



SPE 88653

Blending Formal and Informal Learning Offers New Competence Development Opportunities

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This paper was prepared for presentation at the 11th Abu Dhabi International Petroleum Exhibition and Conference held in Abu Dhabi, U.A.E., 10–13 October 2004.

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Abstract

A shift from content-based to activity-based learning is taking place at the Shell Open University (SOU), with already more than 100 course events redesigned from a classroom only model to this new model. It emphasizes work-based activities, supervisor involvement, and sharing of knowledge and experiences via a blend of formal and informal learning. Results to date and lessons learned are presented.

Introduction

The Shell International Exploration and Production (SIEP) business activities include exploring, assessing and producing hydrocarbon reserves (www.shell.com). The Exploration and Production business has interests in exploration and production ventures in over 40 countries and employs over 25,000 people. The technical professionals in Shell EP represent the areas of wells engineering, field engineering, production engineering, and petroleum engineering, and geoscience disciplines. A competence framework defines levels of competence development within a discipline, at the awareness, knowledge, skills, and mastery levels. The progression of employees within the company reflects their competence development, as planned for in yearly personal development plans. Learning is understood to be a necessary component of competence development.

Although typically newly hired technical professionals will have an academic background in their disciplines, all complete a New Professionals program within their first five years at Shell EP and after this, to engage in learning events aimed at updating and advancing their competencies. To support this learning, the Shell EP Learning & Leadership Development (EP-LLD) organization provides professional services to support both informal and formal learning.

The EP-LLD organization is a matrix-structured organization in which subject matter experts in three main areas (Sub-

surface, Surface and Business & Leadership) work together with learning experts, knowledge management experts, coaching and mentoring experts, a research team, a competence development team, a learning value assurance team, an IT team, and experts in change in organizations in order to design a variety of interventions that enable learning, knowledge management, coaching and mentoring for SIEP technical professionals worldwide. The services of the LLD organization are offered to the business through the Shell Open University and also through other portals and offerings such as Metis for personalized knowledge management, Job Navigator, and the SIGN (Shell International Global Networks) for knowledge sharing with peers (Van Unnik, 2004).

Two particular issues facing Shell EP are ones that are also facing other oil companies worldwide. The first relates to the maintaining technical excellence in a rapidly changing technical environment where new technologies are creating increased challenges for those handling exploration and production activities worldwide. The second is the “big crew change” that will be occurring among technical professionals in the next decade. Not only will highly experienced professionals be retiring, but those who replace them will represent a wide range of regional, cultural, and professional backgrounds. The two key issues that are drawing attention are: (a) Little opportunity has been taken to provide time for the experienced seniors to work in face-to-face mentoring and coaching roles in order to pass on their knowledge and, (b); Members of the same company, the seniors who are leaving and the juniors who will be moving into their places, are likely to live in different parts of the world with little opportunity for face-to-face interaction.

The LLD organization is responding to these issues through a new global learning strategy that emphasizes the blend of formal and informal learning. Figure 1 shows the strategy. To realize the strategy requires (a) defining competence requirements in a rapidly changing technical environment; (b) analyzing learning needs based on competence requirements and their underlying business needs, and indicating how solutions to these needs could be demonstrated in practice; (c) providing support for learning including support, tools and systems for informal learning and structured learning events for formal learning; (d) assuring the value and transfer of learning to the business; and (e) developing explicit strategies for knowledge sharing, particularly among seniors and juniors working in different

locations within the company. While there are many initiatives within LLD related to the learning strategy, one particular initiative integrating these five aspects (a-e above) is a new form of course which will be the focus of this paper.

