

Getting to Know Your Job-A Social Actor Perspective on Using Information Technology

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Abstract: This article aims to develop an empirically grounded understanding of how newcomers learn to do their work and the role information systems play in this learning. Actor network theory views technology as an important actor. Information systems are built on and embody knowledge of the work and how to perform it. The influence of this actor depends on the other actors' ability to "translate" the capability of the technology into their own work setting. From a social constructionist perspective, it could be expected that the understanding and knowledge of the work is the result of mutual development of images in the group. However, this article builds on research showing that people working closely together can still hold radically different conceptions of their work. Three distinct understandings of work that are associated with different levels of competence and with different demands on the administrative information system are found. These different understandings of the work have implications both for training and for the development of information systems.

Key words: Social actor, perspective, role of IT

INTRODUCTION

How do you get to know your job? The aim of this paper is to develop an empirically grounded understanding of how newcomers learn to do their work and how they perceive the role of IT in their work. From a social constructionist perspective, it could be expected that the understanding and knowledge of the work is the result of social processes-of mutual development of images in the group. Still, there is research showing that people working closely together can hold radically different conceptions of their work^[1,2]. This indicates that the socially formed constructions are but a part-perhaps building blocks-in the shaping of the individual's knowledge and understanding. Actor network theory maintains that technology could also be viewed as an actor^[3,4]. Information systems are built on and to some extent embody, knowledge of the work and how to perform it. But the influence of this actor depends on the other actors' ability to "translate" the capability of the technology into their own work setting^[5,6]. Knowledge of technology and creativity in "translating", could thus be important aspects to study, as they may influence the understanding the individuals come to hold.

Information technology is a tightly integrated part of an employee's everyday working life. In many work situations, you cannot even imagine how it would be without the help of information technology. An individual who for some time has been using IT to support his or her work often has difficulty in distinguishing the knowledge

of how to use the technology from the knowledge of how to solve the task in which the IT support is used. A mismatch between task and ability to perform it brings the knowledge of task and tool to the surface. New learning and unlearning may take place until the task can be satisfactorily solved. With time, this new, conscious knowledge will become internalised, encapsulated and difficult to access and the cycle is likely to start over again

Looking at the situation from a group perspective, the movement of people into and out of the group complicates the situation. Those leaving take with them knowledge that is no longer explicit to them and is thus difficult to transmit-or even to realize that it exists and would be useful to transmit. For those entering the group, the by now tacit knowledge of their fellow workers is difficult to access and benefit from, as the newcomer tries to build knowledge of task and tool^[7,8]. The longer it is since the knowledge-building was a conscious concern in the group, the more difficult it is likely to be for the newcomer to acquire a sufficient understanding, or for the people in the group to adjust to changing conditions.

The basis for the study is retrospective interviews with office workers (university secretaries)-newcomers at different points in time-concerning the learning process and the communication between learner and other actors, that has taken place. What constitutes "knowing your job" and how was that knowledge developed? What is the role of different actors-including the IT used in the work-in this knowledge development?

Organizational implications of information technology have been of interest to many researchers in the field of information systems research. Attention to the social, rather than purely technical, aspects of using the information technology^[9] and an understanding of technology as well as of organizational theory have been suggested as important^[10,11]. Typically, the focus has been on understanding how the use of information technology is shaped and what influences the use^[12-15]. These researchers have provided a good understanding of how the organizational structures and the users' perceptions influence the use of technology.

However, as Lamb and Kling^[16] note, this has meant viewing individuals primarily as users rather than as social actors in a work context. The focus on understanding information technology and its interaction with the organization has meant paying little attention to the need and importance of use itself in the context of the full job situation. Most individuals in an organization are not primarily users of IT; they have many other roles and activities that have to be taken into account when understanding use^[16,17]. In the present study, the entire work situation as the starting point has been taken and then attempt to understand the role of technology in learning how to do a job.

THEORIES ON LEARNING YOUR JOB

The division of knowledge into "knowing what" and "knowing how", into theory and practice, is widespread and has been with us for a long time. However, when this dualism is used to establish a "theory" of the knowledge needed to perform a job competently and teaching the theory decontextualised, apart from the actual practice, something is easily lost. Then, the result is unlikely to be an education or a training that results in competent work performers or professionals^[18]. Decontextualised teaching is a norm rather than exception in education and often typical of training situations too. Theory is discussed separated from actual application of it and applying theory is used as a way of learning the theory rather than as an aid in handling a particular situation.

But there is more to the dualism than this. Focusing too strongly on action and particular situations can have its drawbacks too. Schön^[19] talks of knowledge-in-action, reflection-in-action and reflection-on-action as central to what constitutes competence, emphasizing the importance of practice and a close connection between the actual performance of a task, the knowing how and the knowing what. However, an unquestioning adoption of the "reflection-in-action" perspective results in an over-emphasis on the action and a partly unwarranted

assumption that reflection that results in useful learning actually takes place. Learning could appear on many levels and given little time to reflect on action, it is likely that reflection *in* action becomes myopic. It could result in the kind of dysfunctional behaviour that Levitt and March^[20] refer to as the "competency trap". Competency traps develop when the actual competence in using one procedure (or software system) can produce a better result than the inexperienced use of another procedure (or software system). The impression derived from experience then serves to stop the people (or the organization) from adopting a better procedure (or one that, with practice, would result in a better performance). Using other terminology, a competency trap is a situation where second-order learning or double-loop learning^[21] does not take place.

