

Organisational Learning: An Investigation of Response to Rapid Change in a Traditional Environment

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Abstract

This paper is a case study of 'collective' HCI in a 'top-down' systems project – a very large computing center in a new university in the United Kingdom. The authors present the findings of a small empirical study of computer supported teaching and learning in the new environment. Using activity theory, they discuss individual and organizational responses to this initiative in its first 18 months of operation.

1 Introduction

In September 2001, a very large computing centre (VLCC) was opened at an institute of higher education. There had been little prior consultation with instructors and students, and the centre did not conform to existing perceptions of a teaching space. This led to initial difficulties in relation to acceptance and adoption of good practice. An earlier report focused on observations and findings in the actual teaching space through covert participative observation (Buckner & Davenport, 2002). This paper presents the next phase of a longitudinal study of classroom transformation in the VLCC; it focuses on organisational impact.

2 The context: 'user-free' design

Traditionally, spaces designed for teaching with computers in UK higher education institutes have been comprised of laboratory or workshop facilities containing between 20 and 50 computers. The computers are normally positioned either around the walls of the room or in parallel rows. In either case there is a clear 'front' of class from where the teacher can instruct if they wish; identifiable boundaries (in the form of classroom walls) and a semi-secure entrance which can be closed if the instructor desires. Normally there is a computer linked to a dedicated projector from which the instructor can demonstrate particular activities and other teaching artifacts such as overhead projectors and whiteboards. The use of the space can be controlled by the instructor (eg s/he can choose to allow student not in their class to use the spare capacity or not) and the attention of the students can be gained and held through clearly identifiable lines of sight and lines of communication.

An efficiency drive in the institution that hosts the VLCC has led to a number of modifications in the use of space. The VLCC which was set up during the summer of 2001 was inspired by a vision of economies of scale. It offers a high-density open plan teaching environment for computing

students, consisting of 18 clusters or 'pods' of 24 tightly packed machines, back to back on two rows of twelve. The facility is open 24 hours a day, and at full capacity can house 500 individuals. Unlike the traditional teaching spaces, each pair of pods is bounded only by a waist high surround, and access to them is by means of a system of intersecting aisles. There are no walls or other form of physical boundaries between pods although some 'virtual boundaries' are formed where upper and lower tiers are separated by height and there are no physical barriers at the entrance to each pod.

Teaching staff returning from summer vacation in September 2001 were faced with a radically new environment in which to teach with little time to acclimatise or rethink teaching strategies prior to the start of Semester. The authors saw this as an opportunity to explore emerging work practice, and account for reactions and strategies to what was in effect a 'user-free' design and implementation exercise.

3 Theoretical background

We consider the VLCC to be a collective activity system in which the study of activity focuses on the actions of and interaction between individuals, their relationship and interaction with systems and artifacts and the continually changing organisational setting (Wells & Harrison, 2000). Emerging literature on social computing (Dourish, 2000) and more established perspectives such as activity theory (Engeström, 2000) have informed our investigation of 'CHCI', or collective human computer interaction.

Using Dourish's (2000) approach to the study of embodied interaction we have focused our attention on mundane practices that occur within the specific context of the learning environment of the VLCC, to see if what might start as somewhat 'chaotic' practice becomes more orderly through adaptive behaviour.

To further aid our understanding of what and how changes in practice occur, we consider the notion of organisational learning. Argyris and Schön (1996 p16) suggest that "organisational learning occurs when individuals within an organisation experience a problematic situation and inquire into it on the organisation's behalf." The 'problematic situation' in this case is 'how to support student learning effectively in a non traditional teaching space'. A particular focus of the investigation is the way in which tacit knowledge about effective teaching methods is externalised and the extent to which it has or has not become embedded in organisational practice. To date (February 2003) we have completed two phases of the study (Buckner & Davenport, 2002). These have involved 'covert' observation: the first author enrolled as a part-time student; the second author 'picked up' information at staff meetings and other informal gatherings.

4 Empirical study

In Phase One: 'The Phantom Wall Syndrome' we observed modifications in habits and perceptions when work practice was forced into the new habitat of the VLCC. Unsurprisingly, previous habits, practices and expectations of behaviour were carried over and then adapted for use in a new environment during the initial stages of change. Again, unsurprisingly, some practitioners, in particular those that could be referred to as the early adopters - adapted more readily than others to the change (Rogers, 1983). Discussion among teaching staff (formal and informal) in the early stages focused on problem definition rather than problem solution with emphasis on negative aspects of the change.

In Phase Two: 'Adaptive Practice' there was some evidence that practice had been modified to meet some challenges of the new environment. At both individual and organisational level, we observed changes in ownership and occupation strategies at the level of individual learning spaces or pods, and there were observable changes in the ergonomics of getting, seeking and maintaining attention. These were to some extent due to the failure of management to respond rapidly to initial requests in the first semester by "shocked" instructors for teaching artifacts to be provided. As a result when screens and projectors appeared in the second semester they were under used. Interpersonal practice, or the conduct of face-to-face teaching, was already undergoing a transformation as part of a national change in the focus of higher education that emphasised individual learning. In the VLCC this was evident in a shift away from whole group interaction to individual or small group interaction supported by electronically mediated scaffolding. Overall although some instructors perceived the VLCC as a rather brutal intervention others could see how it fitted with a process of transformation that was already underway.

