

Open Research Online

The Open University's repository of research publications and other research outputs

Designing Technologies for Community Policing

Conference or Workshop Item

How to cite:

Zhang, Min; Bandara, Arosha; Price, Blaine; Pike, Graham; Walkington, Zoe; Elphick, Camilla; Frumkin, Lara; Philpot, Richard; Levine, Mark; Stuart, Avelie and Nuseibeh, Bashar (2020). Designing Technologies for Community Policing. In: Extended Abstracts of ACM Conference on Human Factors in Computing Systems (Late Breaking Work), 25-30 Apr 2020, Honolulu, HI, USA.

For guidance on citations see [FAQs](#).

© 2020 ACM

Version: Accepted Manuscript

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's [data policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

Designing Technologies for Community Policing

Min Zhang*

Arosha K. Bandara*

Blaine Price*

Graham Pike*

Zoe Walkington*

Camilla Elphick*

Lara Frumkin*

*Open University (OU)

Milton Keynes, MK7 6AA, UK

first.lastname@open.ac.uk

Richard Philpot

Mark Levine

Lancaster University

Lancaster, LA1 4WA, UK

r.philpot,

mark.levine@lancaster.ac.uk

Avelie Stuart

University of Exeter

Exeter, EX4 4PY, UK

a.stuart@exeter.ac.uk

Bashar Nuseibeh[†]*

[†]Lero, University of Limerick,

Limerick, V94 NYD3, Ireland

Bashar.Nuseibeh@lero.ie

Abstract

Community policing faces a combination of new challenges and opportunities due to both citizens and police adopting new digital technologies. However, there is limited scholarly work providing evidence for how technologies assist citizens' interactions with the police. This paper reports preliminary findings from interviews with 13 participants, both citizens and police officers, in England. We recognize four key types of actors in the current practice of community policing, alongside existing technologies and challenges faced by citizens and the police. We conclude with three design implications for improving citizen-police engagement.

Author Keywords

Community Policing; Crime; Trust; Collective Action.

CSS Concepts

• **Human-centered computing**~**Human computer interaction (HCI)**~Empirical studies in HCI.

Introduction

Community policing (also known as community-oriented policing [13] or neighborhood policing [22]) is a widely adopted approach for engaging the public in policing with the aim of reducing or preventing crime and the fear of crime. The philosophy of community policing arises from a belief that the public are willing

Permission to make digital or hard copies of part or all 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 the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

CHI 2020 Extended Abstracts, April 25–30, 2020, Honolulu, HI, USA.

© 2020 Copyright is held by the owner/author(s).

ACM ISBN 978-1-4503-6819-3/20/04.

DOI: <https://doi.org/10.1145/3334480.3383021>

Community Policing

The most popular definition of community policing is coined by Myhill [24]: "*Community policing is the process of enabling the participation of citizens and communities in policing at their chosen level*".

Community policing has three common features: police-community partnerships, problem-solving approach, and organizational decentralization.

to get involved in policing and engage with the police [21]. However, due to policy and cultural factors, there are many debates about the effect of community policing in practice [12,21]. A number of government authorities and policing researchers have investigated the issues, challenges, and best practices of community policing [12,21,22,28]. Despite this, there appears to be little HCI research on understanding the practice of community policing before designing new technologies to support collaboration.

With information and communication technologies (ICTs) growing, both the level and nature of crime are changing [22], and the public is exposed to more information than ever. While the overall level of crime has decreased in recent decades in England and Wales [25], people's perception is that the level of crime is increasing [5]. At the same time, law enforcement agencies are increasingly adopting digital technologies in their governance, public service, and civic engagement [6,16]. Given the pervasiveness of ICTs, such as mobile sensing technologies and surveillance cameras, there is a unique opportunity to explore current practice and challenges in community policing.

We have conducted a multi-site qualitative study with 13 participants in England, in order to investigate the experience of citizen-police engagement from the perspective of both citizen and police. This paper provides empirical evidence about current community policing practice in England and identifies the challenges and design opportunities for technologies to improve citizen-police collaboration. We encourage HCI researchers to work on the design space of building digital trust between citizens and authorities.