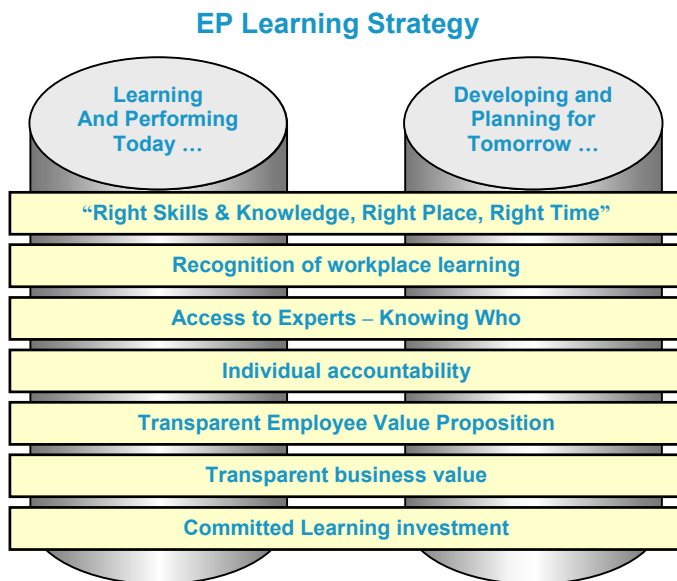


Figure 1. Shell EP's learning strategy includes seven platforms that intersect an employee's immediate and long term learning needs

The questions to be addressed in this paper are:

1. How can courses for technical professionals in a multinational company be designed to emphasize the strengths of both formal and informal learning?
2. How do work-based activities within such courses serve as key tools for meeting the challenges of rapidly changing technologies, build on knowledge sharing, and provide the environment to stimulate formal and informal solutions in learning?
3. How can key issues and challenges for creating the bridge between formal and informal learning via work-based activities be addressed in practice for technical professionals?

While illustrations and experiences from Shell EP will be used to amplify the discussion, the answers to the questions are grounded in research that is transferable to other learning settings.

Theory and definitions

There is a debate as to the definitions of formal and informal learning (for a review see Colley, Hodkinson, & Malcolm, 2002). Despite differences in definition, *formal learning* is often seen as learning structured into a course, workshop or other forms of learning events, delivered in classroom or at a distance, supported by an instructor/facilitator or self-paced through instructional materials. In contrast, *informal learning* is learning that takes place in the work context and arises both from participation – doing the work - and from social interactions with peers and experts in the workplace.

Typically, informal learning does not take place in a course setting, although in this paper we discuss an approach in which it does.

Formal and informal learning each have their own strengths and limitations. Among the strengths of formal learning are guided opportunities to learn while interacting with peers, broadening the learner's contacts beyond his or her workplace; quality controlled and pre-structured content; guidance and feedback from an instructor; and learning events that are well defined in terms of time involved. Among the strengths of informal learning in the workplace are the anchoring of learning in problems and work-based tasks that are real-life and relevant to the learner; opportunities for modeling and coaching from peers and in-house experts; use of tools and data that are locally relevant; and development of self-direction for learning (Billett, 2001). Thus both formal and informal learning make significant contributions to corporate learning. The key is the way in which to integrate formal and informal learning in such a way that the possible contributions of both are maximized.

In any combination of formal and informal learning, the principles of good learning for adult professionals should apply. Merrill (2003) has identified five "first principles" in which "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 is integrated into the learner's world."(Merrill, 2003, pp. 44-45)

Merrill's principles show that adult professional learning should extend past just knowledge transfer. In the corporate learning context, not only must the new knowledge be integrated into and make sense in the learner's world, but also must lead to changes in performance that impact business results. For this to occur corporate learning also should be characterized by creating and sharing knowledge, capturing and re-using experiences and the tacit knowledge and know-how within the organization, and being able to solve workplace problems in a process-oriented, collaborative manner (Collis & Margaryan, 2004). In addition, the more realistic and workplace focused the learning, the more flexibility is required in the learning environment. Flexibility relates to tailoring for individual differences and needs, not only in the time, place and pace of learning but also in the individual and intellectual diversity of the learner (e.g., differences in backgrounds, communication styles, learning styles, and preferred ways of interacting with others) which become critically important when participants are from a variety of regions and cultures (Hofstede, 1991). For all of this to occur, the participants need to have a common electronic learning environment which integrates their course materials and processes and which can be accessed from their workplaces. Web-based course management systems provide such environments, if designed to support knowledge sharing, collaboration, shared access to resources and submissions from others, and access by all involved in the learning process.