The structure of meaning: Could second-order learning depend on how you view your work? Possibly; but first, let us start with views on the process of learning a job.

One way of viewing learning of a job is that of a container model. The learner is the container and "fills up" with new knowledge-going through stages or levels of competence. This view appears in, for example, Benner^[22] discussing nursing and Dreyfus and Dreyfus^[23] discussing airline pilots, chess players, automobile drivers and adult learners of a second language. Learning is an accumulative process of "filling up" the container. Levels the learner goes through are those of novice, advanced beginner, competent, proficient and expert. There is little in such a view to suggest radical changes in conceptions of the work. It would also correspond to how, for example, chess players develop an ever better memory for patterns and game sequencing and efficient chunking of this material that facilitates quick identification and recall^[24].

Some studies of expert versus novice problem solving have, however, demonstrated transitions in problem solving strategies: from backward to forward reasoning in physics and geometry (problem domains with a rich set of givens) and from depth-first problem expansion to breadth-first expansion in computer programming^[24]. Such transitions are inconsistent with a view of learning as the "filling up" of a container. Another view of learning a job maintains that the structure of meaning for a jobholder depends on her or his fundamental conceptions of the job. Going from one understanding or fundamental conception to another involves a restructuring of the knowledge of the job and affects what you do and how you do it. Such a restructuring is not compatible with the linear, step-wise development of the container model. According to dall'Alba and Sandberg^[18], Sandberg and Targama^[2] there

is little empirical evidence to support a step-wise development, but there is empirical support for radically different understandings.

Taking the role of the physician as an example, we can see two fundamentally different conceptions of the work: helping or saving someone who is sick or injured, versus enabling each patient to better deal with his or her (changed) life situation^[18]. Depending on the conception of the meaning of physicianship, individuals would ascribe different meaning and importance to the common factors of medical practice: purpose of the encounter between doctor and patient; nature of this encounter; nature of the relevant knowledge; and time period relevant to the encounter.

Based on Sandberg's studies of motor engineers, Sandberg and Targama^[2] present different understandings of the work held by engineers, corresponding to intersubjectively acknowledged different levels of competence. Thinking of testing the motor for technical performance on one parameter at a time; testing the motor for technical performance based on patterns of parameters and interrelations between parameters; and testing the motor for performance based on how the engineer imagined that a driver would experience it, constituted three different understandings. The three understandings resulted in three different ways of performing the task of motor testing and the people holding the less advanced types of understanding could not see or understand the more advanced understandings. These understandings were not the object of discussions or direct tradition between the engineers.

An implication of a "different understandings" view of the learning process is that effective competence development would need to incorporate the explicit and continuing discussion of the understandings or fundamental conceptions of the work.

Interesting questions to explore for a type of job are if there are intersubjectively consistent views on competence. If so, do they seem more related to a "filling up" view or "different understandings" view? If the latter, what are then the different fundamental conceptions and common factors in the job and what are the associations between understandings and competent performance? Are these understandings discussed in formal training or in contacts between colleagues?

Teaching or learning and re-enactment or modification?: Levitt and March^[20] talk of learning from the experience of others in terms of diffusion and employ a medical metaphor by talking of "spread of a disease" to a "population of victims". They distinguish between three types: broadcasting from an individual to many others

(such as rules promulgated by, for example, governmental agencies and trade and professional associations); contagion through contact between one member of the organization and another; and, thirdly, contagion by contact within a small group and then broadcasting from that group to the rest of the organization. Examples from the third type include communication of routines through formal and informal educational institutions. In terms of spread of innovation, this may be a useful model. However, as noted by Latour^[28], a diffusion model hinges on the perspective of the impetus from the sender as the important component in the transfer of knowledge from sender to receiver. In terms of learning, or adoption, it could be more reasonable to take the perspective of the learner. It is the person performing a task who decides on whether to actually try to assimilate ("translate" in Latour's terms) impulses, pictures, ideas and concepts available in the surrounding, or to work solely according to her own mind. Such a perspective would seem more and more appropriate in a society where more and more emphasis is placed on pull than on push and where we are moving from a basic concept of data, "that which is given", to *capta*, "that which is taken, captured or selected". We move towards a reliance on intranets ("It is posted on the net") and on private initiative ("you are in charge-look for what you need, ask for what you need"). The diffusion perspective is more that of teaching while the reverse perspective is more that of learning. The world of *capta*, private initiative and absence of push is also largely characteristic of the learning context in which the university secretaries in this study find themselves.

Whether taking a teaching or a learning perspective, there is an implicit expectation that knowledge translates into (modified) action. Giddens^[25] attempts to reconcile the traditions of determinism, (the view of actions as determined by the structure of the context) and voluntarism (the view of actions as determined by the choices made by the individual actor). In line with, for example, Berger and Luckman^[26] the apparent rules and structures in society (and organisations) are intersubjectively agreed social constructions. An apparently stable structure involves repeated (faithful) re-enactment. An individual can exercise the discretion available in agency and diverge from previous practice-or adhere to it. Given that such a deviation is tolerated, or even accepted and adopted by others, it can lead to a more permanent change in the intersubjectively reproduced structure. However, it is not obvious that the individual perceives the complete extent of discretion available to her. As Stewart^[27] noted in her investigation of middle managers, jobholders typically tend to underestimate the opportunity for choice available to

them and overestimate the strictness of restrictions placed on their freedom of action.