Related Work

This paper draws from HCI work on community policing [2,17] and the role of technology designed to promote community engagement [9,10,18].

Prior research has examined how technology can facilitate community engagement in policing. Kadar et al. [17] designed a crime prevention system and a modified version, which allowed people to report a crime in real-time. They found that the version supporting social interaction between users was more effective than the one-way information sharing system. Brush et al. [2] explored the use of home surveillance cameras using the concept of digital neighborhood watch, and they identified several security and privacy concerns related to sharing video with police and other households. The Mobile *RoadWatch* [26] app also encourages capture and sharing of video and contextual information using smartphones, supporting video cropping and audio muting to enhance users' privacy.

Much HCI work has focused on online community behavior [19] and its effect on physical community engagement [8]. By comparing the usage of the Chicago police website and a *Yahoo!* web forum, Lewis et al. [19] claimed that the informal forum was used more frequently than the official site. Erete [8] found that the community's online participation can improve their community engagement in the real world.

Other research has highlighted the successful community-based social media systems. For instance, *WhatsApp* neighborhood crime prevention group [27] was initiated by citizens in the Netherlands to empower social control and increase social cohesion and collective efficacy



Figure 1: Top: one of the study settings; Bottom: the storytelling toolkit.

[15]. There are also examples of police forces using *Facebook* to support neighborhood watch and building relationships [14]; and platforms like *Nextdoor* [23] being used to allow local community members to collaborate on neighborhood issues.

However, the impact of technology on policing practice has not been found to be universally positive [1,6,20]. For example, Chan et al. [6] claimed that information technology can act as a barrier to change policing practices. Tullio et al. [30] found that using video technologies supported but also hindered law enforcement tasks. Our work aims to expand the existing understanding of current practice and challenges of community policing across cyber-physical-social space.

Methods

We conducted semi-structured interviews with 13 participants (8 females and 5 males; age range 27-60; median 46). The participants included 2 victims, 4 community workers, 1 prosecutor, and 6 police officers. The citizen participants were recruited through campus-wide emails and noticeboards, with the criteria of having experience with the police. The police participants comprised Police Community Support Officers (PCSOs) and police officers, recruited through OU's Centre for Policing Research & Learning. Each person was first asked to introduce their experience with the police or citizens. They then played with the storytelling toolkit (Figure 1, bottom, including characters, buildings, and communication tools) to represent their experience and shared their stories. Then a semi-structured interview was conducted, which asked questions about the challenges of interactions with the police/citizen, what technologies they used in

these interactions, and the expected features of the technology that could help. Each session lasted 1.5-2 hours, and each citizen participant was compensated with £10 high-street vouchers. The interviews were audio-recorded and transcribed, and an initial inductive analysis [29] was conducted. The participants were coded as P1-P13, and their roles are shown in Table 1.

Findings

Findings indicate four key types of actors in community policing: citizens, community workers, non-governmental organizations (NGOs), and the police. We present our other findings under the broad categories of current practice, technology, and challenges of community policing.

Current Practice

Our findings indicate that the police have adopted diverse tactics for community policing, such as foot, horse, bicycle and car patrols; community meetings; knock-and-talk; school-based educational programs; and *Street Watch* [32]. All participants are positive about the concept of community policing. Police officers are trained to use the *National Decision Model* [33] to guide their engagement with the public and in problem solving (P12). For serious crime, police officers usually consult with relevant legal authorities (Crown Prosecution Service in the UK) to make decisions. The process is opaque to the public, which makes the police-citizen relations worse, resulting in the public tending to blame the police (P1).

Citizens have traditionally communicated with the police by calling the police or visiting a police station. People believe that the appearance of uniformed police officers can improve the community's feeling of safety

Participant Code	Stakeholder Type
P1	Prosecutor
P2	Police Officer & Witness
P3	Citizen - Witness
P4	Citizen - Victim
P5	Community Worker
P6	Community Worker
P7	Community Worker
P8	Community Worker
P9	PCSO*
P10	PCSO*
P11	Police Officer
P12	Police Officer
P13	Police Officer

Table 1: The stakeholder's code and role in our study. *PCSO = Police Community Support Officer. PCSOs do not have power of arrest and typically work as part of neighborhood policing team.

