

# The Individual and the Collaborative: the Interactional Organisation of Trading in a City Dealing Room

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## **Abstract:**

It has been widely recognised that whilst CSCW has led to a number of impressive technological developments, examples of successful applications remain few. In part, this may be due to our relative ignorance of the organisation of real world, cooperative activity. Focusing on share trading in a securities house in the City of London, we explore the interactional organisation of particular tasks and the ways in which dealers interweave individual and collaborative activity. These observations suggest ways in which we might reconsider a number of central concepts in CSCW and begin to draw design implications from naturalistic studies of work and interaction.

"It is important to understand that in any system implementation the people factor is as important, and arguably more important, than the technical infrastructure"

(London Ambulance Service Investigation 1993, p.39)

## 1. Introduction

Despite impressive technological developments in CSCW, it is widely recognised that there are relatively few examples of successful applications in real world settings. In part, this is due to the innovative character of many of the systems and their relative fragility. More seriously however, it is suggested that the lack of success of CSCW systems derives not so much from their technological limitations, but more from their insensitivity to the organisation of work and communication in real world environments (e.g. Grudin 1988, Orlikowski 1992). Galegher and Kraut (1990) suggest, for example that the design and application of CSCW systems could learn a great deal from 'what we know about social interaction in groups and organisations'. In this light, we have recently witnessed a growing interest in delineating some basic distinctions concerning the organisation of 'cooperative work' and exploring their implications for the design of particular tools and technologies. Whilst many of these distinctions are indeed fundamental to the organisation of cooperative work and the design of relevant technologies, including co-present verse physically distributed, synchronous verse asynchronous, symmetrical verse asymmetrical, the idea of 'cooperation' or perhaps more specifically 'collaboration' remains ambiguous and largely unexplicated (cf. Schmidt and Bannon 1992). If this apparent ambiguity were merely a matter of sociological relevance, then it would be of little importance to CSCW, however, our relative ignorance of the organisation of cooperative and collaborative activities in work settings may have profound implications for the success of the technologies we are attempting to develop.

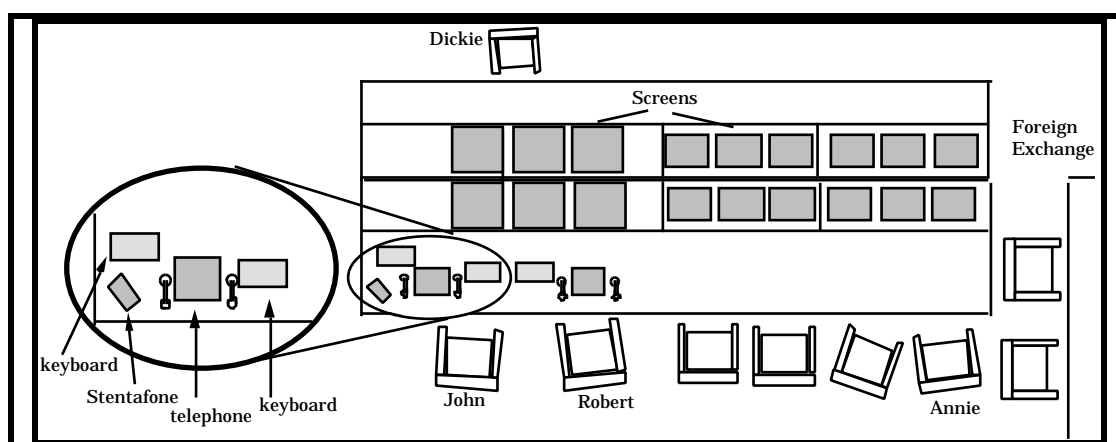
In this paper, we wish to explore a few aspects of the organisation of collaborative work in a real world setting, namely the dealing room of an international securities house in the City of London. By examining the ways in which dealers coordinate their actions with colleagues and participate in each other's conduct, we wish to provide a sense of the delicacy and complexity of collaborative work, and show how apparently individual tasks are systematically, yet unobtrusively, coordinated with the actions of colleagues. In the light of these observations, we will consider not only the relevance of proposed technological support for market trading, but also discuss their more general implications for the design of systems to support cooperative work.