We have just completed a third phase of the study, that we have labelled 'Partial Adaptive Practice'. Given our findings in the 2nd phase, we anticipated that emerging shifts in practice would result in prescriptive organisational intervention in the form of mentoring and/or provision of guidelines for new staff. In fact, there has been relatively limited organisational activity of this kind, and it is only in the past month that colleagues have organised a survey (a little over half of those involved in VLCC teaching responded) to assess perceptions of the VLCC experience. Though reports on specific problems have been raised in staff meetings since the opening of the VLCC this is the first attempt to present consolidated evidence to the appropriate committees. We are intrigued by the time lag between identification of problems and intervention at the organisational level and have turned to activity theory (Engeström, 2000) to account for the apparent organisational inertia.

5 Analysis and discussion

We initially constructed activity diagrams for two groups: learners and instructors. Student transformation by learning (the object of activity) is influenced by complex interactions between the subject (ie learner or instructor), tools (eg computers, projectors; signage, learning resources etc), rules (eg speed of learning; control of space), community (eg instructors; students; technical support; management), division of labour (by type of learning or instruction). We used the diagrams to distinguish between the learner (L) experience and instructor (I) experience. (These are not, of course, homogeneous groups, and we concede that we have used the diagrams as rather blunt instruments). There is some divergence in the resulting 'profiles', notably in the areas of tools, rules and division of labour. But within the 'I' group, there are further 'primary' contradictions (see Turner and Turner, 2001). We have captured these by using the terms Instructor-Adopters (I-A) and Instructor-Resisters (I-R): these can be modelled in two separate activity diagrams capture differences in their respective activity systems. (In reality these are not homogenous groups and instructors are positioned somewhere along the continuum from adopter to resister).

On the basis of interviews with key informants, our perception of the goal or object of the instructors is that while both are focused on the student, I-As are more focused on the outcome of facilitating effective student learning. There are however two categories of resister, some I-Rs (I-R/L) may be similarly focussed on facilitating student learning but are resistant to change because they believe that other types of classroom better support student learning while other I-Rs (I-R/T)

are more focused on transforming the student through effective teaching. This fundamental difference has a significant impact on the extent and manner in which affordances in the physical and virtual teaching and learning environment are exploited. It also affects the way in which different instructors adapt to the space. Students appear to have embraced the new environment, and thus the instructor who focuses on ‘student learning’ is more likely to embrace the new space.

I-As are most likely to see useful tools as those which support ‘individual’ self paced student learning. These may include web-based resources and workbooks which the student can use either individually or with colleagues in small group activities. I-As do not normally require external props such as whiteboards and PC projectors as their interaction with students is on a one-to-one or small group basis. I-R/Ts on the other hand prefer to lead whole group activities (at least for a part of the time allotted for the class) which often require the use of tools such as PC-projectors and whiteboards. Tensions arise when these artefacts, previously accepted as standard, are no longer readily available or easily accessible.

Division of labour, differs according to type of instructor. I-As allow the student to lead the learning process, and proactively support the student according to individual need. I-R/Ts however prefer to lead the students as a class or group through the learning process and consequently find an environment which is more conducive to independent learning more difficult. Some managers have suggested that a decrease in the level of visible presence of instructors in the VLCC indicates that they are simply abandoning classes, however our observations suggest that I-As and I-R/Ls have altered the balance of visible and invisible work by ‘entering’ the machine. They do this by supporting learning through the development and use of online learning materials. They may still be present in the classroom though demonstrators may assume some of their support role there, and they are not as highly visible as traditional up-front ‘teachers’.

Engeström’s ‘subject/rules/object’ complex has allowed us to unravel a major nexus of contradictory practice in the instructor group. How to ‘set the pace’ is a major concern. I-As generally work in a facilitating manner in which the student will set the pace of learning. I-As ensure that each student is progressing satisfactorily but they not overly concerned if students approach the problem from different perspectives. I-R/Ts, however, prefer a more didactic approach in which they set the pace. They are more comfortable if all the students in a class are working on the same problems each week, and find it more difficult to adapt to individual learning styles, speed and approach. This is less well suited to the VLCC where it is more difficult to lead and control whole group activities. I-R/Ts thus prefer to have more exclusive control and ownership of the space in which they teach – which as we have seen in previous phases is extremely difficult with regular ‘incursions’ from students who are not members of the class. I-As, in contrast, are content with less exclusive control and are more tolerant of incursions provided that the interlopers do not disturb the class.

6 Conclusion

We have found that the community of practitioners who regularly instruct in the VLCC discuss their practices with others. New instructors discuss teaching approaches with co-instructors. Established instructors discuss practices in informal situations eg at coffee, in the corridor and more formally in discussing teaching approaches for the next semester. In this way an environment is engendered in which knowledge, values and assumptions are shared. The tacit

knowledge of 'how to' teach in this particular space becomes externalised and available for adoption by others. Significantly, it does not rely on formalised training sessions.

To date, no organisational policy on teaching and learning in the VLCC has emerged. We have thus not found evidence of explicit organisational learning in relation to the VLCC in its first 18 months of operation. This was contrary to our expectations, as the department that hosts the VLCC has well-established structures to promote organisational learning by means of formal and informal programmes for staff development and for good practice through the teaching and learning group. The VLCC appears to have been a 'no go' area as far as institutional response is concerned, though, as we note above, individual instances of difficulties, and specific requests for equipment were presented to staff meetings. Our (limited) analysis with activity theory has provided us with insights into this paradox. It suggests that the issues are complex (Fleck and Howells, 2001), and that a naïve institutional response (in the form of workshops, for example, to promote good practice) might do more harm than good. The VLCC touches on fundamental issues of differences in teaching philosophy and personal sense-making that will take time to resolve. What we describe as 'organisational inertia' in an earlier section may in fact be 'organisational caution'.

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8 References

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