeatedly, their different backgrounds and experience bases are tapped in order to strengthen the process of learning from each other's experience. The activities done before the classroom session are not "self-study e-modules" but instead tools by which participants already go deeply into the course topics and themselves prepare many of the resources that will be built upon during the classroom sessions. The submissions of the participants are not only reused during the classroom sessions but are available via the database underlying the course Web environment for reuse as examples in other course sessions or even in other courses or for informal coaching. Participants come from many different locations worldwide, including Nigeria, Oman, and the UK and USA and thus bring in experiences and problems that vary geographically. All activities focus on real workplace situations. All include engaging aspects that motivate and stimulate learning.

Reactions and Implications

   The approach used in the Applied Production Technology course is highly appreciated by the participants. In course evaluations, participants consistently give the course and the instructor high ratings. In an evaluation of the course design, using Merrill's (2001) first principles and the extensions of those principles to bring in strategic goals relating to engaging work-based activities, the course ranks very highly. Particular strengths of the course are in relation to Merrill's first principle, "Learners are engaged in solving real-world problems", and Merrill's fourth principle, "New knowledge is applied by the learner." In terms of Harris' guidelines for engaging learners, the course is a strong example of learner participation, active involvement, and building on personal contributions from the participants. On many occasions a game-type or competitive situation is involved, between teams. Teamwork is stressed, as well as creative answers to tangible problems. In terms of Web-site design, the more-than 100 objects in the course Archive are well organized and the instructor makes good use of the different communication possibilities in the site for comments to the entire course in the News and to individuals via feedback messages. The course environment itself is reused for different cycles of participants, with only minor tailoring when needed.

The basic approaches to work-based activities and engagement are not specific to production technology. They can be applied in any course for experienced professionals, particularly when those professionals will bring with them many different sorts of experiences within a general job category. The approach, however, requires new skills of the instructor. The instructor must focus more on activity design than on content presentation. Also, the instructor must be experienced and broadly based in his or her discipline in order to respond helpfully and critically to the great variety of workplace experiences that will be reported by the participants. The instructor needs to develop a communication tone to use in the Web site that sets the atmosphere for team work as well as individual contributions. And, new for many instructors in the corporate context, the instructor must become proficient at making use of a Web-based course environment system as the interface among all aspects of the course during the portions that occur when participants are in the workplace. The instructor also needs to develop techniques for managing his or her own time, in that the large number of submissions coming into a course Web site require timely feedback but at the same time cannot be allowed to overwhelm the instructor. The instructor will also need to interact more with workplace supervisors of the participants, not only because participants will need time and space to carry out their pre-classroom activities but also because many of these activities may require use of data and experiences from the workplace that will have to be cleared by the supervisor or may require interpretation by others with experience. All of this requires new approaches to course design, such as have been developed at Shell EP (Bianco, Collis, Cooke, & Margaryan, 2002).

Thus learning from experience, by experienced staff involves new approaches to course design, new skills of the instructor, and new kinds of work by the participants. The results, in the opinions of those involved in Shell EP courses such as Applied Production Technology, are well worth the investment.

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