

AIS Transactions on Human-Computer Interaction

Volume 4 | Issue 2

Article 4

Summer 6-26-2012

Personas in Uniform: Police Officers as Users of Information Technology

Erik Borglund

Mid Sweden University College, erik.borglund@miun.se

Urban Nulden

Gothenburg University, urban.nulden@gu.se

Follow this and additional works at: <https://aisel.aisnet.org/thci>

Recommended Citation

Borglund, E., & Nulden, U. (2012). Personas in Uniform: Police Officers as Users of Information Technology. *AIS Transactions on Human-Computer Interaction*, 4(2), 92-106. Retrieved from <https://aisel.aisnet.org/thci/vol4/iss2/4>

DOI:

This material is brought to you by the AIS Journals at AIS Electronic Library (AISeL). It has been accepted for inclusion in AIS Transactions on Human-Computer Interaction by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.



Transactions on Human-Computer Interaction

THCI

Original Research

Personas in Uniform: Police Officers as Users of Information Technology

Erik Borglund
Mid Sweden University
erik.borglund@miun.se

Urban Nulden
Gothenburg University
urban.nulden@gu.se

Abstract

This paper discusses information technology in the contemporary policing context and presents a research approach that aims to capture and describe a multifaceted account of police work. There is a need to further analyze the constitution of the uniformed user and the use environment in this domain. Data from extensive ethnographic fieldwork are analyzed. Personas and scenarios are used in this paper to illustrate the properties and conditions of police work. Evidence from the study suggests that personas and scenarios can make the daily work visible and support the emergent design of information systems in the dialogue between designers and users. The paper concludes that personas and their scenarios provide a richer description of the specifics of a context and a design space. A scenario is used to show characteristic properties and the emergence of work practice in relation to the design of information systems.

Keywords: Persona, scenario, design of information technology, emergent use of IT

Horst Treiblmaier was the accepting Senior Editor. This article was submitted on 10/31/2010 and accepted on 9/5/2011. It was with the author 151 days for 2 revisions.

Borglund, E. and U. Nulden (2012) "Personas in Uniform: Police Officers as Users of Information Technology," *AIS Transactions on Human-Computer Interaction* (4) 2, pp. 92-106.

INTRODUCTION

Over the last two decades, information technologies such as the Internet, tablets, and smart phones, have changed and continue to change everyday life in drastic and salient ways. In the law enforcement domain, information technology (IT) has been applied for more than 50 years; today, IT is probably the most important technology for the police. However, police work is a new context for empirical IT research. In the 1950s it became increasingly clear that computers would enable the storage and retrieval of large amounts of data contained in criminal records and files (Benson, 1993). A decade later in 1964, real time inquiry systems for patrolmen in the field were in operation in some police departments. Political support came in 1967 when the U.S. President's Commission on Law Enforcement officially stated that computer technology might be an important tool for police work. Since these early milestones, computers have shown a potential to aid law enforcement by enabling rapid communication of accurate and complete information and thus supporting the decision-making process (Colton, 1979).

This paper discusses IT in the contemporary policing context and presents a design approach that aims to capture and present a multifaceted description of police lived-work. This is done through the notion of personas and the use of scenarios to illustrate the properties and conditions of police work. There is a need to further analyze the constitution of the uniformed user and the use environment in this domain. The police force is a relatively closed organization, and access to the work practice is limited. There is also a risk that the understanding of the police context is based on assumptions partially derived from police appearances in the media. For example, the focus of the media is more likely to be on extraordinary events than on more mundane police work. The uniform hides the diversity of individual characteristics, and the same uniform manifests the professional role (Rafaelli and Pratt, 1993). The study in this paper demonstrates that personas and scenarios can make the daily work practice visible and support the emergent design of systems and applications, as well as serve as boundary objects (Wenger, 1998) in the dialogue between designers and representatives of the police practice.

The following questions guided this research: 1) Can personas and scenarios be applied to illustrate the richness of the daily work practice of police officers, and 2) Can personas and scenarios support the design of systems, applications, and services in this domain?

The paper is organized into the following sections. First, related research on policing and information technology is reviewed, followed by a section on the motivation for this research. Then, the concept of a persona is described and the research approach is explained, and additionally the notion of temporal structures is defined. The four police personas derived in the research are then presented, followed by four scenarios in which the personas are acting. The personas are then verified in two workshops with police officers. The paper ends with a discussion and conclusion.

RELATED RESEARCH

The police force has been undergoing a significant period of change and innovation over the last five decades, and many of the innovations are based on IT. One of the most important and strategic innovations in policing is claimed to be the implementation of Compstat (Silverman, 2006). Compstat is a goal-oriented strategic management model that uses information systems, operational strategy and managerial accountability to structure the delivery of police services and to provide safety to communities (Walsh, 2001). The model seeks to focus on specific problems and empower police agencies to identify and solve problems (Weisburd et al., 2006). Two central features of Compstat include its ability to identify patterns of crimes, and its applications based on geographic information systems (GIS) to visualize and analyze these crimes (see, for example, Goldsmith et al., 2000). However, the Compstat model has received criticism for reinforcing the old management style, which emphasized central control over individual initiative (Moore, 2005). The model is claimed to lead to bureaucratic dysfunction, and by strengthening the bureaucratic hierarchical model of policing, Compstat impedes the ability of police organizations to develop innovative problem-solving approaches (Weisburd et al., 2006).

Research on the police force and its use of IT has largely concerned the measurement of organizational performance and enhancement of management control (Benson, 1993), for instance through the use of a balanced scorecard (Carmona and Grönlund, 2003). The use of a car mounted computer, MDT (Mobile Data Terminal), and an incident reporting system to capture and report information near the source has been studied to determine how to improve the quality of the information and efficiency of reporting (Williams and Aasheim, 2005). However, measuring organizational efficiency has been claimed to be ambiguous in a non-profit organization such as the police force. Most police agencies do not have an explicit mission statement or a clear goal, merely a list of functions to be performed, such as protection of the community from crime and violence (Golden, 2000). For example, one of the Swedish police force's core values is to be efficient.

While some have claimed that police culture has not changed in spite of the increased use of IT (Manning, 2003), there are signs that technology has shaped practice (Chen, 2001). In particular, MDTs have enabled data traffic as a complement to voice-over-radio to support new types of tasks. This has changed the overall practice of police officers, and altered authority relationships, most notably between supervisors and their street officers and radio dispatchers (Meehan, 1998).

Police management literature stresses that police supervisors must be able to articulate the needs of the beat officers, who may be frustrated by the peculiarities of an IT application, to the technical staff. The challenge is to make information resources and the computerized tools available to the officers in the field so they can work as effectively as if they were at the police station (Chu, 2001). As a means for contending with this challenge, requirements engineering has been used to identify problems that individual officers experience. Once established, these problems are to be solved through the design of applications for the officers. In a study to identify such problems, ten respondents were asked to recall critical incidents experienced over the past six months. However, translating the requirements into design specifications is difficult (Baber et. al, 2001). One probable reason for this difficulty is that the recall of incidents gives a fragmented image of 'what goes on' in police work. For example, retrospective descriptions often convey isolated 'tasks' rather than the actual 'practice' of police officers, and thus only offer a limited understanding of police practice itself.