Combining these aspects leads to a response to the first research question: Courses for adult professionals should reflect:

- Merrill's five first principles
 - Anchoring learning in relevant problems,
 - Activation of prior knowledge,
 - Demonstration by others with experience,
 - Application to one's own work, and
 - Integration with one's own work)
- Business anchoring through learning activities in the workplace that address locally relevant business needs
- Learning from others through collaboration and by comparing and contrasting different submissions to similar/different problems
- Building on complex problem solving through activity-based learning
- Learning from the experiences of others, in the course, in the participant's own workplace, and in the company more broadly
- Use and reuse of resources from the business
- Leveraging the diversity and individual characteristics of the participants
- Supervisor involvement via coaching
- Appropriate design of Web tools and environment

Work-based learning activities, if properly designed and managed, can be a tool for realizing these requirements.

Work-based activities within courses: a link between formal and informal learning

Characteristics of work-based activities

Work-based activities are assigned learning activities within a course which are carried out partially or totally while the participant remains in his workplace. They are real workplace tasks, not artificial experiences; tasks that the participant will be doing as part of his work that incorporate both formal and informal learning aspects. Coaching occurs from the workplace supervisor and other appropriate persons which may be technical subject matter experts. Use is made of the in-house resources captured in knowledge management systems such as document repositories and discussion forums (Van Unnik, 2004). Persons throughout the company contribute their advice and share their experiences with similar problems. These are all benefits of informal learning. But because the work-based activities are carried out within a course context, there are also the benefits of formal learning that are involved. There is an instructor and perhaps a team of experts who steer and guide the linkage of theory and practice and how supplement the feedback given in the workplace with their own. They also help the workplace coach in his feedback processes and extend make systematic the range of resources and contact persons available for knowledge sharing.

Within this form of learning, not only the work-based activities but also the submissions from different types of reports and the reflections based on compare and contrast activities provide a course Web-environment that helps make

the cognitive processes explicit and serves as a basis for reflection and feedback. Further, follow-up activities then build upon these submissions. Transfer of learning to the workplace is significantly enhanced, since this transfer is part of the learning process. In this model, content objects are seen as resources for the activities, not as the initial drivers of the activities. Selected learner submissions are re-used as valuable content objects for others in the same class as well as for future classes. Classroom sessions may still occur, but with a focus on drawing together and sharing the learning occurring through the work-based activities. Reflections become an integral part of the learning process while the relations between the work-based activities, content, and concepts to be learned in the course are stimulated and monitored by the instructor, either during face-to-face sessions or asynchronously, with submissions made electronically.

Examples of work-based activities

Work-based activities should relate to complex, multi-step tasks and thus consist of a series of steps each building on learning and feedback from previous steps. Table 1 gives a suggestion of a multi-step series of sub-activities that can form a work-based activity.

Table 1. Examples of work-based activities

Types of work-based activities	Examples
Discovery	<ol style="list-style-type: none"> 1. Search the corporate knowledge-management resources for discussions and previous materials related to the topic 2. Search the Web in general to see what others (including competitors) are doing relating to the topic 3. Interview people with experience relevant to the topic in your own workplace
Compare/ Contrast, Analyze	<ol style="list-style-type: none"> 1. Compare your own situation with that of others 2. Analyze your own situation in terms of key theoretical concepts.
Apply	<ol style="list-style-type: none"> 1. Describe an approach to dealing with a problem or new opportunity relating to the topic in your own setting and apply the key concepts (plan, design, predict, carry out procedures, etc.) 2. Interview colleagues to get insight into how they apply the concepts in their work 3. Get feedback from workplace peers and coaches, the course instructor, and fellow course participants on your planning or procedures
Present, reflect, leave for others to use	<ol style="list-style-type: none"> 1. Present the results of your application to relevant persons in the workplace as well as to the instructor and fellow course participants. 2. Compare and contrast your results with those of others in the course; what can you learn from each other's work? 3. Leave a reflection on your learning that can be useful for others, both in a formal course setting but also informally, such as via knowledge-

management archives and discussion forums.
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In each case each participant submits the result of the activity into the common Web environment, where other participants build on it in a series of follow-up activities. Because the activities occur as part of a course, they refer to study material that is also available in the Web environment. The submissions receive feedback from the course instructor, and are assessed and scored, if appropriate.

