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DRIVING THROUGH!
Online Learning For Industrial Supply Chains

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ABSTRACT

Interaction between work (thought of as doing) and learning (mastering new knowledge and skills) and between paid work and leisure is predicated to become much more fluid in the future . With the advent of online learning, this notion becomes real and the role of training to work in new ways and in new online environments becomes of critical importance.

There is broadening acceptance and understanding of learning as a socially mediated and constructed process and of knowledge as no longer "fixed". Therefore supporting training and education through work-based networks, especially exploiting the interactive benefits of online working, needs to take account of a much wider variety of factors than learning to use appropriate software.

This article aims to research and develop concepts and practice in this field of well-structured distance learning courses (which increasingly include some online working), to the requirements of organisational learning and the individuals within them in the context of the project, named KLASS (Knowledge and Learning in Automotive Supply Systems).

KLASS has a course which provides learning within industry based networks and aims: to attract to distance learning individuals and groups that tend to be under represented within the adult learner population (people working within manufacturing in small and medium enterprises (SMEs),using an appropriate mix of media; to develop motivations for learning among individuals and within the companies that employ them; to identify, through an initial focus on the development of work capabilities, the potential for improvements in performance, thereby contributing to improved employment security in a sector that faces intense economic and technological pressures; to stimulate collaborative learning in supply chains.

The course which takes 220 hours includes a higher than average level of tutorial support for students, through four routes: Preliminary induction, via day schools/workshops and support materials, for key role holders: Change Facilitators and Team Leaders; Day schools held in the start-up and mid-project stages; Learning support from highly experienced tutors, which is provided face-to-face, and via synchronous and who have extensive experience of the analytical tools and approaches being used in the course and of support for industry based learners. And the course consists of Module One: Working Smarter?; Module Two: Analysing Your Workplace; Module Three: Developing a Learning Network as three main modules.

The course implement in two main steps. One of them is Supporting online learning for supply chains, and contains five stage as Stage 1 Gaining Access To and Use of the CMC System, Stage 2 Becoming Familiar with the On-line Environment, Stage 3 Asking For and Giving Information, Stage 4- Knowledge construction-group and community interaction, Stage 5 Looking for Additional Benefits. The sacond main step is Building an Interactive Online Training Programme. In this step the researcher care about The Principle of Training

Online, Training Structures, Building in Reflection and Learning online through supply chains-translation to practice.

LEARNING ONLINE WITH AND THROUGH SUPPLY CHAINS

ConText

Interaction between work (thought of as doing) and learning (mastering new knowledge and skills) and between paid work and leisure is predicated to become much more fluid in the future . With the advent of online learning, this notion becomes real and the role of training to work in new ways and in new online environments becomes of critical importance. There is broadening acceptance and understanding of learning as a socially mediated and constructed process and of knowledge as no longer "fixed". Therefore supporting training and education through work-based networks, especially exploiting the interactive benefits of online working, needs to take account of a much wider variety of factors than learning to use appropriate software.

However, as Schreiber and Berge point out:

> **" It is a daunting task to maintain an educated, high performance workforce in today's global economy. Increased competition, regulatory bodies, changing technology and process re-engineering conspire to disrupt traditional employee practice and capability" p. xv**

At this stage, we do not have clear pathways to translate our knowledge and practice of well-structured distance learning courses (which increasingly include some online working), to the requirements of organisational learning and the individuals within them. I believe we have some of the stepping stones in place- but early projects and innovations are not reporting a smooth ride. Our project, KLASS, is researching and developing concepts and practice in this field.