## 2. The Setting

There are many different types of trading that take place on dealing room floors, for example, there are markets in foreign exchange, bonds and derivatives ('forwards', 'futures' and options), and combinations of these vary from one dealing floor to another. However, much of this trading tends to focus around the notion of making 'deals' that is, the buying and selling of shares and bonds in order to make a profit.

Our study focuses on market makers on the equities desk of one dealing floor of a securities house, who deal in stocks on both the US and UK markets. These dealers have a continuous responsibility to buy shares at their published bid price or to sell shares at their offered price, whether or not they actually hold the shares. In this way market makers make a profit on the difference between the prices at which they buy and those at which they sell.

Our study is gathering materials from the 'number one' position on the equities desk which deals in the top ten stocks (for example, Hanson, ICI and Wellcome). Dealers currently work the stock collaboratively, and at present, this position is managed by two dealers; one (John) being mainly responsible for dealing in registered stocks, those which are listed on the UK Stock Exchange, and the other (Robert) for American Depository Receipts (ADR's), which are certificates traded in the US backed by registered holdings of shares in UK companies. As these dealers can effectively trade and hold stock in both sterling and dollars, they have to keep track of changes in the exchange rate and the current state of both markets. They also must ensure that the bank has enough of the appropriate currency to cover any deals done in ADR's (figure 1 is a rough plan of the local area of the dealing room where John and Robert are located).



**Figure 1.** The 'number one' desk in the dealing room

Primarily, dealing in shares takes place over the telephone between different market makers' dealing rooms. But other deals occur within the dealing room either through the stentafone (an intercom system), face-to-face or shouted across the dealing floor and usually occur between market makers and salespeople with or without consulting foreign currency dealers. Dealers have a range of technology to assist them in understanding the current state of the market. Figure 2 is a diagram of the displays for various systems that John and Robert have available to them.

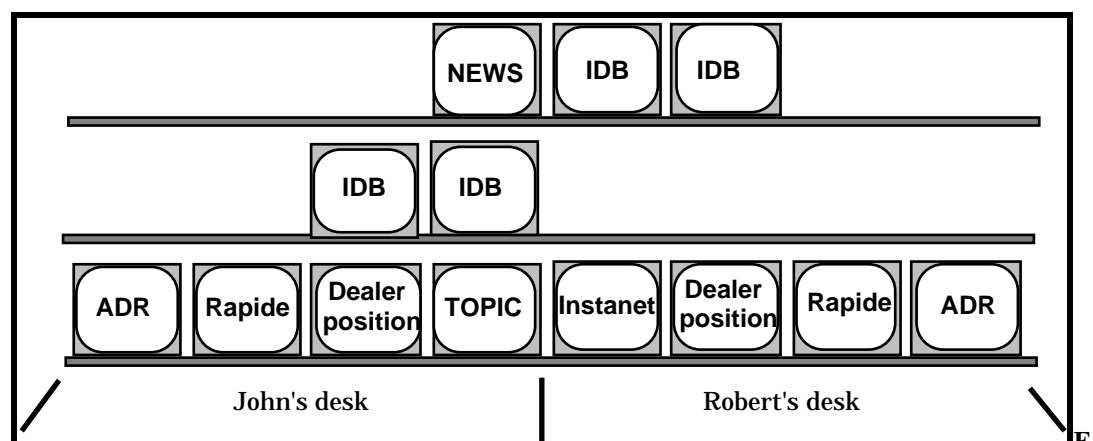


Figure 2. The displays available to the 'number one' desk

These systems include: TOPIC, for screen based price and market news; Instanet for American wide information on stocks and prices; IDB systems which provide a facility for displaying anonymous prices from Inter-dealer brokers (i.e. Cedar Street Ltd, Tullet and Tokyo, Garban Equities and First Equity); and Rapide, the security house's own system which, by presenting a restricted amount of information, allows dealers to see 'at a glance' which competing market makers are 'on the strip', that is, offering the best prices on a particular stock. This is also the only system, on which dealers can input information, enabling them to change their bid and offer prices on stock according to the current state of the market. ADR screens show the equivalent information on ADR's along with conversions from registered stocks to ADR's. Finally, each dealer has a screen which displays their current position, that is, the dealer's current holdings in stocks in which they are dealing. Thus, from all these resources, dealers must be able to discriminate what is relevant for them in order to make a deal.