The importance of analyzing the uses and users of IT is a recurrent topic in the literature. One instance comprises exploring the distinction between users of information systems for major crime and users of information systems for volume crime (Adderley and Musgrove, 2001). Other studies have investigated the users of field mobile computing systems and how these artifacts match up with the task at hand (Ioimo and Aronson, 2004), the involvement of users in the acquisition of computer aided dispatch systems (Nesbary, 2001), and the potential users of a data warehouse in the Chicago Police Department (Skogan and Hartnett, 2005). It is clear that there is significant variety in the requirements of the different uses and users of IT in the policing context, and there is a need for new methodological approaches to support the design process.

Motivation for this Research

The police force is becoming a computer-rich environment, and should be understood as an evolving computing ecology where new systems and technologies are introduced and adopted. This paper presents the argument that a wider variety of police officers' work situations, both as individuals and as members of an uniformed practice, should be analyzed and problematized further to increase the quality of the design of information systems.

There are two aspects of the police that are important for this argument: the closed nature of the police force and its recurring presence in the media. First, the police force has been and still remains a closed organization and community, and police officers have a pending and even skeptical attitude toward outsiders, especially when their organization and practices are brought under scrutiny. This skepticism can cause a problem of access for researchers with agendas that might pose a threat to the police. As a consequence, much of outsider knowledge of police practice is based on assumptions about the work practice and the overall organization.

Second, representations of the 'police' are constantly in the media. Outsiders with an interest in police practice are influenced by the dramatic images of the police portrayed in the media, and it is highly unlikely that a researcher, or designer of IT for that matter, can ignore the massive stream of police related matters from television and other media channels.

A claim made in this paper is that the media in general gives a distorted impression of police work. During the fieldwork, one of the researchers participated in a sales meeting at the National Police Board (NPB), which is the central administrative and supervisory authority of the Swedish police service. At the meeting, representatives from an information systems vendor presented a new version of their system to a group of officers working with the procurement of information systems. The sales representatives described the excellence of the new version and explained the new functionality by using examples from American police movies and TV-series. After the meeting, the officers explained that this was common during this type of meetings.

Contrary to what is represented by the media, police work on the beat is largely mundane work, and most of the work done by police officers will never make the news. Most cops see little actual action or violence, but they work in a world that has the potential to become violent very quickly (Perlmutter, 2000). "Police work consists of hour upon hour of boredom, interrupted by moments of sheer terror" (Felson, 1998, p. 5). Yet outsiders are not the only ones influenced by the media's portrayal of the police; police officers watch TV too. The police and media are in a circular and mutually reinforcing relationship. As such, officers are influenced by images of the police communicated through the media, and as a result, their own experience of a dull and mundane job is constantly put in sharp contrast with the "cops on the box" (Mawby, 2003) image portrayed in media (see for instance Doyle, 2004; Perlmutter, 2000; Manning, 2003, or McCahill, 2003 for a more lengthy discussion on police and the media).

The research presented in this paper is based on professional police experience, participative observations and interviews. A large amount of qualitative data was collected and three concepts have been used to frame the research: social actors, temporal structures and personas.

The common conception of a 'user' is claimed to be a restricted individual with cognitive limits but well specified and well articulated preferences when it comes to choosing and using information technology. Yet most 'users' see themselves as having very little to do with computers; rather they see themselves as professionals working with others and using computers and other IT to support their interactions, i.e. they are social actors (Lamb and Kling, 2003). For the purposes of this paper, the notion of the social actor serves to aid the understanding of police officers' contingent work conditions and their use of information technology in practice.

Efficient information management is crucial in organizations where time has a central role. Time, temporality and temporal structures have received extensive interest from the information systems research community (see, for example, Ancona et al., 2001; Orlikowski and Yates, 2002; Reddy and Dourish, 2002). Distinct information technologies have different impacts on temporality in work (Shen et al., 2005). There are many possible temporal structures in police work. Two temporal structures have been conceptualized in this research: first, the overall institutional mission; and second, the scheduling of officers' work shifts. These structures will be described in greater detail in a later section.

To visualize and analyze social actors in the temporal police structure, personas are used as an intermediating technique. Personas are hypothetical archetypes of actual people who can represent the users in the development process. The characters designed here are fictional, but their behavior is based on real data acquired in this research. This paper claims that personas can be applied to illustrate the nature of work and the diversity that exists in this uniformed and sometimes diverse context.

Personas

Personas serve as a tool in the process of investigating 'work-practice' as lived-work (Button and Harper, 1996) and as a technique for 'making work visible' (Suchman, 1995) for the purpose of the design of information technology and information systems. They are "hypothetical archetypes of actual users" (Cooper, 2004, p. 124), an interaction design technique applicable for design purposes. Personas are fictional; they represent nonexistent persons but still represent intended users of the design object, and they have characteristics derived from real data. According to Cooper (2004), designing is more successful when a small group rather than a large one is targeted, and personas enable this focused targeting. It is claimed to be better for designers to design for a single persona than to try to design vaguely for a large, unspecified group, or in the worst case, design for themselves (Grudin and Pruitt, 2002). Instead of interviewing or observing real persons selected from a large population, the large population is represented by a number of personas with certain characteristics. It is essential that the personas represent potential users of the technology being designed. Personas are claimed to force designers to consider the social and political aspects of design that otherwise often go unexamined (Grudin and Pruitt, 2002).

Each persona should be given a name, an identity, and a life story. Scenarios can be used to describe situations and events the persona is part of in a typical work environment. Grudin and Pruitt (2002) argue that scenarios are more effective when they are built on personas, and emphasize that the personas should be formed before the scenario. Pruitt and Grudin (2003) based their design of personas on existing knowledge and research results of potential users, and they limited the number of personas to three to six to make the design process manageable. When designing a persona, anecdotes from previous research can be useful to give life to this fictive person (Pruitt and Grudin, 2003).

RESEARCH APPROACH

One of the authors has worked as a police officer for 16 years. In the last five years, he conducted full time research and did only limited police work. During this period, police practice was observed both from a researcher's perspective and carried out in the spirit of a 'reflective practitioner' (Schön, 1983). Research notes were taken in parallel to police notes during the shifts, and reflective informal minutes were compiled after the shifts. The other author conducted participatory observation over a period of six years. The time spent in the field is equivalent to 26 weeks of full-time firsthand observations using an ethnographic approach (Agar, 1996; Ferrell and Hamm, 1998; Hammersly and Atkinson, 1995; Orr, 1996).

The researchers were either following a specific person, role or function, e.g., an officer, a sergeant, a senior officer or a dispatcher; or observing a place, e.g., the patrol car, the dispatch center, a local police station or a situation in the society where the police were present, e.g., traffic accident or crime scene. Notes were taken during observations when possible, though in several instances notes had to be written down after the shift because difficulties arose,

such as a sensitive or chaotic situation, rain and darkness during a night shift, or suspicious glances from officers towards the taking of notes. Digital photos were also taken on some occasions but no audio recordings were carried out.

Sequential sketchy diaries of each shift were produced. These included information about when and where the shift was taking place, data about the officers working the shift as well as the various events that took place during the shift. Statements made by the people involved, e.g. officers, suspects, plaintiffs and witnesses, as well as people from the public, were an important source of data. These were captured as quotes. Conversations among officers were also an important part of the data collection. Breakdowns in the routines and the conversation that took place in relation to those breakdowns were crucial for the data collection. Officers' explanations to each other and to the researchers required them to articulate their perception of the situation. These were captured as quotes.