Properly designed and managed, courses with work-based activities can fulfill the requirements identified with respect to the first research question. In response to the second research question, they can integrate the strengths of formal and informal learning. With respect to the particular challenges facing learning for technical professionals in the oil industry, they provide a way for courses to move quickly with new developments in the workplace, and if properly steered, can stimulate the sharing of experiences between persons in the company with experience and thus just gaining the experience, regardless of their physical locations.

While the arguments for blended courses involving work-based activities can be compelling, such an approach must be carried out in practice to realize its benefits. This will require didactic changes from the traditional classroom approach, adjustments in the way that the corporate training centre organizes the delivery of courses, and new uses of technology. The next section will focus on examples from a multinational corporation where this approach has been in realization since 2001.

Work-based activities: Examples of implementation from a corporate setting

In this section, implementation of work-based learning in a multinational corporation (Shell EP) will be described. After briefly introducing the particular course approach that is used (called "blended learning"), an overview of types of work-based learning activities that are occurring in the new form of course is given, and a specific course is presented as an illustration. The work-based learning activities are integrated via a Web-based environment called TeleTOP© developed at the University of Twente in The Netherlands (<http://www.teletop.nl/teletop.nsf/home/en>).

Blended courses with work-based activities

An instructional design method called the "Shell Blended Learning Development Path", based on research and best practices in using technology to support activity-based learning has been developed and validated and innovative tools built to guide each course team through the process of course redesign (Bianco, Collis, Cooke, & Margaryan, 2002). The key steps in the design process and delivery process are:

- Begin each course with an identified business need or competence gap, then restate that need or gap into terms that indicate measurable performance in the workplace.
- Design the course around a multi-step work-based activity, not around sequences of content. Content serves as a resource for the work-based task, not as the driver.
- Lead each participant and his or her supervisor to the completion of a learning agreement for the course in

which they jointly identify a workplace problem or opportunity related to the overall course topic. Express this in terms of the individual's competence development by indicating the sorts of performance that should be demonstrated during and by the end of the course. Guide the participant and supervisor towards the selection of a locally relevant problem that is manageable within the course period and relates to the general business need that has motivated the course. This is to ensure enough parallelism among the different work-based activities that will be occurring so that peer interaction can occur during the course even though participants each have their own specific work-based situations.

- Design, according to best-practice guidelines based on research, a Web-based learning support environment to serve as the common electronic workspace, the environment for collaborative learning and discussion and for submissions from the participants, all under the leadership of a skilled new-style instructor.
- Build in peer interaction, use of the Shell Global Networks, contacts with experts outside of the course, reuse of submissions from previous participants, and carefully crafted interactions with the supervisor through the course into the instructions for the activities. Retain records of all interactions and submissions in the Web environment.
- Integrate evaluation from different perspectives (participant, supervisor, instructor, course-design and technology-design experts) into every course. Use the evaluation not only for course improvement but for cross-course analyses and impact measurement
- Coach the supervisors and instructors in how to plan for and manage this new type of course, including building on "teachable moments" that arise from participant submissions.
- Reuse of the submissions as resources for the next cycles of the same course or other courses, thus increasing the local relevance of the course materials.

Over 100 different course cycles, involving approximately 65 fully redesigned courses, have occurred at Shell EP since 2001. Approximately half of the courses blend work-based activities with a classroom component, while the other half of the courses take place only in the workplace with no classroom component. Satisfaction with the courses is high and the general response from all involved is that the shift toward work-based activities has made the courses more relevant as well as increasing the learning that has occurred.