If learning does indeed lead to changed behaviour, is it necessarily beneficial? There are voices that answer "No" to this question. "Even within a single organization, there are severe limitations to organizational learning as an instrument of intelligence. Learning does not always lead to intelligent behavior. The same processes that yield experiential wisdom produce superstitious learning, competency traps and erroneous inferences. Problems in learning from experience stem partly from inadequacies of human cognitive habits, partly from features of organization, partly from characteristics of the structure of experience. There are strategies for ameliorating some of those problems, but ordinary organizational practices do not always generate behavior that conforms to such strategies."^[20] They state explicitly that they discuss organizational learning rather than individual learning. However, despite that statement, we deem that their discussion can very well be applied to individual learning in an organizational context. Does learning from experience result in efficient organizational practices?

Present study is looking at individuals coming to an existing organization and learning to fill positions that existed previously or to a large extent consist of tasks that have been performed also prior to the newcomer's arrival. Learning the job could then be learning to re-enact the existing structure faithfully, but considering that the jobholder, the agent, has changed, it could just as well involve more or less drastic changes to the (apparent) structure. The newcomer is no blank page; she or he brings her previous experience, preferences, values and personality. The change of jobholder could be an obvious point for changes in understandings of the job, (re)design of routines, etc.

Thus, the balance between reproduction and change of structure in the organization is another interesting question to pose to the empirical material. A part of this is the point raised by Latour^[28] who speculated that artefacts, such as computer software, further the re-enactment of previous behaviour in an organization and play important roles in fostering collective action. Do the computer-supported tasks show a greater tendency for reproduction than non-computer-supported ones?

The work conditions and information systems: If IT plays a role in organisations, what roles can it be expected to take (or be given)? Based on a retrospective case study of the use and development of ERP systems over a decade in a Swedish manufacturing company in the ABB group, Askenäs^[29], Askenäs and Westelius^[30] proposed five roles that an information system may be allowed to

take in an organization. The roles are Bureaucrat, Manipulator, Administrative assistant, Consultant and Dismissed. These roles are specific to the relation between the information system and an individual or a group of people. Different individuals in the organization may see the information system as having different roles. Therefore, these roles may coexist. They suggested that the way an information system is used is influenced by the perceived fit between the structure in the company and the information system functionality on the one hand and the user's perception of how the system is trying to influence the user's work on the other hand.

A bureaucrat is an official who adheres strictly to the rules and principles laid down for him, rather than making individual considerations. The structure the bureaucrat enforces is accepted by its users. A manipulator is someone who controls, directs, or influences others in a way that is not entirely of their choosing. A consultant is someone contracted to perform specific, nontrivial tasks and to advise. The consultant is neither responsible for, nor in command of, the work the organization performs. An administrative assistant is someone who takes care of less complicated tasks in an orderly way. The user takes a more active role and the computerized information system is put to limited use only. "Dismissed" signifies an information system that is not used at all by some or all intended users. The dismissed is someone who temporarily has been dismissed from work, but may be reinstated at some later point in time.

We will explore three questions concerning roles played by IT applications in connection to learning a job and understandings of a job: Do the computer-based administrative systems help reproduce the structure and transmit the structure of the former activities to the newcomers? Are the computer-based administrative systems in our study given any or all of these roles? Do the roles seem to correspond with understandings of the job?

MATERIALS AND METHODS

Studying the individual learning process and competence together with the influences of technology demands a method that allows deep understanding of the empirical subject. We chose to investigate our own working environment, due to good access and the possibilities it gives us to perform an in-depth study.

The workgroup of interest is the university's secretaries, engaged in administrative work that in part is supported by a computerized information system. To allow us an opportunity to understand the learning process at different stages, we chose to study secretaries

that had entered the organization at different times. The secretaries had worked at the university for between four months and eighteen years. We employed multiple sources of data in the study. Five secretaries were interviewed in the late spring of 2001. The interviews typically took two hours each. Four of the interviewees were the secretaries with whom we had some work contact, ranging from relative newcomers to those who had worked at the university for many years. In addition, we interviewed a relative newcomer with little previous work experience, who we had not worked with. For one of the newcomers, we also had access to her predecessor, still working in the organization, but now in a different position. All interviewees were female, age ranging from 23 to 50.

We conducted semi-structured interviews, covering topics such as ‘What constitutes knowing your job?’, ‘How was that knowledge developed?’ and ‘What is the role of different actors-including the IT used in the work in acquiring this knowledge?’, following up on interesting or surprising answers with further questions and requests for clarification and examples.

Both of us asked questions and took notes. We compared notes after each interview, both to see if our recollections matched and to find points that needed further clarification or would be interesting to spend extra attention on in future interviews.