After a deal is made, whether through the telephone to another market-maker or within the dealing room itself, it is required to be recorded and transferred to the Stock Exchange centralised database. As at peak times a dealer may make deals anywhere from every five to thirty seconds, great effort is spent in ensuring that these records are accurate. At present, this activity, called 'deal capture' is done on 'tickets'. Each dealer

has a book which holds the tickets on which he or she writes a record of the deal. The ticket itself is then removed from the book and picked up by 'deal input' staff.

### 3. Coordinating collaboration with activity completion

Each dealer is responsible for a number of stocks or ADR's and is accountable for the profits and losses made through their sale or purchase. So, whilst dealers need to remain aware of the work of their colleagues, they frequently make deals themselves without direct reference to others within the local milieu. Within the dealing room, we do find instances of the forms of sequential, collaborative activity one finds in other settings, such as Control Rooms, medical consultations or more conventional office environments. In these cases, the activity of one individual, is coordinated with the completion of the activity of another, so that we can find sequences or trajectories of conduct which allow separate individuals within a relatively circumscribed division of labour, accomplishing collaboratively, step by step, a particular task or activity. In general, the form of collaborative activity supported by many CSCW applications, is designed to support this cumulative, sequential collaboration, characteristic of work within many organisational settings.

Whilst such sequential collaboration is perhaps less prominent within the dealing room than within the other environments, at least between dealers themselves, we do find that individuals frequently orient to the potential completion of a colleague's activity, prior to initiating collaboration. Their reluctance to 'interrupt' an activity of a colleague is hardly surprising, not simply because it might infringe conventional etiquette, but by virtue of the fact that a colleague's activity may only be partially 'visible' or available to others, even within the immediate vicinity. For example, a dealer may only have access to one party's talk on the telephone, or is unable to tell exactly what a colleague is looking at when he is reading some share prices. The relative inaccessibility of many of the activities of one's colleagues within the local milieu, especially those undertaken on the telephone, coupled with one's inability to access the relative importance of particular actions, however seemingly trivial, encourage personnel to be sensitive to when and where they should attempt to initiate collaboration. Notwithstanding the etiquette in question, it is likely that an individual will stand a far greater chance of establishing mutually focused collaboration with a colleague, if he coordinates his initiating action with the completion of an activity in which the other has been involved rather than interrupts that activity.

So for example, in each of the following instances, a dealer produces an utterance which demands a reply from a colleague, just as the other completes an activity.

**Fragment 1. 14:40:47**

R: Thanks very mu:ch. {on the 'phone}  
(2.3) {R replaces receiver on console}

→ J: Do you want to take the B.P. in New York?

(R): Yes:::

J: An then run em up (.) a bit.

**Fragment 2 14:27:26**

R: DICKIE: {outloud, having taken an incoming call}  
(1.2)

R: Cedar Street  
(2.2) {R replaces receiver on console}

→ H: I've put some Shell (an) sell at fifty six and three quarters...

**Fragment 3 14:24:02**

R: {Lifts hand from keyboard and flicks calculator to one side}

→ J: Wh-what are Hansons, they're twenty: o five offered?  
(0.4)

R: Yeah.  
(0.2)

J: Ninety two o five I'd say. {picks up 'phone}

In fragment 1, John initiates a query concerning whether they should buy B.P. shares which immediately develops into buying stock on the New York Market. In the second instance, Robert tells Dickie that Cedar Street (an Inter-Dealer Broker) is on the phone and then replaces his receiver. As Robert replaces the receiver, Harold only then turns and informs Robert that he has put out some Shell for sale. Harold then proceeds to detail the various shares and their prices that he has put out on the New York Market. In fragment 3, John asks a question concerning the price of Hanson, precisely at the point at which Robert marks the completion of typing with an exaggerated press of the key and pushing his calculator to one side.

In each instance a dealer successfully initiates collaboration with a colleague by producing an utterance, such as a query or an informing, as his colleague completes an activity in which he has been engaged. By positioning the utterance in this way, dealers not only preserve the integrity of the activities in which their colleagues may be engaged, avoiding interrupting a potentially important business which is being undertaken, but

also initiate collaboration at a juncture at which a colleague may be more willing to being or return to a collaborative activity.