THE KLASS (KNOWLEDGE AND LEARNING IN AUTOMOTIVE SUPPLY SYSTEMS)

This pilot project is in the automotive component sector, and is being prepared in partnership with four HE/FE institutions and two industry training bodies. The course will provide learning within industry based networks. It has four primary aims:

1. **To attract to distance learning individuals and groups that tend to be under represented within the adult learner population (people working within manufacturing in small and medium enterprises (SMEs), using an appropriate mix of media.**
2. **To develop motivations for learning among individuals and within the companies that employ them.**
3. **To identify, through an initial focus on the development of work capabilities, the potential for improvements in performance, thereby contributing to improved employment security in a sector that faces intense economic and technological pressures.**
4. **To stimulate collaborative learning in supply chains.**

The pilot is intended to establish the basis for wider provision in manufacturing and other sectors. The pilot is an R&D project. It is developing 4 to 6 learning networks, each of which includes some 5 to 7 SMEs. Development of the networks is based upon established buying/supplying relationships between the companies in the networks. The pilot aims to establish how individual learning development and potential for accreditation is shaped by involvement in teams with mixed characteristics, and whether such development can be combined with improvements in the capabilities of companies across supply chain network. The pilot sector faces particularly acute technological and economic pressures.

The course is built around a guided project with integral engineering support as well as learning support. Students in the learning networks will be grouped in teams of up to 8 people within each participating company, drawn from different areas of skill and responsibility. The course provides 220 hours of study. It is undertaken within learning groups that are initially located within companies but that extend, in later stages, to inter-company (network) levels. Establishment of the in-company and inter-company learning groups will be founded upon firm commitments by the companies involved to support the learning objectives and processes. The approach develops from initial, extensive work that been supported by DTI and by the automotive industry.

The course includes a higher than average level of tutorial support for students, through four routes:

- **Preliminary induction, via day schools/workshops and support materials, for key role holders: Change Facilitators and Team Leaders.**
- **Day schools held in the start-up and mid-project stages.**
- **Learning support from highly experienced tutors, which is provided face-to-face, and via synchronous and asynchronous conferencing (FirstClass plus Lyceum).**
- **Support from professional engineers who have extensive experience of the analytical tools and approaches being used in the course and of support for industry based learners.**

The course consists of three main modules.

- **Module One: Working Smarter?**
- **Module Two: Analysing Your Workplace**
- **Module Three: Developing a Learning Network**

The overall objective for the assessment strategy is to guide, sustain and support the combination of individual and group learning. It also provides interdependent group and individual responsibilities for assignment submission, and ensures that tutor feedback contributes to the reformulation of task objectives where appropriate and to the next stage of project investigation and trials.

SUPPORTING ONLINE LEARNING FOR SUPPLY CHAINS

Since the KLASS programme is currently at implementation, I report here underlying ideas and immediate plans for supporting the learning rather than outcomes. The first stage of implementation is the development of materials and the training of key staff. I focus in this paper on preparation for the more innovative aspects of working online, through asynchronous and synchronous media.

My work has focussed on the building of online learning and working communities of practice. Though content analysis of voluntary use by MBA students and tutors of early online conferencing systems, I developed an understanding of the stages that users go through before becoming competent and comfortable .

Stage 1 Gaining Access To and Use of the CMC System

This stage involves the learner getting to know about the availability and the benefits of the system, setting up his or her own system of hardware, software and password, dialling up the system if necessary and getting in to the point that the conferences are available on screen.

At the first stage of use, the learner needs information and technical support to get online, and motivation to take the necessary time and effort. High motivation is a

prime factor at this stage in encouraging participants to tackle the technical aspects, especially if they are dialling in from remote sites. Access to support needs to be available at the times at which the learner is likely to be struggling to get on-line on his or her *own*.

This problem can be overcome by providing continuing encouragement and support. Where the supply chain online networking is concerned this critical "set up" stage cannot be ignored and will need to be repeated at any point that access or software is changed.

Stage 2 Becoming Familiar with the On-line Environment

A century ago, Durkheim began exploring issues and consequences of socialisation and the implications of shared customs, beliefs and heritage for human behaviour and welfare. He showed that a sense of security and progress depends on a broad agreement both on the ends to be pursued and on the accepted means for attaining them. Every grouping of people develops its own culture - formal and informal rules, norms of behaviour, ways of operating and of sanctioning those who fail to understand or conform.