Material was also collected by observing the secretaries, especially the ones working closest to us, in action, individually and in meetings. We also observed two of them using the computer system and discussed their use and exploration (or lack of exploration) of the computer system in connection with the tasks they were currently performing. One of them had worked at the university for a very long time. The other was a newcomer in the organization. In addition, one of us tested the computer system to get an understanding of the complexity of using it. We also returned to the interviewees to check ideas that came up during the analysis of the material we had collected.

Both of us were working in the same department as the secretaries and in more or less contact with them. One of us was mainly working from home and the other was in the office each day. This gave us the possibility to get a distance at the same time as getting the closeness to the subjects. Thus, before interviewing the secretaries, we had our own understandings of their work environment, their managers, colleagues and the organization. By interviewing them, we got a somewhat different view of what they actually were doing and their feelings about the work. All through the interview and analysis period, we took care to articulate our preconceptions, discussing our

own working experience of them with each other. In this way, we could use our combined experience to the full, while comparing notes and guarding against unwarranted preconceptions and unarticulated sentiments directing the analysis.

We analysed the material by comparing the theoretical and empirical findings from other studies with what we found in our empirical stories. The analysis was iterative, comparing theory, data and even testing our pre-findings by observing and asking new questions. Focus was on finding similarities and differences between the secretaries in our study and between our empirical material and previously published research.

University secretarial work: University secretaries in this study handle the administrative work in university courses or even complete programs, they interact with the teachers regarding planning and preparation of schedules, course information, keep track of and remind of, deadlines regarding schedules, course information, exams and reporting of course results. They register student results in the university register (a computerized information system) and serve the students with general information regarding the courses and specific information regarding student course results. A considerable part of the job regards error handling and reminding teachers and students to hand over required information.

Typical description of getting to know the job: The stories of learning your job that typically unfold when we discuss with the secretaries have certain traits in common, traits that-at least at the surface-hold no great surprises. At first, there is a feeling of being newly arrived, insecure and not really knowing anything. The early learning centres on understanding the university lingo, the organizational context, mastering each task that ends up on ones desk, taking introductory courses in “university knowledge” (not mentioned by everyone) and computer application courses (mentioned by all). As there are no written instructions or work manuals, a central part is finding out who knows what, who is responsible for what, who can answer what type of questions, who to refer certain types of tasks to, etc. This learning continues, but is prominent for at least a year.

Sometimes, the secretaries share experience on how to handle different activities by starting an e-mail discussion or asking something at the coffee breaks. However, this does not happen very often. Instead, all of them have the impression that their own work is very different from that of the others and that they have little to learn from each other. However, the answers we get regarding what they do are rather similar; some have more

responsibilities, others have less, but the idea of narrow and dissimilar jobs is not supported by the descriptions.

Apart from learning to master each task, another important type of learning is that of slowly developing an understanding of the range of tasks over a year and how they interrelate in the cycle of the academic year. This context learning or development of a holistic view is deemed important to get a sense of mastering the job, of being competent and somewhat in control and of being able to start anticipating and planning tasks. It also serves to help develop a mental model of the limits of the job-what is included and what could reasonably be tasks that I decline to perform? As there are no clear-cut work descriptions and the workload is experienced as high (and increasing), developing a sense of competence and a grounded view of what is actually part of the job gives the confidence to dare say "no, that is not something that I will do". One of the secretaries said: "If I don't learn to set the limits, no one else will do it for me. The tasks will just continue to arrive in an ever-increasing stream."

Reflecting over what constitutes competence in the job, they give answers such as: social competence; life wisdom; willingness to help and serve; an administrative mind and a sense for keeping order; acquiring a knowledge of who is who and who knows what; knowing the answers; understanding the sequence of tasks over the academic year; knowledge of computers and computer applications.

RESULTS AND DISCUSSION

Much of the research on learning a topic or a job and on features exhibited by people with varying degrees of competence, that we draw on, has focused on highly skilled "professionals" and on intellectually demanding tasks. Secretaries, although they definitely hold a profession and this profession requires its set of skills, are typically neither viewed as "professionals" nor are the tasks typically viewed as intellectually demanding. Are then theories developed with other jobs or skills in mind inapplicable to secretarial work? Although not specifically tailored to the area under investigation, we hold the theories we have discussed above to be valuable in providing a frame of reference, but we want the reader to take into account that the jobs we study are different from those studied by the other researchers.

Regarding the administrative computerized information system the secretaries use, it is worth noting that to some extent it is typical of administrative applications in most organisations. Systems for registering the transactions carried out-be they deliveries to and from the stockroom, purchases, sales and other

customer interaction, or registration of students currently taking courses and the results of students having finished courses-all carry a conceptual resemblance in terms of what they are used for and regarding the relation the user takes to the system. The individual user of such a system typically has little possibility to change the routines embodied in the software.

The structure of meaning: As noted in the theory section above, there are a number of interesting questions regarding competence and understandings to explore for a type of job. Are there intersubjectively consistent views on competence? If so, do they seem more related to a "filling up" view or "different understandings" view? If the latter, what are then the different fundamental conceptions and common factors in the job and what are the associations between understandings and competent performance? Are these understandings discussed in formal training or in contacts between colleagues?

When we ask for what the secretaries do and how they learn their work, they start describing tasks: designing schedules, registering course results, error handling when the computer system refuses to accept a course result or when a student calls to ask why a registration is missing for a course they believe they have completed (which for example could mean that it is time to start nagging the teacher about handing in results for registration).