#### 4. Monitoring potential boundaries within a colleague's activities

In the instances mentioned above, the initiation of collaboration by a colleague is coordinated with relatively gross, visible features of a co-participant's conduct, such as closing a telephone conversation, or removing one's hands from a keyboard. Even so, it is interesting to note that in these and other cases, a dealer does not necessarily have to wait for actual completion of the activity before successfully initiating mutual engagement with a colleague. In the cases at hand, a colleague can be aware of the upcoming completion of a particular activity, even before the last few moves are actually accomplished. On a telephone call for example, well before the actual receiver is placed on the console, a colleague can monitor the talk and know, unambiguously, that it is drawing to completion. More interesting perhaps, individuals can assess a physical action or activity undertaken by another, within the course of its production, and prospectively envisage its completion. So for example, it is not unusual in the dealing room for individuals to time, with precision, an utterance which engenders collaboration, so that it coincides with a colleague finishing writing out a ticket or swallowing a mouthful of lunch. By monitoring the course of action in this way and by prospectively identifying its upcoming boundaries, individuals can successfully initiate collaboration so that it does not interrupt an activity in which a colleague is engaged.

In these instances, an individual initiates one activity immediately following the potential completion of another. In some cases, the subsequent activity is relevant to the prior, and is directed towards the accomplishment of a particular task, such as collaboratively selling some stock. In other cases, the activity is juxtaposed with the prior, simply to avoid interrupting an action in which a colleague is engaged. Either way, we find that individual tasks are temporally, and sequentially coordinated, activity by activity. However, collaboration within the dealing room often involves the mutual overlapping of multiple activities in which various individuals participate. Frequently a dealer will not wait, nor be able to wait, until the completion of an activity prior to initiating collaboration, but interject an utterance at a 'natural juncture' within the course of the activity. Consider, for example, the following instance in which Robert positions an utterance at a potential boundary point within the developing course of one of Harold's current activities.

Fragment 4 14:26:07



H:      {*Writing notes*}

R: Things: like Han:son  
Trust Har old we want

H:              Errrrr  
R: ou:t there:,  
(1.0)  
R: I wan:t ter:: (. )  
B.P. out there,

Harold is on the telephone. Whilst he waits he is makes some notes on a piece of paper. As he writes, he momentarily lifts his pen from paper to begin a new line. As his hand breaks from the trajectory of writing, Robert interjects an utterance which mentions the sorts of things which should be put out in New York. Harold briefly orients towards Robert while the initial part of the utterance is being delivered, and then turns away, producing a loud “Errrrr” into the mouthpiece of the telephone. The “Errrrr” serves to respond to the party with whom he is speaking on the phone and simultaneously acknowledge his co-present colleague's utterance. In the light of Harold's response, Robert goes on to detail the stocks which should be put out on the New York market.

It is worth noting that in this case, Robert’s interjection is not so much attempting to initiate a new activity between himself and Harold, but rather contributing to an activity in which he and his colleague are engaged and which has been the subject of an earlier discussion. Indeed, the Robert's talk is relevant to Harold's telephone call. The delicate design of Robert’s utterance(s) does not demand mutually focused engagement and talk, but rather preserves Harold’s primary commitment to the telephone conversation, whilst providing some potentially relevant information. The utterance(s) exploits the dealer’s ability (and necessity) to engage in one activity, whilst monitoring and participating in another.



## 5. Stepwise progression into collaborative activity

Whilst dealers may successfully initiate collaborative activity by coordinating an utterance with the completion of, or a boundary within, a colleague's activity, in many instances the actual initiation of mutual engagement is foreshadowed by non-verbal, or better, non-vocal behaviour through which the participants progressively enter into collaboration. In the following instance, Robert's utterance, through which he initiates a discussion concerning stocks they are trying to purchase, is immediately preceded by his turning from the right hand side of his desk towards a monitor on the nearside of his colleague's desk. As he appears to complete the turn, John who is sitting on his left, turns and appears to look at the same monitor (picture 5.2). The moment John begins to realign his gaze, Robert moves posturally and facially so that his bodily orientation, as well as his gaze is in parallel with his colleague.