(P3, P6, P13). All our citizen participants know about *Neighborhood Watch*. However, people think it is confusing (P4) or needs to be improved (P5-P8) to get the younger people involved (P7). Citizen participants also report that the experience of policing during their youth influences their attitudes in later life. As P6 mentioned: *"I found that really hard when I first started working as a community worker, because I was brought up not to speak to the police"*.

It is not surprising to see that community workers report having more effective communications with citizens than the police. Community workers are self-elected by residents and trained to advise citizens towards appropriate support or assistance services. Additionally, they play an important role as a consultant to the council and the police (P8).

The benefits of non-governmental organizations in policing are mentioned by both citizens and the police (P3, P8, P9). For instance, the police encourage people to call *CrimeStoppers* which allows anonymous reporting. As PCSO P9 said, *"people don't feel comfortable to report directly to the police, so they can dial CrimeStoppers so they don't feel they will be treated as an informant to the police, and we can develop it off without knowing where it has come from... having information is better than nothing."*

Technology

Technology provides another different channel for people who are willing to interact with the police. Our findings show that the police have already adopted digital technologies and social media to communicate with the citizens. Police websites provide citizens with useful information such as contact details and crime

maps. The public can report things via the police websites and get updates from the police's Facebook site. Local, self-organized social media groups have the potential to greatly empower their residents (P11). The most popular tool for self-organization among our citizen participants is to use *Facebook* groups (P1, P3, P5-P8), followed by *WhatsApp* (P4).

Our participants are positive about using surveillance technologies. For instance, residents use Amazon Ring (P3, P5) and other private cameras. Additionally, authorized CCTV cameras, body-worn cameras, and ANPR (Automatic Number Plate Recognition) systems are adopted by the police to facilitate their work. Police officers only request the private camera data if it is the part of an investigation per se (P9). Commercial premises like shops use all kinds of CCTV cameras as well, however, due to the variety of CCTV systems used, the police struggle to get footage suitable for evidential purposes. One police participant reports using their body-camera to record the screen of private CCTV cameras during the police interview (P12).

Challenges

Our findings indicate several challenges in both practice and technology. An important practical challenge is the misunderstanding between the police and citizens. On one hand, all citizen participants complain about either the absence of or decreasing number of PCSOs/police officers patrolling in their community area (P3, P4, P6). Especially, residents in high-crime areas have lost trust in the police. There are three reasons for this. First, it is difficult to contact the police by calling the non-emergency phone number (101 in the UK), which is also costly. For instance, P5 claimed that it took 30-45 minutes to get answered by the police. Second, in line

with Bullock's work [3], people feel fearful or concerned to be labeled as informants, especially if they report their neighbors (P8). Third, when the public needs something, they think the police are unresponsive to their report or needs, so they feel the police are useless (P5). These factors lead to a reduced willingness to report suspicious activity (P8).

On the other hand, the police think that the community cannot differentiate between emergency and non-emergency calls (P2), e.g., dealing with garbage dumping, which is the responsibility of the local government. Police officers, therefore, think giving the opportunity to the community to report has a downside, which may increase their workload unnecessarily. As police officer P13 mentioned: "Everyone wants their own PCSO or police officer." Moreover, police officers emphasize challenges of fragmented work patterns, due to interruption by emergency calls and massive overloads (P2, P13).

Another challenge relates to the privacy concerns associated with citizen-police communications. All citizen participants think that reporting crime anonymously is an important feature, which determines whether to report crime via a third-party platform. For example, P4 (a victim of crime) said they would only use *WhatsApp* because the criminals may find out what has been posted on *Facebook*. Social media moderators are necessary to monitor inappropriate posts that may verbally abuse people online (P5, P8).

It is also reported that due to perceptions of legitimacy and data protection regulations, online communication between the police and the public is limited to certain roles of police staff. As police officer P11 put it: "police

forces are trying to keep everything centralized, and to keep corporate accounts". It is also found that police officers have barriers to access to data and technology. For example, police officers cannot access social media on their work devices (P13).