When we ask them to talk about the competencies needed and what characterizes a competent secretary, many start with social competence, life wisdom-"There is a lot of contact with people in this job". But for some reason, learning about this side of the job is nothing they talk of. They do not mention courses and there is very little reference to asking colleagues for help or tips like "What am I supposed to do with a crying student?", "How do I handle the insolent student demanding rectification?", "How do you handle the impossible teacher who never produces proper reports and does not even hand in the sloppy lists on time?" All these are important parts of the job-but how do the jobholders learn them? Our lack of data in this respect could be a consequence of the questions we ask, or of perceptions the interviewees hold of us or our study, but it could also reflect how they actually think about their jobs. Learning the job involves asking others for information needed to complete a task or help in learning to master a routine, but social competence, life wisdom, attitude, etc, are parts of life and being a person, not specifically connected with the job.

However, there also seems to be a progressive shift of focus between views while learning to understand and master the job. Maybe social competence and the ability

to handle a multitude of contacts with people is at the centre of work, but it seems that it takes a while to realize this. At the start, they attempt to learn to handle each separate task given to them. After a while, they start to build their general understanding of the tasks in the context of the academic year and some start identifying processes that tie tasks together in a larger context involving their own and other people's work. A different way of conceptualizing work, that to some seems to come early while others take time to develop it-if indeed they do-is that work is about serving or aiding someone (such as a boss or mentor) or some type of "customer" (such as undergraduate students or external doctoral students). Table 1 is an attempt to identify three such understandings of the job and describe them in terms of how they differ in four dimensions of the work. The impulse for the task in the example is that someone poses a question. This analysis is inspired by the work of Sandberg^[1], Sandberg and Targama^[2] and dall'Alba and Sandberg^[18].

A conception of the work as consisting of handling isolated tasks is not viewed as particularly competent, but seems to be the understanding newcomers have (Table 1). It also seems to have been the typical role in an earlier period, when secretaries were mostly given tasks and direct instructions on a daily or even hourly basis. The "isolated task" view corresponds to a narrow focus on the literal task, such as providing the answer to the exact question posed (or even viewing the question as an interruption to be dealt with). The time period relevant to the task then becomes equal to the duration of the call or, if the answer was not immediately available and the secretary promised to find it out, until the answer has been given or forwarded.

An understanding of the work as the managing of processes is quite a different attitude resulting in other activities. A question is then not viewed in isolation, but

rather as a part of a process to be managed. In addition to trying to (help) find an answer, dealing with the question then involves trying to identify if this is a recurring type of question and in that case try to develop ways of preventing the question from arising in future, or efficient ways of providing the future question-holders with answers. It could also involve identifying connections between this question and later (or previous) stages in the process and dealing with such connections if they seem to involve further problems or opportunities. Knowledge needed to deal with the question under the process management view, includes knowledge of the process or candidate processes to which the question could be viewed as relating. The relevant time frame is no longer the time needed to answer the question, but rather the duration of dealing with the question and its implications for the process. Maybe this time span has an end, when the consequences the question gave rise to no longer need specific attention, but maybe the time span is unending-that of a going concern.

The third understanding, that of serving or aiding the counterpart, again brings a different way of dealing with the impulse "someone asks a question". Instead of simply providing an answer to the literal question, this view entails trying to identify and solve the problem implied by the question. Knowledge of the perspective and situation of the person asking the question may then be important-both to identify the problem and to help devise appropriate ways of solving it. The time period relevant to the task extends to when the problem has been solved or the person asking the question has been provided with sufficient aid to be able to deal with the problem on her own.

Are these views actually distinct and impossible to arrange along a "filling up" view of learning the job? We hold that they are conceptually different from each other and do not correspond to a succession of steps reaching

Table 1: Conceptions of work

Dimensions of the work	Conceptions of work		
	Handling isolated tasks	Managing processes	Serving or aiding the counterpart
The purpose with the task	Answer the question; deal with an interruption	Deal with the question as a part of a process	Solve the problem
Operations involved in the task	Find answer and respond, or refer student to someone else	Look for recurring questions and prevent them; look for connections between this question and later (or previous) stages in the process and deal with them	Identify the problem and help the counterpart solve it, or solve it for her
Type of knowledge relevant to the task	The answer to the question, or knowing who has the answer	The problem in relation to the process	Understanding the problem (as experienced by the counterpart and finding ways of solving it
Time period relevant to the task	The duration of the call, or until an answer has been provided	"Going concern" perspective - dealing with the question and the consequences it gives rise to until they no longer need specific attention	From the posing of the question until the problem is solved

from novice to expert. However, within each of them, more experience would probably make a more competent execution possible.

Do they correspond to levels of competence? The answer to that question would probably depend on the perspective of the person passing the judgement, but it seems that both we and the interviewees would agree that the “isolated task” understanding corresponds to a lower degree of competence than the other two. The view of which of the other two would be regarded as the more competent is probably a question of preference. There is no indication that secretaries would typically progress from the one to the other. What we do note, however, is that there were more indications of secretaries tending towards the “serving or aiding the counterpart” understanding of the job rather than towards the “managing processes” understanding.