### Fragment 5 14:42:48




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5.1	5.2	5.3
	bodily reorientation	
	-----	
	gaze at monitor	
	.....	
R:	-----,--They will be ho:pefully (.) coming to us	
J:	...-----	
	gaze at monitor	

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John's response to the initial realignment of gaze, and in particular his turning towards the same focal point, encourages Robert to align himself further with John (picture 5.3) It provides an environment for the delivery of the utterance. By placing himself alongside his colleague and adopting a parallel alignment towards the same focal point, Robert builds an environment of mutual orientation which may not simply provide a mutually established display of commitment to collaboration prior to the delivery of the initiating utterance, but informs both the design and interpretation of the utterance. The pronoun "they" invokes and refers to an object at which they are simultaneously looking; namely a bid which they have submitted for a particular stock

that is being displayed on the monitor. It embodies the mutual orientation and foreshadows the collaboration.

In eliciting a realignment of gaze from John towards the 'relevant' focal domain, Robert secures his cooperation to enter into mutually focused collaboration, prior to the delivery of the initiating utterance.

Unlike face to face interaction, where participants successively establish a bodily framework in which they physically orient towards one another (cf. Kendon 1992), in the dealing room, mutually focused activity is often preceded by one individual bringing his visual and bodily alignment in parallel with a colleague and in particular orienting towards the focal area of the other's attention. Dealers rarely turn and look directly at the face of a colleague as one might in more conventional forms of sociability; to do so would demand rather than encourage co-participation (cf. Heath 1986, and Heath and Nicholls forthcoming). By looking into the physical domain of a colleague, and aligning towards the objects and artefacts of their attention (the focal point(s) of their activity), dealers display their orientation to their colleague's activity, and preserve the integrity of the other's conduct. It allows a dealer to discern more accurately when it might be opportune to initiate collaboration and have the other see that their current activity is being attended to, but does demand the immediate involvement of the other. Such monitoring is potentially accountable, and the initiation itself, reflexively provides an explanation for the attention the other's activity is receiving. The ability to exploit a look, and in particular alignment towards the focal object of another's activity to foreshadow mutual engagement, necessarily relies upon the participant's orientation within the dealing room to specific physical areas, monitors, and artefacts, belonging to particular individuals. The glance at the monitor, for example, is accountable by virtue of it not simply being the focal area of another's current activity, but by being located within the immediate horizon of a colleague's work domain. The spatial distribution of personal work domains within the dealing room is momentarily exploited and produced for the purpose of initiating collaboration.

## 6. Outlouds and recipient sensitivity

The data begin to suggest therefore, that though dealers may be engaged in a particular, individual, task they remain sensitive to the conduct of colleagues and the possibility of collaboration. As in other settings, such as London Underground Control Rooms (Heath and Luff 1992) and Air Traffic Control (Harper et al. 1991), individuals appear to remain sensitive to, and monitor, activities within the local milieu, whilst participating



J: Are we going to hit  
'em?  
(2.3)  
R: ((Peers at screen))  
R: Erm::^ (.) YES::,  
R: (0.9) WHO'S: THAT?  
(1.0)  
R: Bernie? ((Picks up  
phone))  
(3.0)  
R: We want to sell (forty:)

In fragment 6, Annie who is sitting at one end of the ADR desk, shouts across the room that Shearson is on the bid (picture 6.1). Robert is in the process of sitting down and makes no indication that he has heard the utterance. As Robert lands in his chair, John turns momentarily towards his domain and asks whether they should try to 'hit the bid' (i.e. sell Hanson shares - picture 6.2). John's question assumes that Robert has both heard the utterance and may be prepared to collaborate in selling the stock. The utterance appeals to, and invokes a mutual orientation towards, selling stock and initiates collaboration with John. A second or so later, Robert grabs the telephone and shouts to Annie, asking who is actually on the phone (picture 6.3). A little later a substantial amount of stock is sold.

Whilst Annie's utterance is shouted outloud, as if potentially relevant for anyone within the local vicinity, it is perhaps only two or three traders who might have an interest in the information. Shouting outloud, rather than specifically telling certain colleagues, is not only a relatively economic way of informing a number of recipients, but also delivers the information in a way that does not necessarily demand that anyone responds. So, whilst shouting across the room might be thought relatively incursive, potentially interrupting activities being undertaken by various traders in the room, it is perhaps less obtrusive than actually informing particular persons. Annie's utterance does not demand that anyone respond. It allows them to overhear and receive the information without necessarily abandoning the activity in which they are currently engaged. It does not oblige any particular dealer to become a recipient and respond to the utterance. It also provides a basis for collaboration, since one dealer, like John, can presuppose that others for whom the information might be potentially relevant will have heard the utterance.