Police participants identify operational challenges associated with some technologies in the field. For example, PCSO (P9) mentioned the difficulty of typing a statement on mobile devices in the wet weather. Separately, P11 highlighted that sometimes video recordings can misrepresent the facts or just provide a partial story. Finally, it is noted that too much data is also an issue for back-office processes: "now every police officer will have a body cam ... it is the policy that I will use my body-worn camera for the stop and search. It is not for every occasion, otherwise, we would have too much footage" (P11).

Implications for Design

Our findings lead to three key design implications for technologies to improve the current community policing experience. These include needs to support multi-stakeholder collaboration, mechanisms for collective evidence analysis, and building digital trust.

Multi-stakeholder Collaboration Platform

The quality of community engagement is a vital element in successful community policing [21]. Findings indicate that digital technology is much easier for people who are afraid of bureaucracy or reporting someone they know. Additionally, mobile sensing technologies facilitate the reporting process. This opens design opportunities for the digital platform which could empower the collaboration among police personnel, community workers, NGOs, council, and residents, who

are all involved in the current 'ecosystem' of community policing. Such tools should support different stakeholders to provide and get mutually beneficial information. The police officers could balance their workloads by focusing on serious crimes and allowing petty crimes [7] to be handled by other stakeholders. Incentive mechanisms (e.g., rewards) could be provided to encourage citizens to actively participate in crime prevention and activity in their local community.

Our preliminary findings highlight that both witnesses and victims would like to know the result of reported cases. The system should keep people informed about the process, which would also raise awareness of policing processes among the community.

Collective Evidence Analysis

An additional way to engage citizens would be to involve them in the analysis of reported information. The public is referred to as the 'eyes and ears' of the police [24]. However, our findings indicate that citizens' reports may have limited evidentiary value. The private cameras and phone cameras provide more data than the police can reasonably handle. This is a crucial challenge when designing for community policing, where it should be noted that mutual understanding and helping behaviors within community members could improve collective efficacy [15]. Technologies for crowdsourcing human intelligence into investigations, with appropriate data protection mechanisms, could be one approach to achieve this.

Building Digital Trust

The technology should allow the citizens to report without attracting attention and exposing them to potential harm, e.g., a domestic violence reporting

function could be embedded into a mundane system like weather broadcasting [4]. Further, digital evidence collection with limited disclosure [31] could protect users' privacy as well as support building digital trust between users and authorities. Findings indicate that the high visibility of uniformed police officers enhances trust and confidence in policing. This suggests a design space for HCI researchers to explore how to build the public's trust in the digital presence of police.

Prior research suggests that users are likely to trust the system more if they know how their information is going to be used, and to what extent it will be kept confidential [16]. Therefore, privacy policies should be provided to the users, who also have the power to edit or recall their message or even delete their accounts. The consent should be provided with opt-out options.

Conclusions

This empirical work explores current community policing practice, based on interviews with 13 participants from both citizens and police officers in England. Initial findings describe the current practice and technology used, together with the challenges of community policing. We propose three design implications for improving citizen-police engagement, which we plan to expand on through further detailed thematic analysis of the data [11], leading to co-design activities for community policing technology. We hope our findings will encourage HCI scholars, technologists and policing practitioners to join in this work.

Acknowledgements

This work was supported by the Citizen Forensics project, funded by the UK EPSRC (EP/R033862/1), and Science Foundation Ireland (SFI 13/RC/2094).