Are the three understandings we identify discussed in formal training or in contacts between colleagues? As far as we can tell, the understandings as such are not explicitly discussed. Furthermore, only the first understanding corresponds to what is normally discussed and what the secretaries ask their colleagues about. As noted above, it neither appears that questions relating to the process management view nor to the “counterpart” view are discussed much. However, there are some indications that elements of the “counterpart” view are part of the culture. “In this department, service mindedness is part of the culture.” “Not that showing a positive attitude to others is discussed much or explicitly demanded of you, but you cannot be abrupt or brusque to, for example, students in general. It would become known [and reflect badly on you].”

The only part of the work that seems to be covered by a noticeable amount of formal training courses is the use of the administrative computerized system for registering student results on courses. This training is divided into small modules corresponding to specific tasks, but it appears that the teaching is rather decontextualised, describing how the software is built and should be handled rather than taking the handling of specific tasks as the starting point. Learning how to handle the specific task is then up to the individual’s willingness to experiment or ask colleagues. It thus appears that the courses do not specifically support or reinforce any of the three understandings.

Teaching or learning and re-enactment or modification?:

We now turn to the questions regarding re-enactment and modification: What is the balance between reproduction and change of structure in the organization? Do the computer-supported tasks show a greater tendency for

reproduction than non-computer-supported ones? Does learning from experience result in efficient organizational practices?

A striking feature of the secretaries’ description of learning their jobs is the absence of manuals, process documentation and actually all other forms of written descriptions of routines. When a newcomer arrives, she is typically introduced to the job for two weeks by the predecessor, who to a greater or lesser degree is available to give oral accounts from memory of what the job involves and how tasks are handled. While learning, they write checklists to some extent, but then throw them away when they think the lists have served their purpose. Despite the lack of written routines to promote re-enactment, they all seem to view reproduction of the predecessor’s actions as a main source of competence. This apparent stability of routines applies across the board-computer-supported tasks as well as completely manual ones. In this setting, computer-supported tasks thus do not show a greater tendency for reproduction than non computer-supported ones. Acting based on “how things are done here” rather than based on your own judgement is the norm and those who really know “how things are done here” are regarded as competent by the others. Process innovation is rather absent, even though they all say there is so much to do and most of them can see inefficiencies in the way they perform their work (and in the processes they are involved in).

Given this culture, it is perhaps not surprising that there seems to be rather little process innovation or process management focus among the secretaries. Most of the process attention or process awareness that we have encountered has been directed at understanding things like who is involved in a process, what the steps and the deadlines seem to be and thus be able to determine when it is time to remind people to provide information needed, like course results or exam questions and to forecast your own workload. The tasks and routines do not seem to be organized as comprehensive processes in the minds of the secretaries. Rather, they seem to be strings of relatively small chunks and it is the execution of a task that drives recall of the steps—a rather strong “knowledge-in-action” orientation. “How do you cope with describing a routine to a newcomer?” “Well, I may be able to recall about half of it, but half of it I am not aware of until I do it—Oh, yes, this too and here you do this, fill this in. It is probably not because it could not be described or written down; it is just that it is difficult to reconstruct from memory without actually doing it [performing the task].”

In sum, most of the learning takes place as an integrated part of working. The continued use of

numerous time-consuming routines that show considerable room for improvement shows that this learning in action does not result in efficient work practices. Given the low degree of process focus, this is not surprising. With re-enactment as the dominant concept of competence, competency traps can be expected to appear and they do. You learn from your predecessor and from experimenting and asking others until you can manage each task. Although, or perhaps because, the workload is experienced as high and increasing, tasks are then performed in established ways, rather than investing time in finding more efficient ways of performing the tasks.

The work and the information system : The questions we posed concerning roles of technology in work are the following: Do the computer-based administrative systems help reproduce the structure and transmit the structure of the former activities to the newcomers? An information system can be given the role of an administrative assistant, a manipulator, a bureaucrat, a consultant, or be dismissed from service. Are the computer-based administrative systems in our study given any or all of these roles? Do the roles seem to correspond with understandings of the job?

Above, we noted that computer-supported tasks showed a great tendency towards reproduction, rather than modification, but so did non computer-supported tasks. But are there any signs that the computer support helps in transmitting the structure of previously performed activities to newcomers? From an information system perspective, LADOK, the computer-based administrative application for recording students' course results, is a rather minor part. A large part of the information system is manual. The teachers fill in paper lists. Some of the checks of correctness and completeness are performed manually and the checks implemented in the computer application prevent results from being entered unless all requirements are met. This leads to a completely manual error handling and backlog system that each secretary has to devise herself. Typically, it consists of a combination of post-it notes stuck to the screen or a piece of paper, loose sheets of paper and some binders to collect the loose ends that do not seem to be solved in the immediate future. Some use e-mail as a part of the record-keeping too, while others print the relevant mails and let them join the rest of the paper-based system.