Many 'outlouds' within the dealing room have this sort of character. They are designed to have a number of individuals hear the information, without demanding that all, or even any, of them actually respond. Even at the more local level, we find dealers delicately designing talk which can encourage, one of an umber of people to respond, without demanding that anyone in particular address the utterance. It allows others to

volunteer whether they wish to participate, and thereby helps preserve the integrity of the tasks in which they may be engaged.

## 7. Individual and Collaborative Conduct

Within a working environment such as a dealing room therefore, as within other organisational settings, we can see the ways in which collaboration, as a delimited form of cooperative work, is simply a gloss to capture a complex configuration of momentary arrangements through which two or more individuals, sequentially or simultaneously participate in particular tasks or activities. Not only is collaboration initiated through a variety of interactional procedures and practices, but the form of cooperation which actually arises, is contingent and continually subject to rearrangement and reorganisation as it emerges step by step, within the activity(ies) in which the participants are engaged. Moreover, to characterise the cooperative arrangement of the number one position on the equities desk as a 'group', provides no firm anchor with which to secure a technologically relevant description. Even a brief glance at the domain reveals that the various tasks rely upon an socio-interactional organisation allowing dealers to co-produce, and co-participate in, particular activities in highly variable and contingent ways.

The analysis above has not only revealed the complex set of arrangements which might reasonably constitute 'collaboration' within the environment, but also the difficulties of demarcating individual activities or tasks. For example, we find that whilst a dealer may be engaged in an apparently individual task such as making a deal, he will simultaneously monitor the local environment, including the activities of colleagues and the changes to his own computer screens and to those of others. Moreover, his production of the tasks or activities in which he is engaged is sensitive to the concurrent activities of colleagues, and may be altered, during the course of their production, in the light of some information he receives or overhears. Such 'peripheral monitoring' is an integral feature of the proper accomplishment of tasks within the dealing room, and dealers would be called to account if they failed to follow the array of concurrent 'goings on' within the local milieu. Indeed, a missed remark, an undetected screen change, or even an unnoticed sale or purchase by a colleague, can, during the course of deal, greatly effect a dealer's position in the market and have costly results for the bank. Individual work within the dealing room, relies upon a dealer's ability to monitor the action of his colleagues and changes within the local environment, even though he may be engaged in a potentially unrelated activity.

Dealers, however, are not simply expected to remain sensitive to the local environment of action and to discriminate what may, or may not, be relevant. Rather, work within the dealing room demands that whilst they are engaged in one activity they may have to participate simultaneously in the activities of colleagues. So, for example, we find dealers who are apparently engaged on the telephone, making recommendations to a colleague as to what he should buy or sell. Indeed, a dealer may design a single utterance in such a way that it not only secures a sale on the telephone, but simultaneously publicises the purchase within the dealing room itself, encouraging a colleague to make the necessary currency arrangements. More complex still, are the ways in which dealers simultaneously sustain and participate in multiple activities with their colleagues, so that a number of deals will be built alongside each other, and at the right moment, a substantial amount of stock will be sold as it is being purchased, maximising profit and keeping the books balanced. Within the dealing room therefore, we not only find a myriad of ways in which dealers collaborate with their colleagues, but it is difficult, if not impossible, to delineate the 'individual' from the 'collaborative', since personnel are continually participating in multiple activities which more or less involve their colleagues, and are produced with respect to the emergent conduct of others.

Through an examination of collaborative activity in the dealing room we have begun to reveal in more detail the nature of these forms of collaboration and the ways in which individuals move into and achieve collaborative activities. Even from this preliminary analysis it appears that the conventional distinction between 'individual' and 'collaborative' work requires further refinement, and it may be that such relatively restrictive conceptions of work have confined the nature of the technology that has been intended to support it. Furthermore, unpacking the notion of 'collaboration' may have implications for the design of technology that is not normally conceived of as being intended to support the work of several individuals. This re-specification has consequences not only for technologies to support activities in the dealing room, but also for computer systems to support 'collaborative work' in general.

## 8. Collaboration and Technological Innovation

Management were misguided or naive in believing that computer systems in themselves could bring about [such] changes in human practices. Experience in many different environments proves that computer systems cannot influence change in this way. They can only assist in the process and any attempt to force change through the introduction of a system with the characteristics of an operational “straight jacket” would be potentially doomed to failure.