References

- [1] Ben Brewster, Helen Gibson, and Mike Gunning. 2018. Policing the Community Together: The Impact of Technology on Citizen Engagement. In *Societal implications of community oriented policing technology*. 91–102. https://doi.org/10.1007/978-3-319-89297-9_11
- [2] A. J. Bernheim Brush, Jaeyeon Jung, Ratul Mahajan, Frank Martinez, and One Microsoft Way. 2013. Digital Neighborhood Watch: Investigating the Sharing of Camera Data Amongst Neighbors. In *2013 conference on Computer supported cooperative work (CSCW '13)*, 693–700. <https://doi.org/10.1145/2441776.2441853>
- [3] Karen Bullock. 2018. The Police Use of Social Media: Transformation or Normalisation? *Social Policy and Society* 17, 2: 245–258. <https://doi.org/10.1017/S1474746417000112>
- [4] Candice Prosser. Artificial Intelligence Disguised as a Phone App to Provide Support for Victims of Domestic Violence. Retrieved January 2, 2020 from <https://www.abc.net.au/news/2018-12-15/artificial-intelligence-to-help-domestic-violence-victims/10606376>
- [5] Spencer Chainey and Tompson Lisa. 2012. Engagement, Empowerment and Transparency: Publishing Crime Statistics Using Online Crime Mapping. *Journal of Policy and Practice*: 1–12.
- [6] Janet Chan, David Brereton, Margot Legosz, and Sally Doran. 2001. *E-policing: The Impact of Information Technology on Police Practices*. <https://www.cmc.qld.gov.au/>, Queensland.
- [7] Carola van Eijk. 2018. Helping Dutch Neighborhood Watch Schemes to Survive the Rainy Season: Studying Mutual Perceptions on Citizens' and Professionals' Engagement in the Co-Production of Community Safety. *Voluntas* 29, 1: 222–236. <https://doi.org/10.1007/s11266-017-9918-1>
- [8] Sheena L Erete. 2015. Engaging Around Neighborhood Issues : How Online Communication Affects Offline Behavior. 1590–1601.
- [9] Sheena L Erete, Ryan Miller, and Dan A Lewis. 2014. Differences in Technology Use to Support Community Crime Prevention. In *Proceedings of the companion publication of the 17th ACM conference on Computer supported cooperative work & social computing - CSCW Companion '14*, 153–156. <https://doi.org/10.1145/2556420.2556499>
- [10] Sheena Lewis Erete. 2013. Protecting the Home: Exploring the Roles of Technology and Citizen Activism from a Burglar's Perspective. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems - CHI '13*, 2507. <https://doi.org/10.1145/2470654.2481347>
- [11] Jennifer Fereday and Eimear Muir-Cochrane. 2006. Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development. *International Journal of Qualitative Methods* 5, 1: 80–92. <https://doi.org/10.1177/160940690600500107>
- [12] Charlotte Gill, David Weisburd, Cody W. Telep, Zoe Vitter, and Trevor Bennett. 2014. Community-oriented Policing to Reduce Crime, Disorder and Fear and Increase Satisfaction and Legitimacy Among Citizens: a Systematic Review. *Journal of Experimental Criminology* 10, 4: 399–428. <https://doi.org/10.1007/s11292-014-9210-y>
- [13] Herman Goldstein. 1987. Toward Community-Oriented Policing: Potential, Basic Requirements, and Threshold Questions. *Crime & Delinquency* 33, 1: 6–30. <https://doi.org/10.1177/0011128787033001002>
- [14] Marie Jacoba Hattingh. 2015. The Use of Facebook by a Community Policing Forum to Combat Crime. In *Proceedings of the 2015 Annual Research*