Durkheim used the term anomie to describe the feeling of lack of identification and adjustment with the social environment. An individual cannot easily replace a familiar culture or values with those of a new community - he or she is more likely to selectively adapt or modify features of a new group that seem attractive or useful.

Working online is a new and potentially alien world for many participants . From the first research on Computer Mediated Conferencing (CMC) an influential discovery was the lack of expressive (i.e. non-verbal and visual) behavioural cues . Some users regard this as an inadequacy that can result in a "sense of depersonalisation" p. 100).

Others considered the lack of face to face elements to be a freedom, since participants However, such depth and power appears not to be inevitable but to be dependent on the early experiences associated with access and then integration into the virtual community. This stage is critical for the establishment of effective online working for the supply chain community, which already has strong cultural norms and resistance to disruption.

Stage 3 Asking For and Giving Information

After comfort in logging on and feeling part of an online community, users start to appreciate the broad range of information about the topics available to them online. Information flows very freely and the "cost" of responding to a request for information is low. However, the messiness of computer mediated communication is a stark contrast to well structured and logical books, and it makes demands on the participants to find what they "really want".

As a result, the learners look to the conference e-moderators (i.e. online facilitators) to provide direction through the mass of data and encouragement to start using the most relevant material. The support skills related to the task focus of the group become important for e-moderators as well as their taking part in the processes of discovery. The interaction occurring at this stage is largely around *content* and/or sharing of information. For supply chains, this implies constant appropriate structuring of online material and the development of online search skills. In the supply chain context, we are seeking to have well presented and filtered information available, especially in the early stages.

Stage 4- Knowledge construction-group and community interaction

At this stage the participant start to interact with each other, often in highly exposed and participative ways. The act of formulating and writing down an idea or understanding and reading and responding to peers is a collaborative act. Once this

begins, it had its own momentum and power and collaborative learning can be seen to happen in very visible and often exciting ways . At this stage, very active learning, especially the widening and appreciation of differing perspectives, sharing of information and understanding of application of concepts and theories happens very obviously as conferences unfold and develop.

It is at this point in the development of learning to work on line that embryonic "communities of practice" can be established.

If interactive conferencing and the building of shared practice is desired through online working, the role of the conference e-moderator became important at this stage. The most successful e-moderators demonstrate the high levels of facilitation skills related to group building and maintenance.

In the KLASS project, we seek to involve all participants, in whatever role but especially those holding tacit and experiential knowledge. The key is enabling sharing and availability of knowledge through the on and off line environments.

Stage 5 Looking for Additional Benefits

At this stage, participants become responsible for their own learning through the online opportunities and need little support beyond what is already available. Learners often become most helpful as guides to newcomers to the system. This phenomenon was observed from the earliest days of large-scale conferencing . It is at this point that closed Intranets and conferences can be linked to wider online systems such as the Internet with confidence that users can make appropriate use of the benefits.

This is a critical stage for the KLASS project where we seek to tap into existing and established networks and leverage their power and influence through the online environment.

BUILDING AN INTERACTIVE ONLINE TRAINING PROGRAMME

The Principle of Training Online

It is "by experiencing the learning that the meaning is constructed" and the best way to learn or teach online is through the environment itself. p.139). Training to work online should take place through the medium itself and this has the advantage of being much lower cost and effective than face to face training alone.

Engaging in reflective and interactive activities, especially those leading to explaining, justifying and evaluating problem solutions are very important to learning processes . From the situated learning literature, comes the notion that providing the training in context, i.e. on-line and within a community of practice, enables learning to develop as an intrinsic part of the ongoing activity .

Training Structures

The metaphor of "scaffolding" has been applied to notions of tutorial interactions between learners and teacher , linked to Vygotsky's "Zone of Proximal Development". This refers to the gap between what learners can achieve alone and what they can achieve through problem solving under guidance from a teacher or in collaboration with peers . The paradox of interactive media is that they should give greater control to the user, and yet the learner does not know enough about it to be given full control.