London Ambulance Service Inquiry Report (Page et al. 1993, p. 40)

The wide variety of technologies used in the dealing room, including screens, telephone systems and input devices, have all been designed for individual use. However, the analysis demonstrates ways in which the apparent individual use of these technologies can be a resource for others to initiate collaboration. The examination of the details of collaboration has prompted an awareness that current technology in dealing rooms may be constrained by too narrow a focus on the activities of individuals. For example, even the most basic of dealing room technologies such as the loudspeakers on the various telephone systems could be redesigned to provide better support for multiple forms of participation from colleagues in the local environment. Similarly, the design and positioning of the various monitors are organised around the desks of individual dealers, and yet the instances above reveal how dealers make use of another’s displays in order to move progressively towards more focused collaboration. Therefore, the space that surrounds the participants, and the configuration and design of technology used within it, could become an concern of system developers and reconsidered to take into account how several dealers can make use of particular ‘domains of interest’.

The study of interactional practices within the equities dealing room has had a direct contribution to assessing the feasibility of proposals for future technologies for dealing rooms in general. At the outset of the study, a company developing trading systems for the City was proposing a novel technology to support the recording of deals. Each deal is currently recorded by the dealer who writes out the key details of a deal on a paper ticket. The ticket is then ripped out of the book, put into a pot and picked up by another member of staff who types the details into the company’s database. At present, this activity is meant to be accomplished in sixty seconds. The information entered then updates the screen in front of the appropriate dealers to show his current position in stocks. This process of writing ‘tickets’ to record deals is seen as time-consuming, archaic and prone to error. Hence the proposal for a technology to automate deal capture. Particular suggestions to support this process have included the addition of

headphones to current systems to prevent interference from outside noise, the use of touch screens to input the details of transactions and voice recognition technology to record the deal directly from the dealers' phone conversations (e.g. Howells and Crowley-Clough 1991). The work and interactional practices outlined above may reveal why some of these solutions have encountered difficulties in their design and introduction into the workplace. For example, a touch screen, not only reduces the visibility of particular items from the dealer while he is using it, but also particular activities of the dealer on the screen may become undifferentiated, making it difficult for others to identify boundaries and thereby coordinate their own activities. Similarly, headphones introduced to eliminate the 'negative effects' of noise, impede the dealer's ability to monitor for junctures in a colleague's activities and, more importantly, restrict the dealer's sensitivity to potentially relevant utterances, such as outlouds.

This study has focused on a particular proposal by a company to use Voice Recognition Technology to detect the key details of a deal from the phone conversations and then automatically transfer the information into the dealing room database and the individual dealers screens. The hope was that not only would the system make the process more efficient and narrow the risk for individual dealers, but would also give the securities house real-time knowledge of their overall position, information which at present is lacking. It is interesting to note that many of the justifications for the use of voice recognition systems in this domain arise from the constraints of the current state of voice recognition technology. It has been argued that the limitations on the size of the vocabulary which such systems can recognise is matched by the limited amount of information that the system needs to record and the small number of words and jargon that dealers use (e.g. suggested to be thirty key words plus numbers). In addition, the predominant use of the phone for dealing and the apparent limited movement of dealers around their local environment should make it possible to train these systems on individual dealer's voices using specific phones. However, even preliminary observations of the materials gathered from dealing rooms shows that these assumptions appear to be optimistic and overlook the interactional and collaborative nature of dealing. In particular, dealers' vocabulary does not appear to be as restricted as originally envisaged, but more importantly dealers make sense of the details of transactions, without necessarily making them explicit, by utilising a range of resources which include: the information on the screens in front of them; news broadcasts and outlouds occurring in the local environment; and their co-participants' contributions to deals on the phone. Furthermore, deals are also made over the stentafone and across the floor; dealers 'cover' for each other often when just passing by an empty desk; and deals are collaboratively achieved not just between buyer and seller but also co-produced



between dealers. Voice Recognition Technology would have to: make sense of dealers voices from the general background noise of the dealing room; recognise the voice of any number of dealers phoning in from other dealing rooms in the City; have some “intelligence” about the current state of the market and make use of the information in the local environment (see Jirotko et al. 1993).