Categories of work-based activities at Shell EP

Various analyses of the work-based activities in the Shell EP courses with work-based activities have occurred, carried out by the LLD Research Team (see Margaryan, Collis & Cooke, 2003; and Margaryan, 2004). Analyses of the work-based activities shows that they can be grouped into the following generic categories:

- *Orientation:* Activities such as the learner signing a "learning agreement" with his/her line supervisor, getting acquainted with the ground rules for the

course (i.e. expectations in terms of participation in discussions, regularity of checking out the course site, completion requirements, etc.), reflecting on his or her own knowledge gaps and learning needs and expectations from the course in terms of addressing those needs, and posting some information related to his or her own background and work experience and some personal details to help learners get to know each other

- *Collecting information from the workplace:* Activities in this category begin with a problem related to the subject-matter of the course, and involve steps relating to finding information about that problem in the participant's own workplace. Examples of these types of activities include participants finding (like a scavenger hunt) pertinent equipment, e.g. valves, joints, hardware, in their own environment. The activity could even stimulate conversations with subject matter experts enabling dialogues on use, maintenance, repairs, etc. This enables a link between new content and real-world application. In Shell EP more broadly, activities encourage interaction with a discipline community via the Global Networks. By integrating these informal knowledge-sharing channels within a formal course environment, learning is expanded beyond the boundaries of the course, and learners are stimulated to make use of various existing company resources (people and technology) to solve their particular problems. Once the report on the results of the activity is submitted to the course web environment, follow-up activities can occur. These often include the participants comparing and contrasting their problems and solutions or giving feedback to each other's submissions.
- *Product development:* The third category of work-based activities appearing in Shell EP courses relates to developing some type of a product that can be directly used in the workplace. The products can range from development of an online-bidding project for the workplace to the development of technical models or inventories or personal leadership-development plans. These are often multi-step activities following a systematic procedural framework (Assess-Plan-Design-Develop-Implement-Evaluate). After each step, reports summarizing the results in that step are submitted to the course web environment, and the course instructor and the other participants can give feedback on those submissions. This category of activities sometimes involves a mid-course checkpoint with the participant's supervisor to discuss the learning progress.
- *Sharing and reflecting:* This category of activities relates to sharing experiences on a given topic, by posting reflective reports in the course environment. This is followed up by group (a)synchronous discussions of the submitted issues in the discussion area in the web environment. The course instructor

participates and monitors these discussions, and gives feedback or guidance when needed.

- *Comparing and contrasting:* These activities involve comparing and contrasting each other's submissions, comparing course content with the real situation in the learner's own workplace, or comparing the learner's own experiences and ideas on the subject matter of the course with the company standards.
- *Self-analysis:* In this category of activities participants are guided through a multi-step process of self-analysis and reflection activities to identify their own knowledge and skill gaps and development needs.
- *Reflections:* Although part of many of the other categories of activities, the final type of activity, reflection, is emphasized here as a separate category as it is often used as the final activity of the course where learners are asked to reflect and recognize what they learned and on the results of the applications in their workplace. Many times the final activity of the class is to check with their supervisor on the Learning Agreement and determine how closely their learning experience has met or exceeded expectations and defined business challenges.

In addition to the work-based activities, more-traditional learning activities also occur in the workplace portions of the Shell EP LLD courses. These include activities relating to studying the conceptual material related to the subject matter of the course that is available in the course Web site. Calculation exercises, quizzes, case studies, and working with simulation software are also familiar types of activities carried out outside of a classroom setting via the support of the course Web environment. Case studies and simulations are used in courses where because of time, manageability, or safety constraints it is not possible to use real workplace situations or tasks as the main project of the course. However, such courses often use some of the above-described work-based types of activities to accompany the use of the simulation and thus make the learning as work relevant as possible.

In Shell EP LLD courses built on work-based model, many of the activity types discussed above are used in combination. In the next section, a specific example of a course re-designed using the work-based approach will be discussed to illustrate this sort of combination.

An example from Shell EP LLD: the Health Risk Assessment course

In this section, a specific example of a course re-designed to emphasize the workplace orientation and benefit from the affordances of the combination of formal and informal learning in the workplace will be described. The course is focused on health-risk assessment and incorporates a number of the types of work-based activities described in the previous section. First, the health-risk assessment process at Shell EP will be explained, then the rationale and process of re-designing the course will be elaborated upon. Finally, results from the course evaluation will be discussed.