The LADOK module for doctoral students has little directing or restricting logic built into it and does not serve to conserve practices across jobholders. The undergraduate and graduate modules, however, contain a large number of checks. These checks serve to notify

the user when a requirement, such as registration for a course or having passed a prerequisite course or total credit level, is not fulfilled. The advanced user can sometimes use LADOK to find out *what* is missing or wrong, but it seems that to most users, the refusal of LADOK to accept an entry is a signal that starts a detective work. An "isolated task" understanding of the work would, however, simply lead to a note on the paper manuscript that the result could not be entered and the matter would rest until someone-the student in question or someone else-inquires about the missing result.

Whether you learn rules from LADOK or not seems to depend on when you learned your job. There are those who have seen the entire development of the computer application and learned the rules before LADOK existed. However, the computer application keeps order and "discipline". Even the very experienced secretaries rely on LADOK for such things as checking that the student has registered for the course in LADOK (and not just with the teacher). In this sense, LADOK acts as a bureaucrat (Fig. 1). It helps to uphold the existing overarching structure and sees to it that the administrative routines that have been decided on are followed and that exceptions to the rules are thwarted. In most cases, the bureaucrat role is appreciated and accepted and the secretaries seldom view LADOK as taking a manipulator role. However, for someone with an exceptional "servicing or aiding the student" focus, refusals on LADOK's part are just a signal to find ways of getting around the programmed restrictions if there seems to be a good reason for an exception to be made. In these cases, the secretary views LADOK as trying to take an unwarranted manipulator role and relegates it to an administrative assistant's role (Fig. 1 and Table 2).

One role that the secretaries do not give LADOK is that of the consultant. Perhaps this is because LADOK is neither very flexible nor rich in functionality. It is not built to play a consultant role, except regarding reports and

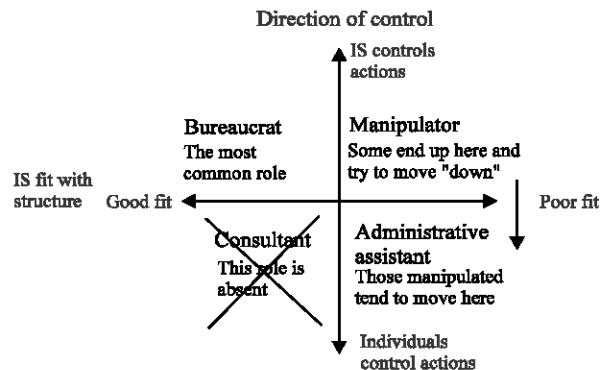


Fig. 1: Existing roles

Table 2: Conceptions of work with information technology

Dimensions of the work	Conceptions of work		
	Handling isolated task	Managing processes	Serving or aiding the counterpart
The present role of LADOK	LADOK acts as a bureaucrat and helps to uphold existing structures	LADOK acts as an administrative assistant, supporting the correct execution of certain tasks, but not aiding in keeping track of processes	LADOK sometimes plays bureaucrat, sometimes acts like a manipulator, but is then relegated to an administrative assistant role
Suitable roles for a computer-based administrative application	Bureaucrat that helps the newcomer perform the work or a manipulator that enforces correct routines	Bureaucrat that helps managing the processes or a consultant that allows changing the processes	Consultant that is flexible in helping finding answers, or the administrative assistant when it is not possible to solve problems within the system

queries. However, to most secretaries the report generator seems complicated and compiling reports manually becomes the preferred mode, thus relegating LADOK to an administrative assistant role, supplying standard reports from which more sophisticated reports are compiled manually. Another possible consultant role is that LADOK could support another division of tasks: for example letting teachers enter results directly. However, this is not applied by any secretary.

The fifth role, that of the dismissed, is not given to LADOK when it comes to registering course results-many rules and the incentive provided by internal transfer pricing built on LADOK-derived production figures prevent that. But when it comes to retrieving and analysing data, LADOK has greater functionality than what is used. In that respect, LADOK is dismissed. As noted above, many secretaries use standard lists, pen and paper to perform analyses, rather than trying to find out what LADOK has to offer them. This could be viewed as a result of inadequate training concerning the functionality of the computer system, but it could also be viewed as a (dysfunctional) result of the reliance on learning from the predecessors.

The Bureaucrat is an obvious role in a work setting where faithful re-enactment is viewed as a sign of competence. It would be a perfect match for a process view, given that the system (LADOK) could be altered to fit more efficient process enactments.

The Consultant could be a role suiting the “serving or aiding the counterpart” conception of work (Table 2). Flexibility and providing alternatives would be appreciated features when you take a client-focused view of your work. It could also be a useful role for an “individual task”-oriented secretary, but giving a computer based information system a consultant role typically requires high competence on the part of the user-both in terms of knowledge of the task and of the tool, the computer application. Since the individual task-focus in this study is typically associated with novices and higher competence is rather associated with the process view or the aiding view, the combination of LADOK as Consultant and the “individual task” view

seems unlikely. For those taking a process view, the Consultant does not appear altogether desirable. It would only be a second best to a good Bureaucrat, that would provide efficient execution of the well-designed process. However, in the absence of a well-designed process, or when attempting to continuously improve the process, a Consultant would be preferable to an inflexible Bureaucrat that is turning into a Manipulator.

