Institution:
Middlesex University

Unit of Assessment:
UoA 11

Title of case study:
Enabling positive engagement between youth workers and young offenders through mobile apps

Period when the underpinning research was undertaken:
2010 - 2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Balbir S. Barn	Professor of Software Engineering	2008-onwards
Franco Raimondi	Professor of Formal Verification	2008-onwards
Dr Giuseppe Primiero	Senior Lecturer in Computer Science	2013-2018

Period when the claimed impact occurred:
2016-2021

Is this case study continued from a case study submitted in 2014? Y/N

1. Summary of the impact (indicative maximum 100 words)

Since 2008, Prof. Barn and colleagues have been researching the use of mobile apps in a variety of social care settings. This research has focused on marginalised young people in conflict with the law leading to the UK's first mobile app to support Youth offending teams in the work with young people in the youth justice system. National impacts included: The mobile app was developed through a co-design process that generated impact of engagement of young people in the design, development and deployment of social technology. The MAYOT app is embedded in the strategy for West Mercia YoS. The app has been deployed and is in use in at Bromley Youth Offending Service by 25 case workers. A third Youth Offending Service, Essex YoS is in the process of finalising deployment before March 2021. Additionally, the co-design methodology is embedded in the design practice of an international software development house.

2. Underpinning research (indicative maximum 500 words)

Middlesex Computer Science undertakes leading research in technology for social good. The research undertaken for the impacts reported in this case study is an example of multi-disciplinary research with contributions from computer science, social policy and criminology. The research has been reported in leading international outlets over the research period of 2006 through to 2020.

Prof. Barn began work in the field of app development for social care settings in 2006 with app development for nurses. Applied research in social care education settings was further developed under another JISC funded project in support of social workers. The latter project was instrumental in exposing the importance of understanding users and how users interact and work with mobile devices in challenging settings. A second outcome was the importance of inter-disciplinary approaches to solution development.

Knowledge of the important role of mobile technology in their relationship to young people, was further enhanced through a research consultancy project funded by the Association of Chief Police Officers. Here, research elaborated a detailed understanding of the relationship between young people and mobile technology. Outputs from the research addressed the risk-taking behaviours of young people and were published in the Core-A-ranked Hawaii International Conference on

System Sciences HICSS [R1]. This research was conducted in conjunction with Royal Holloway, University of London. An early insight from this research was the understanding that social care was critically neglected in terms of benefiting from advances in mobile technology.

This new understanding led to a proposal being submitted to the Nominet Trust in 2012 and awarded in 2013 as the MAYOT project (Mobile Apps for Youth Offending Teams) and conducted from 2013-2016. The research performed as part of this project developed a personalised mobile app for use by young people and their case workers in youth offending teams.

In the youth justice sector, Youth Offending teams were set up following the 1998 Crime & Disorder Act and comprise multi-agency teams coordinated by a local authority. YOTs work with young people on a range of community orders. At the initiation of this research (2013), there were over 20000 first time entrants into the youth system. Further, there 66,430 young people forming the case load of YOTs nationally (Data available from 2012). To ease this workload, we envisaged the use of a smartphone app to support interactions between case workers and young people.

Requirements for the app were elicited through the instigation of a value sensitive co-design approach where young people, their managers worked in close conjunction with the research team. The research was innovative in the use of such a methodology with a marginalised section of the community.

The sensitivity of the problem domain and the nature of the end-users, young people in the youth justice system, meant that value sensitive concerns were brought to the fore and in particular, issues such as privacy, security, autonomy and transparency were quickly established as critical. As a result, our research contributed a conceptual model for value sensitive concerns published in the Software Engineering in Society Track at the premier international software engineering conference, ICSE [R2]. This topic has subsequently become an important research area. An approach to early identification of value sensitive concerns using Floridi's Informational Privacy theory was described in the ACM Symposium on Applied Computing (SAC) paper [R3]. More complex relationships between such concerns and desirable attributes such as resilience have also been illustrated [R4 – an extended paper of work first presented at the core ranked A conference, European Conference on Information Systems (ECIS). The value sensitive co-design approach was further adopted by a boutique software development company specializing in app development.

Reflecting on the interdisciplinary nature of the research, and the interplay between research and impact, research conducted during the deployment of the MAYOT app also addressed the impact of such technology on both case workers and young people. Techno-habitats of practitioners were explored in [R5].

The conceptual model of values is particularly important as it provides an important bridgehead between software engineering practice and non-functional requirements and has formed a substantive body of research reported elsewhere. Notably, we have also demonstrated how values can be more formally accounted for to support the design of resilient information systems. [R6].