Scaffolding suggests a way of structuring this interaction and collaboration, starting with "recruitment" of interest, establishing and maintaining an orientation towards task relevant goals, highlighting critical features that might be overlooked, demonstrating how to achieve those goals and helping to control frustration . The

notion of scaffolding provides an overall framework for training and learning on the KLASS project.

Throughout the design processes, it is essential to stay alert to the notion of training for practice, given that it would be very easy to reduce the experience of preparing for online working to one of teaching software skills. Rasmussen agrees:
"to learn how to use a new media is one matter, to learn how to integrate it into day to day practices is quite another." p. 5).

It is therefore important to build in mechanisms and activities to ensure that users actually take part at each level of the online opportunities.

Building in Reflection

Schon pointed out that people influence their everyday practice by having reflective conversations, frame their understanding of a situation in the light of experience, try out actions and then reinterpret or reframe the situation in the light of the consequences of that action .

This seems to me to be a most accurate description of what occurs "naturally" in supply chains. Through reflection the practitioner can surface and critique understandings that have grown up around a specialised practice and make sense of a situation for him or herself.

To enable this to happen productively in the online environment is extremely important for supply chains since much of the informal knowledge of workers will be generated and transmitted in this way. In that sense the action research embedded in KLASS training will attempt to spot key devices enabling translation from off line reflection to online reflective practice.

LEARNING ONLINE THROUGH SUPPLY CHAINS-TRANSLATION TO PRACTICE

The vision is for a process to "wrap around" the learning system (on and off line) so that every participant is quickly enabled to keep his or her focus on sharing and applying knowledge, and the learning provision becomes as natural as reading a book or listening to a lecture.

Key premises

- **The technology must enable planned and purposeful activities**
- **Participants make use of online facilities if there is a very good reason for them to do so, and continue to do so (i.e. no matter how attractive the technology)**
- **The benefit come from interaction with others (towards learning communities, relevance, group identification), not from huge amounts of online resources- these should be used as stimuli for the interaction between people**
- **Working in groups is different online, requires certain (additional) skills of participants and somewhat different facilitation (e-moderating)–these need to be trained for, they don't happen by chance**
- **Existing resources and processes can be adapted to the new systems**
- **Learning model is one of constructivism and reflective practice**

Implications

- **Support resources are available at the point of need and at the level required for each participant.**
- **Induction for participants and training for e-moderators takes place in the environment itself.**

5 Stages	What?
1. Getting in/Getting Started 1.1. Technical supporting for logging in and setting up 1.2. Motivation to take part 1.3. Welcome by online persona	Documentation, discs and helplines Provided by overall programme and integration in offline activities Individual welcome and support online
2. Getting used/effective/comfortable/ socialised online 2.1. Ability to send and receive and messages 2.2. Take part in finding others and interacting in 2.3 . Facilitation to support	From prior experience or through local handholding, online induction Ready-made conferences Encourage, support, moderate "social conferences"
3. Giving and Receiving information 3.1. How to search, find and give relevant and useful information, how to post messages, files and links 3.2. Take part in information exchange activities 3.3. Facilitate activities and task completion on lines with groups	Online help, offline training, online training and induction programmes Meaningful and relevant (small-scale) activities pre and post face to face
4. Generate New Knowledge, collaborate 4.1. technical support for setting up private small group conferences 4.2. leadership of small group 4.3. support and provision of resources	Collaborative and co-operative activities
5. External links 5.1. support access to Internet 5.2. participants ask for relevant resources 5.3. point towards available online resources	Online databases, libraries and Web links

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The project reported here reflects Dr Salmon's long term interest in teaching and learning online, her research into the benefits, costs, opportunities and problems of teaching through computer mediated conferencing and her struggle, with colleagues, to understand how groups and communities can be effectively facilitated and stimulated towards productive learning through online environments.

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