After entering the field, the focus was on observing work practice and the various dialogues taking place amongst the people involved. Initially the researchers took passive roles and asked relatively few direct questions; acting instead as mostly silent observers. The researchers perceived some statements made by the officers during the observation to be central to the work. These were captured as quotes to become circumstantial evidence and the basis for the formation of patterns for a tentative definition of thematic problem areas. A problem area is defined as a thematic boundary for an area with specific properties that are to be further investigated. The quotes that were found to be central were then reformulated into questions and served as entry points for informal conversational interviews with officers during following shifts. When there were similarities with previous situations and statements that were recurring, researchers asked these interview questions. As the research cycle indicates, this is a continuous process that can accommodate long-term fieldwork.

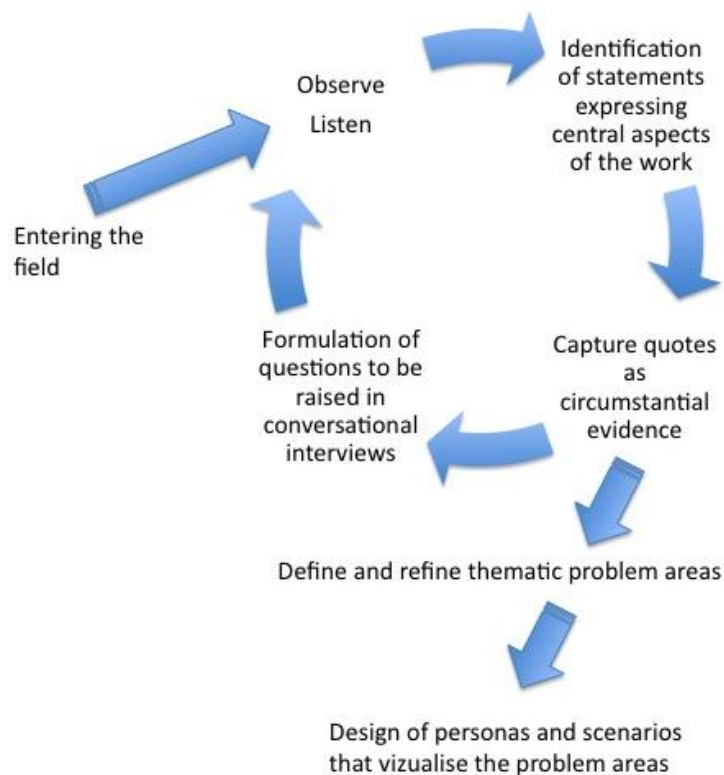


Figure 1: Research Approach

Some of the tentative thematic problem areas were selected to be gradually and subsequently refined. The thematic problem areas, then, formed the basis for the design and development of the personas and the scenarios. Below are four problem areas that were derived from the quotes captured during fieldwork: Work rhythm of the police, cooperation with other agencies, change of generations and resource management.

Work rhythm

"I'm stuck here [sigh] ... waiting for a confiscation number, and a decision by the sergeant" - *officer who has confiscated a knife and needs to do the paperwork before she can get back out on patrol.*

"Guess we have to leave this guy for now" - *detective at a long-planned stakeout when a dispatcher requests him to immediately back up colleagues following a stolen vehicle heading in his direction.*

"Let him go and get in the car. We have to leave for some other thing" - *officer to her colleague when they have to let go of a drunk person they considered for arrest.*

Much of police work is characterized by interruptions. Planned and ongoing activity can be discontinued at any time. Current routines and access to computer-based systems create a somewhat fragmented work situation for the officers.

Cooperation

"We provide them with information, but never get anything back" - *officer after handing over a juvenile that has been in custody with the social authorities.*

"We provide them with heaps of information, but there's never any feedback coming back to us." - *similar comment after a traffic accident where an officer fills in a form to be sent to the traffic authorities.*

"How the hell can they do this now" – *officer upon receiving a fax late Friday afternoon requesting the transportation of a mental patient to an institution in another city—a two hour drive.*

Cooperation with, and relationships to, other agencies and organizations are crucial to police work and the police organization. Dealing with many issues in society requires coordination and close cooperation. These quotes highlight the problem area of information flow between agencies. Institutional flows of information are highly regulated.

Generations

"The new officers can spend hours on reporting trivial things. Reports that I discard when I get them through the system" - *sergeant who tries to educate new officers on how to prioritize time expenditures.*

"It doesn't work to ride with colleagues that are 30 years younger. The distance professionally as well as socially is too big. It is difficult to get younger colleagues to understand. You need to watch your tongue. The younger ones rat us out every now and then" - *detective when talking about working with younger colleagues.*

"It is crucial that at least one of the officers are experienced. We can't put two inexperienced officers in one patrol" - *senior officer some years ago.* (This has, however, changed dramatically over the last years as less experienced officers work together more and more.)

There is a clear generational discourse in the police organization. The norms and routines reflect changes in the surrounding society. The curriculum of the police academy is continuously revised, and there is currently a debate on expanding the academic orientation of the police training.

Resources management

A man from a housing complex has called the police about a neighbor who is disturbing the tenants in the complex. This person is well known to the local police. The sergeant has his cell phone number and gives him a call. "We don't want to drive all the way out there. Go home!" [He hangs up the phone.] "Let's hope this works. If we send the patrol there, it'll take them an hour to get there and back. They can certainly do more important things here."

"The patrol is never where you need it" – *dispatcher who needs a patrol in a certain area of the district for a job. All cars are equipped with a positioning system and visible on a large projected screen in the dispatch center.*

"I made a note about this last week, sorry" - *officer at the morning shift role call, picking up his notebook and realizing that noted information would have saved substantial work for his colleagues.*

Distributed analogue information is frequent and an embedded part of the operative police work. Much of the information gathered is not stored in a digital format. This is due to both restrictive data storage regulation and practical reasons. Police are often faced with scarce resources. Those identified in this research include information, competence and physical resources. There is capacity to deal with the daily demand, but in extraordinary situations, it becomes clear that there are limitations.

TEMPORAL STRUCTURES

The notion of temporal structures can be applied to the study and understanding of how time is spent and managed in organizations. People in organizations produce and reproduce a variety of temporal structures that in turn set a temporal rhythm and shape practice (see, for example Ancona et al., 2001; Orlikowski and Yates, 2002; Reddy et al., 2002; Fisher and Dourish, 2004). In this study, police practice and organization were examined. Two temporal structures were eminent. The first temporal structure refers to the overall mission of the police institution and is of ontological (the role of the police in the society) and epistemological nature and concerns the reactive and the proactive perspectives on policing.

We define ontology as a set of concepts within a domain and the relationships between those concepts. In this context, fundamental concepts are the police institution, other governmental institutions and the surrounding society in general, and how these entities are interrelated. There are essential epistemological differences in the production of knowledge and how knowledge is acquired in reactive policing and proactive policing respectively.

Reactive policing, sometimes referred to as 911 policing, is when the police react in a social domain after an event has occurred. The overall logic is to allocate the appropriate resources to take often rapid actions to limit the damage and restore the situation, and when necessary, take suspects into custody so that they can be further processed in the legal system. By contrast, proactive policing, often referred to as community policing, is when the police in collaboration with others strive to prevent incidents from occurring in the social domain by acting before potential incidents occur. The core of the proactive perspective is the dissemination of information among the police and other institutions in the society to collaboratively promote a proactive and preventative approach to reduce crime and disorder. Organization of policing is often characterized as being either reactive or proactive. However, the two approaches clearly co-exist in the larger policing context.