The Manipulator appears as a role both where the “aiding” view is frustrated and where the “process” view is frustrated. All the manual parts of the secretaries’ present information system (papers in binders, yellow post-its, saved mail, etc.) conform badly to a process view and are in some ways a sign of the Manipulator in action. LADOK forces you to perform certain tasks, but does not solve your problems. They have to be solved by manual routines instead. The unsupported routines are in themselves signs of an administrative assistant: incapable of handling much of the work, it only takes care of input to and output from your work, but does not support your work properly. Possibly, the manipulator role could be used for newcomers who hold incorrect views of how to work, forcing them to handle tasks correctly. However, in such cases it would be better to discuss the views with colleagues or superiors to either come to understand how the work should be performed, or to convince the others that the newcomer’s views are appropriate and then change the system.

The Administrative assistant is also the role given to the system by frustrated “aiders” who attempt to solve their clients’ problems. When LADOK appears as part of the problem, work-arounds or manual routines are devised to solve the client problems. The flexibility given by a system relegated to an administrative assistant role can be appreciated by the client-focused “aider”. Possibly, the Administrative assistant is also an escape route for the process oriented, but is not a preferred solution. An efficiently working bureaucrat would serve the process view better.

The Dismissed, finally, is not a role that any secretary gives LADOK entirely. They all rely on it at least as an Administrative assistant. However, they may dismiss

LADOK for certain analytical tasks-either because they are unaware of the functionality, do not know how to perform the operations, or find LADOK inefficient compared with work arounds.

CONCLUSION AND IMPLICATIONS

This study applies theories on learning and competence to the area of administrative work. These theories are often developed regarding and applied to, the work of highly skilled professionals. However, the analysis shows that they are useful for analysing administrative work, too.

The conception of work and views on what constitutes competence were not uniform across secretaries and seem incompatible with a simple “filling up” view of development of competence. Rather, we detected three different understandings: handling isolated tasks; managing processes; and serving or aiding the counterpart. This is in line with a “different understandings” view of competence. The first of these three is typically a novice step and it is not unusual to spend a year with this understanding of the work, before developing one of the other two types. However, those two are alternative views, rather than being viewed as consecutive steps towards evermore-competent performance. Interestingly, this contrasts with previous research on a “different understandings” view of competence, that has found different understandings of work that align along an intersubjectively consistent rating of competent performance. This calls for further research in other settings.

The three different understandings of work, that we found, are not articulated among the secretaries and are not discussed in formal training or in contacts between colleagues. This is in line with previous research and points to a road for improving formal and informal training. Articulating the different understandings of work and making them the subject of formal training and informal discussions between colleagues is likely to facilitate the transition from a novice understanding to one underlying a higher level of competence. Furthermore, the formal training only matches the first understanding of work: handling isolated tasks and only to a limited extent. Formal training plays a small role in the overall learning. Learning from experience-own and others'-accounts for most of the learning that takes place. Formal training for the more competent, who have a different understanding of work, should be based on their understandings: the “managing processes” view and the “aiding the counterpart” view.

It is interesting to note that while all the secretaries talk of mastering tasks and routines and possessing social

skills and life wisdom as two important components in the competence needed at work, they only seem to view the first of these as something you can learn at work. Learning the job involves asking others for information needed to complete a task or help in learning to master a routine, but social competence, life wisdom, attitude, etc, are parts of life and being a person, not specifically connected with the job.

Concerning the computer-supported tasks, the main administrative system, LADOK, plays the role of a bureaucrat to a large extent. This role is in keeping with the emphasis on faithful re-enactment of how tasks are performed. At present, this role is perhaps best suited to the “isolated task”-view of work. The process-minded and those with an “aiding” understanding of work sometimes encounter a mismatch between what they want to accomplish and how they find that LADOK requires them to work. Then, LADOK appears as a manipulator. Those with a strong “aiding” view sometimes counter by relegating LADOK to an administrative assistant's role. Developing the administrative system software based on recognition of the different understandings of work is likely to give a better match between the work and the roles that the computer support plays in the work.

Learning the job from experience does not seem to lead to efficient organizational practices. Although all interviewees perceive the workload as high and increasing and would thus benefit from improved ways of working, they all attest to the continued existence of inefficient routines. This lack of process improvement corresponds to that faithful re-enactment is viewed as the hallmark of competent behaviour. It also matches that the “managing processes” understanding of work seems to be rather rare. It appears that the faithful re-enactment view is a prevailing culture that newcomers acquire in the organization, even if they had a different view before entering. Faithful re-enactment as the dominant quality norm applies across all tasks-computer-supported as well as non computer-supported. Our expectation, that computer-supported tasks would show greater stability in how they were performed than non computer-supported ones, thus did not hold up in this case.

Our research shows that a “different understandings” conception of learning and competence applies in an administrative position, such as secretarial work, in addition to the professional settings where it has previously been demonstrated. As in previous such research, we found that the different understandings were not articulated and the subject of discussion in either formal or informal training. The different understandings of work are also important for putting information systems use in context. We found inconsistencies between the roles played by the present

administrative software and roles that would be beneficial according to each understanding. This indicates that the different understandings of work that are associated with different levels of competence should be explored and considered in development of training schemes for both new and more experienced employees in general. The different understandings should also be taken into account when developing information systems and when designing training programs for these information systems. This calls for action in the practical arena, accompanied by further research to evaluate and develop the methods for taking different understandings of work into account in information systems development and competence development.

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