Following from this analysis, developers have reconsidered the requirements for automating deal capture and are exploring recommendations for technologies that are more sensitive to the interactional nature of the activities of dealers. For example pen-based, ‘mobile’ systems with ‘gestural interfaces’ may allow deals to be recorded whilst preserving opportunities for others, non-intrusively, to monitor the activity for potential boundaries and make use of these to initiate more focused collaboration. One suggestion may be actually to design ‘gestures’ that make particular activities on the screen available or visible to others in the local environment, for example, it has been proposed that the gesture required for completing a transaction could be an exaggerated ‘sweeping’ gesture similar to ‘ripping off’ a ticket from the book.

Analysis of the ways in which dealers coordinate their actions with colleagues and participate in each other’s conduct may also have implications for the design of systems to support collaborative work in general. It has been proposed that CSCW systems support the ‘seamless’ transition from individual and collaborative activities (Ishii 1990). However, this study reveals the ways in which individual activities are shaped by the contributions of others and the variety of ways in which individuals collaborate. For example, we have revealed how a dealer can monitor a range of activities performed by a colleague, such as their use of a keyboard or a calculator, for boundaries in which to initiate more focused, collaborative work. Even the requirement for a ‘seamless transition’ between individual and collaborative activities neglects the delicate and multifarious ways in which cooperative work is accomplished.

## 9. Summary

In this environment as in others, we find that the use of computer systems which were primarily designed to support ‘single users’ undertaking individual tasks, is embedded in the users’ ‘ongoing’ interaction with colleagues within the local milieu. Indeed, the system, and the visibility of its use, provides an essential resource in the co-production and collaborative organisation of seemingly individual tasks. Although, some recent research has begun to investigate technological support for such aspects of collaborative work, even when the co-participants are physically distributed (e.g. Ishii et al. 1992,

Gaver et al. 1993), it would be unfortunate if the emergence of CSCW detracted attention away from the collaborative organisation of many individual tasks. It may well be important for the development of systems to support situated activity, to design particular tools that are sensitive to the more tacit, yet nonetheless essential, interactional and interleaved practices which underpin activities in real world settings.

However, when considering the methods, techniques and representations developed in HCI, it is perhaps not surprising that such aspects have also been overlooked for 'single-user' systems. For example, the concept of 'task' in task analyses is often restricted to work undertaken by an 'individual' and the particular representations utilised seem to impose a structuring which fails to account for the interactional and interleaved nature of activities in real world settings.

It may be the case, that we not only need to learn more about the social organisation of collaboration in order to develop requirements for systems to support cooperative work, but that it might be useful to reconsider some of the basic presuppositions which underlie empirical research and technological design in HCI. Indeed, we are beginning to respecify some of the key concepts, such as 'task', 'user', 'collaboration' and 'information' that inform many current methods and techniques for the analysis of requirements and system design.

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Unpacking Collaboration: The Interactional Organisation of Trading in a City Dealing Room. January 1993. DOI: 10.1007/978-94-011-2094-4\_11. Focusing on share trading in a securities house in the City of London, we explore the interactional organisation of particular tasks and the ways in which dealers interweave individual and collaborative activity. These observations suggest ways in which we might reconsider a number of central concepts in CSCW and begin to draw design implications from naturalistic studies of work and interaction. Inspired by a case study in a design company, we focus on a collaborative ideation task, which is often part of pair-wise brainstorming in design. Collaborative economies consist of giving, swapping, borrowing, trading, renting, and sharing products and services for a fee, between an individual who has something and an individual who needs something – generally with the help of a web-based middleman. A collaborative economy may also be known as a "shared economy," "sharing economy," or a "peer-to-peer economy." Understanding Collaborative Economy. Companies in the collaborative economy are often disruptive to established businesses (think Uber and the taxi industry or Airbnb and the hotel industry), and many have experienced rapid revenue growth. They rely on the digital space and smartphone apps to connect buyers and sellers. International Organizations (IOs) have become a central part of international relations. As Hurd (2014) writes: "As interdependence increases, the importance of international organizations increases with it. We find international organizations in one form or another at the heart of all of the political and economic challenges of the twenty-first century" (1). The practical expression of this independence varies greatly across organizations, but in a formal sense they are corporate "persons" much like firms are "persons" in domestic commercial law. This means that they have legal standing, with certain rights and obligations, and can sue and be sued (29).