Reactive, incident-driven policing and Proactive, problem-oriented policing have both been on the police agenda for decades. The problem-oriented policing model, and especially variations of community policing, has received substantial interest from researchers. A large number of studies have been conducted to investigate the outcome and effects of community policing (see, for example, Frank et. al, 1997; Oliver and Bartgis, 1998; Ponsares, 2001; Seagrave, 1996). These studies generally conclude that community policing has potential, but point out that there are challenges to implementing the working model in practice. In much of this research, the incident-driven, reactive policing model has received criticism for being passive, paramilitary and outdated by the problem-oriented model.

The second temporal structure concerns the scheduling of police officers' work. In Sweden, the two main ways of scheduling work are through a rolling schedule or period planning. A rolling schedule is a system in which officers work according to a set sequence, i.e. first a night shift, then a day shift and then a morning shift, which is followed by three days off duty, and then the cycle starts again. Period planning, on the other hand, is a system in which the individual officer, together with colleagues and their sergeants, plan the work for a period of six weeks. This may be done manually or with a computer program. Some districts use a full-wall white board with a large matrix containing all days of the month, which are further divided into shifts. Every officer has the same number of magnets as shifts he or she is to work for the coming six weeks, and the magnets are then placed on the open shifts on the white board. It is the sergeant's responsibility to make sure that all shifts are manned according to the actual need and to solve any conflicts that arise in the scheduling process.

The two temporal structures, together with the problem areas above, served to demarcate and create the prerequisite for the development of four archetypes of police officers, namely four different personas. A matrix with the temporal structures was outlined. The four cells in the matrix provide characteristics and distinct conditions for the four personas.

Table 1: Temporal Structures

	Scheduling of the individual officers' time	
Overall institutional mission	Proactive and period planning	Proactive and rolling schedule
	Reactive and period planning	Reactive and rolling schedule

Using these as representations of typical police practice, four archetypes of police officers can be established. Each archetype can then be analyzed in terms of information technology and information system support in relation to police practice. In the following section, the four archetypes are conceptualized as personas.

DERIVING PERSONAS

The participation, observation and interviews conducted in the field produced a large amount of data in various formats as described in the research approach. This section presents the four police officer personas derived from the analysis of the empirical data. Each of the four personas is given a visual representation (Figure 2 below), a descriptive life history and a background. Each persona is then described in a realistic scenario aimed to give some characteristics of his or her work. Although life descriptions and scenarios are longer and consist of more nuances and details, they have been adjusted to serve as examples.



Figure 2: Example of Two Persona – Karin and Leif

Proactive and on a period planning schedule persona. Karin is a distrustful and proud 45-year-old officer. She speaks several languages, and lives in a small suburb just outside a medium sized city. She lives with her teenage daughters in the same community where she works and she is well known by the young people in the community. Karin works closely with social workers and local schools. She schedules her work in accordance with her family obligations. After three years of university studies, she was accepted as a police candidate at the National Police Academy. During her first years as a police officer, she worked the streets on a rolling schedule, but when she got pregnant she was transferred to the criminal investigations division. In 1994, when the problem-oriented policing reform came, Karin was one of the pioneers working with problem-oriented police practice. As her children grew older, she wanted to be involved in the attempts to decrease the amount of crime in the area where she and her family lived. Karin is now second officer in command and works with proactive policing in close cooperation with other agencies, such as the local education agency and the local social service. She believes the relation with these agencies works very well. She has an open door policy and encourages her colleagues to drop in to talk any time they have issues they would like to discuss. According to Karin, period planning is optimal because the needs of her family and her police work can be balanced. Period planning enables Karin to take an active part in her children's activities, which also makes her well known in the community.

Proactive and on a rolling schedule persona. Leif is an uncompromising and direct 53-year old officer, who has been with the force since he was 19. He began his studies at the National Police Academy immediately after finishing his military service and has been working as a police officer in uniform his entire career, with the exception of a two-year period, during which he worked on a surveillance team. Leif has been on three United Nations missions as a police officer. He is a divorced father of two adult sons. Leif was very engaged in his boys' sports activities; he coached soccer for both of them when they were young. He has always been committed to working with and helping young people, but prefers to work with older experienced colleagues. Leif has been on a rolling schedule for 34 years: "Why try something new, when this is working?" Leif may not be as alert as he once was, but his colleagues think this is justified: "If you've been working on a rolling schedule for 34 years, and always in uniform, you've earned the right to be laid back." While Leif is not lazy, he is rarely first to volunteer for overtime or respond to calls from the dispatch. He is responsible for information in schools and maintains a continual dialogue with school principals. He also works with different types of sports associations to inform athletes about the dangers of doping and using other drugs.

Reactive and on a rolling schedule persona. John is a pedantic and ceremonious 33-year-old officer with eight years of experience. He lives with his girlfriend and their 18-month-old daughter in an apartment in the central part of the city. Several of his colleagues live in the same apartment complex. He enjoys his work and prefers a rolling schedule. "You know when to work in advance, and you have several days off in a row, which is good if you want to spend extra time with your family." John likes to maintain a high level of physical fitness and health and goes to the gym or plays floor ball before almost every shift. John is fond of new technical innovations, and he considers himself to have above-average computer skills. He uses his home computer to play online first-person shooter games. The police IS/IT environment does not impress John. He believes that the systems are old and that they must have been developed by people who know little or virtually nothing about police work. He has been elaborating with some software to create a database with his own information. John also records information about criminals, vehicles, and situations that "could be of value in the future" in a notebook. He has a self-made and always updated manual where he keeps police-related legislation. John thinks the police organization is managed poorly and that problem-oriented policing working together with other agencies does not constitute real police work.

Reactive and on a period planning schedule persona. Susan is a determined and terse 38-year-old officer. She finished her studies at the police academy at the age of 29. She is the mother of two teenagers, and is dating a carpenter with one daughter. Her dream came true when she was accepted at the national K9 dog handler basic course at the age of 32. Since then, her partner has been Bronco, a male German shepherd. Susan usually works alone, and enjoys it, on a period planning schedule. She and the other K9 handlers are responsible for ensuring that there is always at least one K9 unit on duty in the district. The period planning works well for Susan and it allows her to spend more time with her family. Being a K9 handler involves a lot of extra work during her free time, and in addition to completing the extra training required, Susan spends her free time with her family. Family time, however, means a lot of activities, and Susan often thinks that trying to get every family member's schedule to fit together is like an unsolvable puzzle. Without period planning, Susan might have been forced to choose between being a K9 handler and being with her family. Now, both can be accommodated and Susan believes she is quite privileged. According to Susan, the only negative aspect of period planning is using the computer-based planning system, Time Care, to schedule her work. She has never been interested in technical stuff and gets irritated when she must interrupt her work and sit in front of the computer instead of being out working with Bronco.

Personas in Action

In this section, each of the personas is placed in a scenario. The purpose of a scenario is not to demonstrate a specific problem to be resolved; rather, a scenario illustrates an information-related problem area for the police and describes properties of the organization and the contingencies of the work practice that has design challenges. Each scenario is also accompanied with a visual representation (Figure 3).