The health-risk assessment process at Shell EP

Health-risk assessment (HRA) is a complex and critical process in Shell EP. Health risks for the employees associated with potentially dangerous tasks such as drilling or handling chemicals must be regularly monitored and prevented, and health risks associated with Shell processes for the local environments must be managed at all times with great care to prevent environment disasters. Hazards can be chemical, physical, biological, or ergonomic, with both acute and chronic effects. As an example, accidents while handling compressed air during drilling can lead to damage to body tissue and even potential deaths; exhaust fumes can lead to irritated eyes, respiratory-tract illnesses, and potential carcinogenic problems; chemicals used in oil processing can cause red and itching skin. Personnel within Shell EP with job responsibilities involving health-risk assessment must be trained to identify the risks, and depending on their position, to take preventative action or report the risks to the appropriate person.

HRA is a carefully documented process in Shell EP and hundreds of Shell professionals worldwide must be trained each year to take responsibility for the assessment process in their workplaces. The person carrying out the assessment never works in isolation, but must lead a team including the drilling foreman and superintendent, technicians, company physicians and physiotherapists, workplace team leaders, plant managers, security advisors, and general asset managers. Typically the course used to take place in a one-week classroom setting, but there were difficulties in participants not being able to travel to the classroom sessions or in the instructors being able to travel to individual regional sites. Also, the classroom sessions did not provide the opportunity to actually carry out a health-risk assessment as it occurs in the workplace and get guidance and feedback from an expert or from peer-collaborators helping one another during this process. A decision was made to re-design the course so that the activities can be carried out in participants' individual workplaces. To avoid scheduling difficulties relating to travel and location, the classroom portion of the course was omitted.

Re-design of the Health Risk Assessment course

The result of the main activity of the HRA course was chosen to be a complete and properly done HRA assessment of a potential health risk in the participant's own workplace in which (a) a potential health hazard is identified and a plan to minimize or eliminate the hazard is presented that is seen by the supervisor as important for the business, (b) an assessment process is carried out by the participant while staying in his or her workplace, and (c) the participant is working collaboratively with a team in his or her workplace and also with peers in the course. For the participants, the motivation is to obtain the health-risk assessor skill level without having to leave the workplace to go away to a course and in a way that generates a full HRA plan for his or her personal-competency portfolio. For the participant's workplace supervisor, the benefits are to be able to develop a team member to HRA skill level in a way that is likely to have the most direct transfer to the workplace and be the least disruptive to on-going work. For the facilitator/instructor, the time needed for continual

trips away to present the one-week course can be replaced by the time, in his own workspace, that he chooses for giving feedback and guidance via the course Web environment. In order to reach the outcome of the course, the course was designed around a series of tasks leading to the generation of a full-scale health-risk assessment and a plan for the participant's own workplace. The tasks were to be carried out in a realistic manner in the workplace, and thus require collaboration among the team that the participant needed to assemble for the health-risk appraisal process.

By carrying out an actual health-risk appraisal following corporate procedures, the familiar rules and division of labor among the health-risk appraisal team still applied. However, making regular submissions relating to subtasks to the course facilitator and reflecting on the subtasks and relating to the course study resources obtained via a course Web environment calls for different roles and rules for *attending a course* than had been previously the case. For the instructor/facilitator, monitoring the assessment process as it goes on in the different workplaces of the participants, calls for new rules and procedures. For the supervisor, serving as a workplace mentor and monitor for the health-risk appraisal process may also call for changes in familiar roles and practices. Thus care needs to be taken in the course design to help all of the subjects handle these new ways of working within the course framework.

Collaborative learning among peers in the course, helping each other reflect upon and move through the different subtasks of the overall task (carrying out a HRA and producing the associated report and recommendations), was chosen as an important support instrument. Collaboration in the workplace itself through instructions for how to involve members of the health-risk appraisal team as learning supporters was also designed. In terms of resources, the PowerPoint® presentations, and previous handouts and written materials that were used at the classroom sessions were made available via the course Web environment. In addition, e-learning modules (modules combining text, with audio and video segments as well as embedded quizzes) were designed and used as a resource. Finally, in terms of electronic tools, the use of a course-management system provided a common environment for submitting, sharing, discussing, and comparing one's own progress with those of the course peers.