- Conference on South African Institute of Computer Scientists and Information Technologists - SAICSIT '15, 1–10.
<https://doi.org/10.1145/2815782.2815811>
- [15] Brian R Higgins and Joel Hunt. 2016. *Collective Efficacy: Taking Action to Improve Neighborhoods*. Retrieved from <https://nij.gov/journals/277/Pages/collective-efficacy.aspx>
- [16] Juan Pablo Hourcade and Jean E. Fox. 2005. Designing public government web sites. In *CHI '05 extended abstracts on Human factors in computing systems - CHI '05*, 2039. <https://doi.org/10.1145/1056808.1057089>
- [17] Cristina Kadar, Yiea-Funk Te, Raquel Rosés Brüngger, and Irena Pletikosa Cvijikj. 2016. Digital Neighborhood Watch: To Share or Not to Share? In *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems - CHI EA '16*, 2148–2155. <https://doi.org/10.1145/2851581.2892400>
- [18] Sheena Lewis and Dan A Lewis. 2012. Examining Technology that Supports Community Policing. In *Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems - CHI '12*, 1371–1380. <https://doi.org/10.1145/2207676.2208595>
- [19] Sheena Lewis and Dan A Lewis. 2012. Examining Technology that Supports Community Policing. 1371–1380.
- [20] Rachael Lindsay, Louise Cooke, and Tom Jackson. 2009. The Impact of Mobile Technology on a UK Police Force and Their Knowledge Sharing. *Journal of Information and Knowledge Management* 8, 2: 101–112. <https://doi.org/10.1142/S0219649209002294>
- [21] Kate Lloyd and Janet Foster. 2009. *Citizen Focus and Community Engagement: A Review of the Literature*. Retrieved from http://www.police-foundation.org.uk/uploads/catalogerfiles/citizen-focus-and-community-engagement-a-review-of-the-literature/citizen_focus.pdf
- [22] Abie Longstaff, James Willer, John Chapman, Sarah Czarnomski, and John Graham. 2015. *Neighbourhood Policing: Past, Present and Future - A Review of the Literature*. Retrieved from http://www.police-foundation.org.uk/uploads/catalogerfiles/neighbourhood-policing-past-present-and-future---a-review-of-the-literature/neighbourhood_policing_past_present_future.pdf
- [23] Christina A. Masden, Catherine Grevet, Rebecca E. Grinter, Eric Gilbert, and W Keith Edwards. 2014. Tensions in Scaling-up Community Social Media: A Multi-Neighborhood Study of Nextdoor. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, 3239–3248. <https://doi.org/10.1145/2556288.2557319>
- [24] Andy Myhill. 2012. *Community Engagement in Policing: Lessons from the Literature*. Retrieved from https://whatworks.college.police.uk/Research/Documents/Community_engagement_lessons.pdf
- [25] Office for National Statistics. 2019. *Crime in England and Wales, Year Ending June 2019*. <https://doi.org/10.1080/09645794.2019.1641111> Figure 3: Trend in Crime Survey for England and Wales violence, 1981 to year ending December 2014
- [26] Sangkeun Park, Emilia-Stefania Ilincai, Jeungmin Oh, Sujin Kwon, Rabeb Mizouni, and Uichin Lee. 2017. Facilitating Pervasive Community Policing on the Road with Mobile Roadwatch. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17*, 3538–3550. <https://doi.org/10.1145/3025453.3025867>

- [27] Jason Pridmore, Anouk Mols, Yijing Wang, and Frank Holleman. 2019. Keeping an Eye on the Neighbours: Police, Citizens, and Communication Within Mobile Neighbourhood Crime Prevention Groups. *The Police Journal: Theory, Practice and Principles* 92, 2: 97–120. <https://doi.org/10.1177/0032258X18768397>
- [28] The Chief Justice Earl Warren Insitue on Law and Social Policy. 2013. *What Works in Community Policing? A Best Practices Context for Measure Y Efforts*. Retrieved from https://www.law.berkeley.edu/files/What_Works_in_Community_Policing.pdf
- [29] David R Thomas. 2003. A General Inductive Approach for Analyzing Qualitative Evaluation Data. *American Journal of Evaluation* 27, 2: 237–246. <https://doi.org/10.1177/1098214005283748>
- [30] Joe Tullio, Elaine Huang, David Wheatley, Harry Zhang, Claudia Guerrero, and Amruta Tamdoo. 2010. Experience, Adjustment, and Engagement: The Role of Video in Law Enforcement. In *Proceedings of the 28th international conference on Human factors in computing systems - CHI '10*, 1505. <https://doi.org/10.1145/1753326.1753551>
- [31] Thein Tun, Blaine Price, Arosha Bandara, Yijun Yu, and Bashar Nuseibeh. 2017. Verifiable Limited Disclosure: Reporting and Handling Digital Evidence in Police Investigations. In *Proceedings - 2016 IEEE 24th International Requirements Engineering Conference Workshops, REW 2016*, 102–105. <https://doi.org/10.1109/REW.2016.43>
- [32] StreetWatch. Retrieved December 24, 2019 from <http://www.street-watch.org/>
- [33] National Decision Model. Retrieved December 24, 2019 from <https://www.app.college.police.uk/app-content/national-decision-model/>