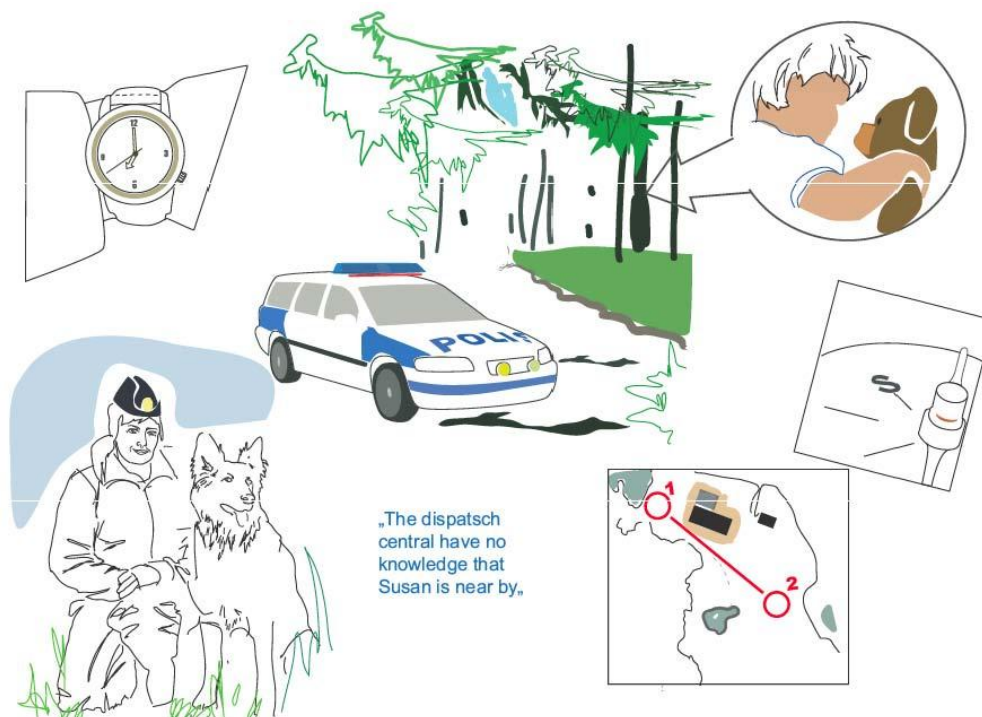


Figure 3: Illustrated Scenario for Susan

Scenario 1: Karin is on a single foot patrol in her local police district. A teacher, whom Karin knows from the high school, stops her for a chat. The teacher informs Karin about two students who are suspected of using narcotics—yet another incident involving narcotics distribution at the high school. Karin brings out her notebook and writes down this new information. Her notebook is full of various notes she has taken while working, mainly about problems, tips about criminal activities, and names of persons she has confronted or reprimanded. Following her conversation with the local high school teacher, Karin has a scheduled meeting with the local business association. The meeting ends later than planned, and Karin leaves the meeting two hours after her scheduled working hours. She now has four days off, and by the time she comes back to work, she has forgotten the tip she received from the high school teacher.

This scenario illustrates how the transfer and use of important information can be delayed or even lost due to individual, manual and analogue routines utilized for information management. Information management within the police force is strictly regulated, and the use of local computer based systems is restricted.

Scenario 2: Leif starts his day shift by getting a cup of coffee and being teased by his colleagues who compare him to the “kindergarten cop,” but he takes no notice of their taunts. Leif knows that proactive police work is not highly regarded among police in general, but he feels that the work he performs is important. Today he will give a lecture at a school 35 km away, and the only available car is an unmarked police car without a working police radio. Leif often has to use old equipment when working so he always brings his own portable police radio, but the battery never holds for a full day. After the lecture is over six hours later, he heads back to the station. Through his portable radio, he is informed that there is a robbery at a Seven-Eleven store nearby and the dispatch central sends out a description of the suspects and their getaway car. Because he is driving an unmarked police car, Leif is reporting for duty on the channel assigned for units involved in the robbery. He is ordered to drive just beyond the outer perimeter of the scene and to watch for any suspicious behavior and make a note of every car’s registration number. The dispatcher would normally give this job to a two-officer unit. Leif is driving the car with one hand and using the other for the radio. He would like to call in all license number that he sees, but the dispatcher cannot stay with him all the time due to the workload at the central. After an hour, the dispatch central calls off the search and Leif drives back to the station to finish his day. He has nothing to report related to the robbery, as he was not able to write anything down. Leif ends his shift and is questioned by a younger colleague: “Have you done any real police work today, Leif?” Leif answers “no” to satisfy the young police officer and then leaves the station.

This scenario illustrates that even if police officers have different specific individual work assignments scheduled for a shift, they may be required to take part in a very different type of operational police work at any time. This means that they might not be appropriately equipped, and in this case also have to perform a job alone that normally requires the presence of a colleague in the car.

Scenario 3: John and his colleague are working a mid-week night shift. They get a call from the dispatcher: “7660 ... we have a suspected drunk driver heading north on the freeway, it’s a white Volvo ABC123 and it just passed the mall.” They write down the registration number on a piece of paper and head to the last known position of the ABC123 car. After a few minutes, they locate the car and instruct the driver to pull over. The driver identifies himself with a valid driver’s license and is not wanted according to the dispatcher, but is, after a test, suspected of driving under the influence. John pushes the call button: “80 [the dispatcher] ...from 7660, we have a ‘12’ and some paperwork.” John and his colleague take the driver to the police station for further analysis of his level of intoxication. The analysis confirms the driver’s intoxication, and he is reported for driving under the influence of alcohol. Several forms of documentation must be completed to record this incident: a general report, an analysis report, a written interrogation of the driver, and a report stating that the driver was brought to the police station. Normally, John could have completed the paperwork in less than an hour, but due to computer problems it takes twice as long. His colleague lets the driver go after a short interrogation. Halfway through the paperwork, the dispatcher calls John. “7661, how’s it going, almost done? You’ll have to drop what you’re doing and head down to the warehouse by the river. We have a burglary in progress. According to the caller, three guys just jumped in through a window.”

This scenario illustrates both how the patrols are dispatched to situations and how the work of officers, such as finishing their paperwork, can be interrupted. In this scenario, the officers are forced to set aside what they are doing to go out for the new call, adding to the paperwork to be completed on their return to the station.

Scenario 4: Susan and Bronco are participating in their scheduled training day. Nearby, there is an ongoing search for a lost child. The dispatch central is not aware that Susan is nearby, partly because they must use a second menu on the command and control system to see all police units on duty, not only the ones on active duty. When Susan goes into the station to pick up a water bottle she is informed of the search for the lost child. Hearing this, she drives to the command post to meet up with the officer in charge. The commanding officer, Joel, is standing beside his car with a large map spread out on the hood and has a cell phone in one hand and a radio in the other. He welcomes Susan and informs her that the search has been going on for three hours and it will get dark in a little over an hour. When the search began, Joel only had four police patrols, but now he is in charge of nine units, and a police helicopter with a mounted heat camera is on its way. It is difficult for Joel to give Susan any specific task because he does not know which areas have been searched already. Each unit involved in the search has been assigned a

specific search area and received a photocopy of a map. However, because the majority of the officers do not have a compass and none have a GPS, it is difficult to specify in detail which areas have been thoroughly searched. Joel says, "At least the immediate surroundings of the place where the child was seen last have been carefully searched, by both another K9 unit and [unit] 7210." Once Susan realizes Joel cannot give her an assignment, she decides to start her own search from the last known position of the child. After 30 minutes, Bronco finds the child asleep under a fallen tree. When Susan and the other K9 units compare their coordinates of the GPS, they realize that the other units had not searched where Joel thought they did.