The result of the design process was a course that involves a number of work-based activities which progressively build upon each other to take the learner through the health-risk assessment process including preparation (identification of a competent HRA team to coach and assist the learner with the work-based assignments during the course; planning; getting permission from the manager of the assessment team to perform an HRA); identification and rating of HRA hazards; assessment of health risks to the business; application of hazard and exposure ratings identified; effective documentation for the HRA results; and reviewing the HRA and assurance process. Figure 3 shows the roster of the course Web environment, where the icons in the column following "Activities" and "Your opinions" give access to the submissions of the participants for those steps of the activity as well as the feedback from others to these submissions. The final HRA plans are thus available to all in the course site, as a

resource for the future.

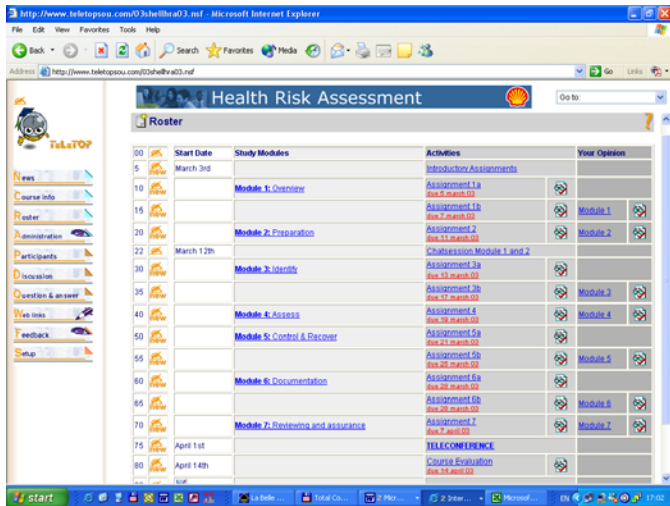


Figure 3. Course Web environment for the HRA course

Evaluation results

Following the pilot in July 2002 and six subsequent runs of the course up until April 2003, 49 course participants were randomly selected and asked to reflect on their experiences with the course. Twenty-six of these course respondents were Health and Safety professionals, six were engineers (including petroleum and production engineers), and 17 participants were from other skill pools. Participants came from Operating Units in Brazil, Brunei, Canada, China, Egypt, Germany, Ghana, Italy, Malaysia, Netherlands, Nigeria, Singapore, Tanzania, UK, US, and Vietnam. The majority of the respondents (n=27) had 12 or more years of working experience in their discipline. The reflection survey focused on the following aspects of the course:

- Quality of the activities
- Communication: (i) teleconference, (ii) asynchronous discussion
- Interactions: (i) with peers in the course; and (ii) with the course instructor
- Learning: (i) understanding of HRA; (ii) competence to perform; (iii) ability to engage others in HRA; (iv) awareness of resources (experts, documentation) and knowing where and who to get help from if needed.
- Application in the workplace
- Line manager support in: (i) participation in the course; (ii) applying learning in the workplace.
- (Perceived) change in performance after the course
- Relevance of the course to the individual competence-based development (CBD) and personal development plan (PDP)
- (Perceived) business impact
- Sharing what was learned with others in the workplace
- Problems with technology

The results are summarized in Table 2. The results of the survey show that the learners' satisfaction with the quality of the work-based activities, interaction with the course instructor, asynchronous discussions, line manager support,

was high. Particularly, learners commented that the design of the course and the work-based activities were motivating. For instance, one learner said: "Prior to taking the course, I had only a vague idea of how to go about doing an HRA. It [the course] helped me a lot to put my learning into practice in order to complete the HRA at my location".