This scenario illustrates how the dispatcher may not be aware of all recourses available. It also exemplifies how quickly a situation can change from a small search to a full-scale search and rescue operation supervised from a field command post.

Verifying the Personas and the Scenarios

The use of personas to depict the police officers and their practice was verified in two groups of police officers in two separate workshops lasting approximately 90 minutes each. The purpose of the workshops was to determine, based on responses from actual officers, whether the concept of personas and scenarios is a viable way to describe police practice and to illustrate the diversity of police work. The results from those two workshops are presented in this section.

The first workshop was held at a police department in northern Sweden at a local police office. Seven police officers of varied rank and age as well as department employees (who often use diverse police IS) attended the workshop. The setting for the first workshop was the role call room.

The second workshop was held in a conference room at a police department in one of Sweden's largest cities. Five officers currently working as detectives on a task force with a special focus on narcotics in the local police district participated in the workshop. The attending officers were three females in their late 30s, each with ten years of experience as uniformed officers, and two male officers with 15 years and 20 years experience of police work in uniform, respectively.

In the two workshops, the researchers began by explaining issues regarding work practice and design from a user perspective. The researchers then guided the participants through a series of 15 slides presenting a number of claims and assumptions concerning police practice. Examples of such claims include: the police is a closed organization compared to many other organizations; the image of the police represented in the media is categorical; police officers are 'social actors' rather than computer users; designers and developers of information technology are isolated from the users and thereby have limited knowledge of actual police practice, and the knowledge these developers have about the police is also strongly influenced by the picture portrayed in the media. The slides concluded with a presentation of the personas in temporal structures and their individual characteristics.

The personas have been characterized by a drawn portrait, as shown in Figure 1, and by narratives which give a rich description of each of the four personas. The scenarios were also presented as both illustrations (Figure 2) and narratives.

Both workshops confirmed that personas and scenarios serve to communicate the work practice and the diversity of the officers. In fact, very few critical doubts were raised against this way of presenting police practice, rather, the response was predominantly positive: "Why haven't these been used before?" Most participants agreed that problems arise when police officers are treated uniformly. Several participants offered examples of police artifacts designed with limited knowledge of police practice. There was a common agreement among the participants that the uniform interpretation and limited knowledge of police practice is a problem. None of the officers in the evaluation had been involved as user-representatives in an IT project.

When the four personas were presented, they were met by some laughter indicating familiarity and comments such as: "That's just like officer-X at X-station, they all look like that." The laughter and spontaneous positive comments were interpreted as important indicators that the personas were, to a certain extent, typical of the temporal structures they represent. The participants' reactions indicate that the personas can represent real police officers. The presentation of the matrix used to introduce the temporal structures brought to light the fact that many of the workshop participants had never thought about their practice in these terms. They displayed positive attitudes about this conceptualization, and suggested that each of the temporal structures could, most likely, be divided even further into new temporal structures, or different kinds of structures that captured the diversity in police practice more completely. Participants indicated that they appreciated the scenarios used to strengthen and situate each persona in practice, and that scenarios are a good technique to describe how complicated police work can be. The police officers at the two workshops nodded in agreement when the scenarios were presented and acknowledged that they represent situations similar to those they had all experienced.

DISCUSSION

This section discusses whether the use of personas together with the four scenarios presented is a feasible tool to be used as a boundary object, and to what extent the technique could serve to bridge the gap between users and designers of information technology in the police context. The scenarios in this research have been used to highlight and exemplify typical and recurrent situations in police work: when problems are partly caused by deficiencies in the current information technology and information systems environment, when problems result from the distance between developers and the practice, and when police practice is interpreted uniformly.

The first scenario illustrates the problem of individual and local information management. Current legislation regulates what information can be captured and stored, who has the right to store and delete information, and how information can be stored. The use of computer-based applications such as a CRM (customer relationship management, or criminal relationship management in this context) would help individual officers to manage the local information. However, there are several possible consequences of such an application. Information becomes very individualized, and police officers manage their own collected information. If they forget to enter something or deliberately neglect to do so, or store or distribute the information on their own accord, then that information cannot be shared among other police officers.

The second scenario illustrates how the working conditions for a police officer can change rapidly. The officer in the scenario is suddenly involved in a situation in which the available technology is insufficient. The scenario shows that officers can and will be involved in a situation in which extra resources are required. It is also common that community officers and detectives will engage in another situation by their own initiative if a more demanding one comes up. As a result, a large number of officers become involved, but often the technology used for communication among them fails to accommodate the diversity of the group. Currently, there are two different radio systems being used in parallel, and a significant portion of the communication is through cell phones. The implementation of a new digital radio communication system was completed in 2010.

The third scenario shows that the officers can only access computers at the police stations. A common pattern is the following: a patrol receives a call from the dispatcher, drives to the location of the situation, and sends an 'on site' status code once they have arrived at the scene. Then the patrol deals with the situation, and when the situation has been handled and the officers have returned to the police cruiser, they call the dispatcher and say: "80 .. 7660 [call sign for dispatcher and patrol] we are done at the scene and are heading in to do the paper work." Frequently, very little time is required at the scene. For instance, a shoplifter who is over 18 can identify himself and confess to the crime at the scene, and the situation only requires about ten minutes of police work. However, after the patrol is finished at the scene they must drive back to the station, which, depending on the distance, can take valuable time. Parking, getting into the station through several locked doors, logging in to the computer, completing a number of forms depending on the crime, and then getting back out on patrol again takes a significant amount of time. During this research, several different officers made the same comment, "Ten minutes of police work can mean hours of paper work."

Finally, the fourth scenario demonstrates how the dispatch center is equipped with advanced IT but fails to utilize it fully. In Sweden, it is clear that IT is a technology supporting the centralization of the police force. In this scenario, a rather minor situation escalates into a large search and rescue operation. The operation needs to be controlled from the scene, not from a centralized position. The police organization is based on regional geographic areas, each with a dispatch center, and when a situation within that area occurs, the dispatch center commands the response to the situation.

The four scenarios were verified in the workshops, and despite being partly fictional, the participating officers agreed that the situations are typical of police practice. Personas and scenarios can serve as the intellectual tool needed to act as a boundary object between police officers, their practice, and the designers and developers of IS for the police. Based on the verification from the workshops, the personas and the scenarios have been successfully used as a tool in the communication between two communities. In this research, police officers and researchers are the two communities, and the technique can therefore potentially be transferred to the communication between designers of IS and representatives of the police practice. The scenarios and the personas in this research are the results of the compilation and analysis of a large amount of gathered data and experience with police practice, and the acceptance of the personas in the workshops is most likely dependent on the fact that they are designed and grounded in experience and knowledge. In this research, the personas together with the scenarios have shown the diversity of police practice, and based on this result, it is clear that additional tools to overcome the misinterpretation of police uniformity need to be developed. Personas derived through the lens of temporal structure can be one such tool. The design of personas is, of course, not restricted to being based on temporal structures, but in this research they were found to be a viable point of departure for identifying the archetypes.

CONCLUSIONS

Four personas situated in four different temporal structures have been presented in this paper. Four corresponding scenarios were used to exemplify the police practice for the personas. The paper described and discussed each scenario and pointed out challenges resulting from limitations of the current information technologies used by the police. Based on the personas and the scenarios developed, this study reports that the Swedish police force is facing several fundamental challenges regarding the use of information technology. These challenges are not solely technical, but are also social, legal and organizational.

The contribution of this research to the HCI field is the empirical verification that personas serve as a mechanism to support the design process. By using personas to develop a set of scenarios in temporal structures, the paper has pointed out problems related to IT and its actual use. Rather than approaching the police from a conventional information modeling perspective, the scenarios presented are examples of the nature, the variety, and the complexity of police work. Police practice is not easily described, and it is posited here that personas and scenarios is a viable way to describe police to communicate the different needs of the officers; especially how IT supports current practice, but also how it can enable emergent new ways of working.

Personas and their scenarios serve to give a richer description of the specifics of a context and the design space. A scenario, in this paper, is not about describing a specific problem that can be easily resolved. Rather, a scenario is used to show the characteristic properties and the emergence of work practice in relation to the design of information technology.

REFERENCES

- Adderley, R. W. and P. Musgrove (2001) "Police Crime Recording and Investigation Systems: A User's View," *Policing: An International Journal of Police Strategies & Management* (24) 1, pp. 100-114.
- Agar, M. H. (1996) *The Professional Stranger: An Informal Introduction To Ethnography*. San Diego: Academic Press.
- Ancona, D. G., P. S. Goodman, B. S. Lawrence, and M. L. Tuchman (2001) "Time: A New Research Lens," *Academy of Management Review* (26) 4, pp. 645-663.
- Baber, C., M. Sharples, M. Broadman, A. Price, and D. Haniff (2001) "Requirements Engineering of Personal Technology for Police Officers," in *Proceedings of IFIP INTERACT01: Human-Computer Interaction* (1) M. Hirose (Ed.), Amsterdam and Washington DC: IOS Press, pp. 512-520. Tokyo, Japan, July 9-13, 2001.
- Benson, D. (1993) "The Police and Information Technology," in G. Button (Ed.) *Technology in Working Order: Studies of Work, Interaction, and Technology*. London and New York: Routledge, pp. 81-97.
- Button, G. and R. Harper (1996) "The Relevance of 'Work-Practice' for Design," *Computer Supported Cooperative Work* (4) 4, pp. 263-280.
- Carmona, S. and A. Grönlund (2003) "Measures vs Actions: The Balanced Scorecard in Swedish Law Enforcement," *International Journal of Operations & Production Management* 23 (12), pp. 1475-1496.
- Chen, J. B. L. (2001) "The Technological Game: How Information Technology is Transforming Police Practice," *Criminal Justice* (1) 2, pp. 139-159.
- Chu, J. (2001). *Law Enforcement Information Technology*. CRC Press. Boca Raton.
- Colton, N. W. (1979) "The Impact and Use of Computer Technology by the Police," *Communication of the ACM* (22) 1, pp. 10-20.
- Cooper, A. (2004) *The Inmates are Running the Asylum: Why High-Tech Products Drive Us Crazy and How to Restore the Sanity*. Indianapolis: Sams Publishing.
- Doyle, A. (2004) *Arresting Images*. Toronto: University of Toronto Press.
- Felson, M. (1998) *Crime & Everyday Life*. Thousand Oaks: Pine Forge Press.
- Ferrell, J. and M. S. Hamm (1998) *Ethnography at the Edge: Crime, Deviance and Field Research*. Boston: Northeastern University Press.
- Fisher, D. and P. Dourish (2004) "Social and Temporal Structures in Everyday Collaboration," *CHI Letters* (6)1, pp. 551-558.
- Frank, J., S. G. Brandl, and R. C. Watkins (1997) "The Content of Community Policing: A Comparison of the Daily Activities of Community and "Beat" Officers," *Policing: An International Journal of Police Strategies & Management* (20) 4, pp. 716-728.
- Golden, J. W. (2000) "Productivity and Performance Evaluation," in W. G. Doerner and M. L. Dantzker (Eds.) *Contemporary Police Organization and Management: Issues and Trends*. Boston: Butterworth-Heinemann, pp. 89-114.

- Goldsmith, V., P. G. McGuire, J. H. Mollenkopf, and T. A. Ross (Eds.). (2000). *Analyzing Crime Patterns: Frontiers of Practice*. Thousand Oaks: SAGE Publications.
- Grudin, J. and J. Pruitt (2002) "Personas, Participatory Design and Product Development: An Infrastructure for Engagement," in *Proceedings of the Participation and Design Conference (PDC2002)* (1) T. Binder, J. Gregory, and I. Wagner (Eds.), CPSR, pp. 144-161. Malmo, Sweden, June 23-25, 2002.
- Hammersly, M. and P. Atkinson (1995) *Ethnography: Principles in Practice*. London: Routledge.
- Ioimo, R. E. and J. E. Aronson (2004) "Police Field Mobile Computing: Applying the Theory of Task-Technology Fit," *Police Quarterly* (7) 4, pp. 403-428.
- Lamb, R. and R. Kling (2003) "Reconceptualizing Users as Social Actors in Information Systems Research," *MIS Quarterly* (27) 2, pp. 197-235.
- Mawby, R. C. (2003) "Completing the 'Half-Formed Picture?' Media images of policing," in P. Mason (Ed.) *Criminal Visions - Media representations of crime and justice*. Cullompton, Devon and Portland, OR: Willan Publishing, pp. 214-237.
- McCahill, M. (2003) "Media Representations of Visual Surveillance," in P. Mason (Ed.) *Criminal Visions - Media Representations of Crime and Justice*. Cullompton, Devon and Portland, Oregon: Willan Publishing, pp. 192-213.
- Meehan, A. J. (1998) "The Impact of Mobile Data Terminal (MDT) Information Technology on Communication and Recordkeeping in Patrol Work," *Qualitative Sociology* (21) 3, pp. 225-254.
- Moore, M. H. (2005) "Sizing up COMPSTAT: An Important Administrative Innovation in Policing," in T. Newburn (Ed.) *Policing: Key Readings*. Portland, Oregon: Willan Publishing, pp. 530-549.
- Nesbary, D. (2001) "The Acquisition of Computer-Aided Dispatch Systems: Administrative and Political Considerations," *Social Science Computer Review* (19) 3, pp. 348-356.
- Oliver, W. M. and E. Bartgis (1998) "Community Policing: A Conceptual Framework," *Policing: An International Journal of Police Strategies & Management* (21) 3, pp. 490-509.
- Orlikowski, W. J. and J. Yates (2002) "It's About Time: Temporal Structuring in Organizations," *Organization Science* (13) 6, pp. 684-700.
- Orr, J. E. (1996) *Talking about Machines: An Ethnography of a Modern Job*. Ithaca, NY: Cornell University Press.
- Perlmutter, D. (2000) *Policing the Media*. Thousand Oaks: SAGE Publications.
- Ponsares, P. (2001) "Reading about 'Community (Oriented) Policing' and Police Models," *Policing: An International Journal of Police Strategies & Management* (24) 4, pp. 470-496.
- Pruitt, J. and J. Grudin (2003) "Personas: Practice and theory." Paper presented at *the Conference on Designing for User Experiences (DUX 2003)*: San Francisco, CA, June 5-7, 2003.
- Rafaeli, A and M. G. Pratt (1993) "Tailored Meanings: On the Meaning and Impact of Organizational Dress," *The Academy of Management Review* (18) 1, pp. 32-55.
- Reddy, M. and P. Dourish (2002) "A Finger on the Pulse: Temporal Rhythms and Information Seeking in Medical Work," in *Proceedings of Conference on Computer Supported Cooperative Work (CSCW)*, ACM Press, pp. 344 - 353. New Orleans, November 16-20, 2002.
- Schön, D. A. (1983) *The Reflective Practitioner: How Professionals Think in Action*. London: Temple Smith.
- Seagrave, J. (1996) "Defining Community Policing," *American Journal of Police* (15) 2, pp. 1-22.
- Shen, Z., Y. Yoo and K. Lyytinen (2005) "Temporal Implications of Information Technology for Work Practices: Organizing in and for Time in an Emergency Department," *Sprouts: Working Papers on Information Systems* (5) 18, pp. 88-101.
- Silverman, E. B. (2006) "Compstat's Innovation," in D. Weisburd and A. A. Braga (Eds.) *Police Innovation: Contrasting Perspectives*. Cambridge: Cambridge University Press, pp. 267-283.
- Skogan, W. G. and S. M. Hartnett (2005) "The Diffusion of Information Technology in Policing," *Police Practice and Research* (6) 5, pp. 401-417.
- Suchman, L. (1995) "Making Work Visible," *Communication of the ACM* (38) 9, pp. 56-64.
- Walsh, W. F. (2001). "Compstat: An Analysis of an Emerging Police Managerial Paradigm," *Policing: An International Journal of Police Strategies & Management* (24) 3, pp. 347-362.
- Weisburd, D., S. Mastrofski, J. Willis and R. Greenspan (2006) "Changing Everything so that Everything can Remain the Same: Compstat and American Policing," in D. Weisburd and A. A. Braga (Eds.) *Police Innovation: Contrasting Perspectives*. Cambridge: Cambridge University Press, pp. 284-301.
- Wenger, E. (1998) *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.
- Williams, S. R. and C. Aasheim, (2005) "Information Technology in the Practice of Law Enforcement," *Journal of Cases in Information Technology* (7) 1, pp. 71-91.