Table 2. Results of the HRA reflection survey (n=49)

Aspect of the course	Not acceptable/None	Below average/Little	Average/Some	Good/Much	Very good/Very much
Quality of the activities	2%	0%	18%	66%	14%
Communication:					
teleconferences	8%	6%	51%	33%	2%
asynchronous discussion	4%	12%	33%	43%	8%
Interactions:					
with peers in the course	6%	29%	47%	12%	6%
with the course instructor	2%	2%	14%	55%	6%
Learning:					
understanding of HRA	0%	2%	2%	27%	69%
competence to perform	0%	2%	2%	33%	63%
engaging others	0%	2%	2%	31%	65%
awareness of resources	0%	2%	2%	20%	76%
Application in the workplace	0%	4%	18%	35%	43%
Line manager support in:					
participation in the course	4%	8%	18%	51%	19%
application in the workplace	8%	2%	12%	67%	11%
Change in performance	2%	2%	8%	33%	55%
Relevance to CBD and PDP	0%	0%	6%	35%	59%
Business impact	0%	4%	43%	39%	14%
Sharing knowledge	0%	2%	10%	25%	63%
Problems with technology	35%	20%	27%	14%	4%

Learners reported that they moved on to new job roles as a result of their increased competence, or were entrusted with new projects of high business impact either in their own OU or in other parts of the organization, as a result of the course. As one learner noted, "I worked with HRA teams in Shell Egypt

sister companies, Fayumgas and Natgas, and developed their level of competence and supervised their HRA, thus supporting stakeholders of Shell Egypt and adding value to the business by strengthening the relationship with other partners”.

Overall, the results of the survey show that the work-based activities in this course resulted in increased competence, application of learning, sharing of knowledge in the workplace, and workplace impact. However, there is a need to improve some aspects of the course, such as interaction among the learners, and make sure that learners are given enough time and resources to study in the workplace.

Issues

The Shell examples also indicates some of the key issues and challenges involved in redesigning courses to this new form of blend. Many types of changes must occur, particularly in the expectations of all involved with regard to what constitutes a “course”. Work-based activities by their very nature are more difficult to manage in terms of time expectations, compared with a pre-set number of days for a classroom-only course. The new expectations for the workplace supervisor will meet with resistance, because they will be seen as new work, unless carefully supported and unless the work-based activities are directly relevant and valuable. In a shift from content delivery to activity management, instructors must learn new roles. The technology used must be simple, flexible, easy to access, and yet make sharing and communicating as transparent as possible. An integrated approach to implementation and course design is needed to manage these complex interrelated requirements. At Shell EP, such an approach has been designed and carried out (Bianco, Collis, Cooke, & Margaryan, 2002). For the approach to be mainstreamed, it must reflect corporate strategy, which is also the case at Shell EP.

Conclusions

Courses for technical professionals, such as engineers and geoscientists in the oil industry, can benefit from a well designed and managed combination of formal and informal learning. The key is designing the course around a real work-based problem or process or opportunity, which is carried out in steps each done in as authentic a fashion as possible so that the final product of the activity is something that is usable and useful in the workplace. For this, the involvement of the workplace supervisor is necessary, not only to help design the task but also to provide mentoring and coaching. While there still may be a classroom component to such a course, the main aspect is the work-based activity.

An appropriately designed Web-based environment serves as a organizer, manager, gateway, communication centre, collaboration and sharing centre, and “common home” for course participants. Although in the Shell EP case, the Web environments are at the moment only being used in the workplace-based portions of the courses, in many other settings such Web environments are also valuable resources during the classroom portions of courses as well (Collis & Moonen, 2001).

With learning driven by work-based problems, tasks and situations, the boundaries between “formal” and “informal”

learning blur and take on new forms. A course becomes a guided opportunity to learn from and share experiences gained through work-based activities, and to contribute one's own experiences as learning resources for others, for reuse in both formal and informal learning settings. Such learning environments supported by network technology create opportunities for learners to collaboratively generate new ideas while working on complex learning situations in their own workplace. Collaboration and knowledge sharing occurs among the peers in the course, peers in the workplace and between teams with similar problems but different workplaces (in multinational organizations, these workplaces are often located in different parts of the world).

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