ABOUT THE AUTHORS



Erik Borglund has a PhD in computer and system science. He is currently a researcher at the Archival and Information Management School of Mid Sweden University. His main research interests are digital recordkeeping, document management, information systems in crisis management, information systems design and computer supported cooperative work. Erik Borglund has been sworn police officers for 20 years, before he became fulltime academic.



Urban Nulden is associate professor in informatics at Gothenburg University. His PhD thesis was in the area of use of information technology in higher education to facilitate the learning and teaching environment. He has conducted research on competence development with the Swedish industry. Nulden changed his research agenda in 2001 to focus on various aspects of information technology in the Police context. The research is published in international journals and presented at international conferences. Urban Nulden has been serving as head of the department of Applied Information Technology since 2006. The department is shared by University of Gothenburg and Chalmers University of Technology.

Copyright © 2012 by the Association for Information Systems. Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and full citation on the first page. Copyright for components of this work owned by others than the Association for Information Systems must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists requires prior specific permission and/or fee. Request permission to publish from: AIS Administrative Office, P.O. Box 2712 Atlanta, GA, 30301-2712 Attn: Reprints or via e-mail from ais@aisnet.org.



Transactions on Human-Computer Interaction

ISSN: 1944-3900

Editors-in-Chief

<http://thci.aisnet.org/>

Dennis Galletta, U. of Pittsburgh, USA

Ping Zhang, Syracuse U., USA

Advisory Board

Izak Benbasat U. of British Columbia, Canada	John M. Carroll Penn State U., USA	Phillip Ein-Dor Tel-Aviv U., Israel
Paul Gray Claremont Graduate U., USA	Jenny Preece U. of Maryland, USA	Gavriel Salvendy, Purdue U., USA, & Tsinghua U., China
Ben Shneiderman U. of Maryland, USA	Jane Webster Queen's U., Canada	K.K. Wei City U. of Hong Kong, China

Senior Editor Board

Fred Davis U. of Arkansas, USA	Traci Hess U. of Massachusetts Amherst, USA	Shuk Ying (Susanna) Ho Australian National U., Australia	Mohamed Khalifa U. Wollongong in Dubai., UAE
Jinwoo Kim Yonsei U., Korea	Anne Massey Indiana U., USA	Fiona Fui-Hoon Nah U. of Nebraska-Lincoln, USA	Lorne Olfman Claremont Graduate U., USA
Kar Yan Tam Hong Kong U. of Science & Technology, China	Dov Te'eni Tel-Aviv U., Israel	Noam Tractinsky Ben-Gurion U. of the Negev, Israel	Viswanath Venkatesh U. of Arkansas, USA
Mun Yi Korea Advanced Ins. of Sci. & Tech, Korea			

Editorial Board

Miguel Aguirre-Urreta DePaul U., USA	Michel Avital Copenhagen Business School, Denmark	Hock Chuan Chan National U. of Singapore, Singapore	Christy M.K. Cheung Hong Kong Baptist University, China
Michael Davern U. of Melbourne, Australia	Carina de Villiers U. of Pretoria, South Africa	Alexandra Durcikova U. of Arizona, USA	Xiaowen Fang DePaul University
Matt Germonprez U. of Wisconsin Eau Claire, USA	Jennifer Gerow Virginia Military Institute, USA	Suparna Goswami Technische U. München, Germany	Khaled Hassanein McMaster U., Canada
Milena Head McMaster U., Canada	Netta Iivari Oulu U., Finland	Zhenhui Jack Jiang National U. of Singapore, Singapore	Richard Johnson SUNY at Albany, USA
Weiling Ke Clarkson U., USA	Sherrie Komiak Memorial U. of Newfoundland, Canada	Na Li Baker College, USA	Paul Benjamin Lowry City U. of Hong Kong, China
Ji-Ye Mao Renmin U., China	Scott McCoy College of William and Mary, USA	Greg D. Moody U. of Nevada, Las Vegas, USA	Robert F. Otondo Mississippi State U., USA
Lingyun Qiu Peking U., China	Sheizaf Rafaeli U. of Haifa, Israel	Rene Riedl Johannes Kepler U. Linz, Austria	Khawaja Saeed Wichita State U., USA
Shu Schiller Wright State U., USA	Hong Sheng Missouri U. of Science and Technology, USA	Stefan Smolnik European Business School, Germany	Jeff Stanton Syracuse U., USA
Heshan Sun U. of Arizona, USA	Jason Thatcher Clemson U., USA	Horst Treiblmaier Vienna U. of Business Admin. & Economics, Austria	Ozgun Turetken Ryerson U., Canada
Fahri Yetim U. of Siegen, Germany	Cheng Zhang Fudan U., China	Meiyun Zuo Renmin U., China	

Managing Editors

Jian Tang, Syracuse U., USA

SIGHCI Chairs

<http://sigs.aisnet.org/sighci>

2001-2004: Ping Zhang	2004-2005: Fiona Fui-Hoon Nah	2005-2006: Scott McCoy	2006-2007: Traci Hess
2007-2008: Weiyin Hong	2008-2009: Eleanor Loiacono	2009-2010: Khawaja Saeed	2010-2011: Dezhi Wu
2011-2012: Dianne Cyr	2012-2013: Soussan Djamasbi		