3. References to the research (indicative maximum of six references)

[R1] Balbir S. Barn, Ravinder Barn, and Jo-Pei Tan. Young people and smart phones: An empirical study on information security. In 47th Hawaii International Conference on System Sciences, HICSS 2014, Waikoloa, HI, USA, January 6-9, 2014, pages 4504–4514, 2014. DOI: 10.1109/HICSS.2014.554

[R2] Balbir S. Barn, Ravinder Barn, and Franco Raimondi. On the role of value sensitive concerns in software engineering practice. In 36th International Conference on Software Engineering, IEEE/ACM ICSE Companion , 2015. DOI: 10.1109/ICSE.2015.182

[R3] Balbir S. Barn, Ravinder Barn, and Giuseppe Primiero. An approach to early evaluation of informational privacy requirements. In Proceedings of the 30th Annual ACM Symposium on Applied Computing . ACM. DOI: https://doi.org/10.1145/2695664.2695788

[R4]   Balbir S Barn and Ravinder Barn. An exploration of resilience and values in the co-design of sociotechnical systems. International Journal of Systems and Society (IJSS) , 3(1):1–17, 2016. DOI: 10.4018/IJSS.2016010101

[R5]   Barn, Ravinder, and Balbir S. Barn. "Youth Justice in the Digital Age: A Case Study of Practitioners' Perspectives on the Challenges and Opportunities of Social Technology in Their Techno-Habitat in the United Kingdom." Youth Justice 19, no. 3 (2019): 185-205. DOI: https://doi.org/10.1177/1473225419869568

[R6]   Primiero, Giuseppe, Balbir Barn, and Ravinder Barn. "Value-sensitive co-design for resilient information systems." Studies in Logic, Grammar and Rhetoric (2020). DOI: https://doi.org/10.2478/slgr-2020-0032

4. Details of the impact (indicative maximum 750 words)

The impacts arising from this research are an example of close integration between research and practice. Impacts occurred both during the research process and from the outcomes of the research. The impact from the research has ranged from policy/strategy, public education and impact on the growth of an international SME working in the social enterprise sector.

Policy and Strategy

The reach of our work is potentially significant with a total of 153 youth offending teams in England and Wales. In March 2016, a total of 27,900 young people (aged 10-17) were convicted and sentenced by the courts (YJB, 2017). The vast majority of such young people are supervised in the community by the 12,000 personnel in Youth Offending Teams (YOTs). There are 153 multi-agency teams YOTs with representation from the police, probation, education, health and social services. The service also includes specialist workers, such as mental health practitioners, and substance misuse workers.

Our advocacy of the use of mobile technology (the MAYOT app) was embedded in the 2015-16 strategy of one large youth offending service, Worcestershire and Herefordshire YoS (now West Mercia YoS) [S1] as an example of innovative practice for engagement and dialogue between the case worker and the young person.

Before the app can be deployed in Youth Offending Service setting, staff undergo a rigorous training programme. Our conceptual and methodological training programme that focuses on the ethics of using social technology to promote engagement and empowerment in young offenders has been delivered to 20 YOTs in England and Wales in urban (e.g. London, Bradford, Leeds, and Newcastle), and rural (e.g. Worcestershire, Oxfordshire, and Cumbria) settings [S4].

The overarching and monitoring government body, the Youth Justice Board (YJB), has recognised the value and potential of our technology. In 2017, following a meeting between one of the co-investigators of the MAYOT project the then Parliamentary Under-secretary of State for Justice, Dr Phillip Lee invited the project team to contact the Youth Justice Board formally, to discuss our approach and update the YJB on the aims of the MAYOT app [S9]. The meeting took place on 29th November 2018 and included our deployment partners from the Youth Offending Services of West Mercia and Bromley. More recently, discussions have re-started and with the YJB and they are now considering an option to take ownership of the MAYOT technology to support wider deployment.

Further engagement with UK Government has also taken place through interactions with the Home Office. Following the rise in knife crime statistics in March 2019, the MAYOT team, along with the software development partner, GNB, met with the Home Office to elaborate how the MAYOT app could be used in the fight against knife crime. The team was invited to submit a proposal to evidence how the app could be applied in this setting by Tom McDonald from the Home Office.

The value of the app to the YoS was first noted by the Head of London Triborough YoS, who noted that the co-design process used by the team "helped develop confidence in our young people". The senior leader was further was clear that: "The use of the MAYOT app encourages and supports positive engagement with young people and could reduce further offending by providing key information that young people may need such as what to do if you are arrested or drug information." [S7].

The senior leader recognised the importance of such technology and when they moved to Bromley YOS, the team was again approached for engagement at Bromley.

In Autumn 2019, Bromley YOS agreed to adopt the MAYOT technology for use in the service. Dedicated training sessions to the entire Youth Offending Team and supporting services was provided (October 2019). (Letter of support/evidence: [S7]). Full deployment was planned for spring 2020 but has been impacted by the COVID-19 pandemic lockdown restrictions. A further deployment is now scheduled for February 2021.

Between July and October 2020, the Head of Western Essex YoS, responded to an Innovation call by Essex YoS and proposed the use of apps in a youth justice setting. Realising that such an app already existed, asked for MAYOT to be used at Western Region of Essex YoS. Training sessions for 8 case workers managing around 70 young people are scheduled for March 2021 with a deployment of the app planned for March 2021. The COVID-19 pandemic has resulted in further delays. The Essex YoS has produced a compelling video available as source [S8]. Confirmation of the Essex YoS deployment plan is noted in source [S3].

Stakeholder Engagement

We have worked with a range of key stakeholders through the entire design process. A key concern in the adoption of technology in challenging work environments, is the involvement of stakeholders. We instigated a co-design approach where case workers, managers (combined total, 17) and most importantly, the young people (10) were first class designers in the design processes used in the development of the MAYOT app. These were spread across three Youth Offending Services in England (London Triborough YoS, Hereford and Worcester YoS, and Oxfordshire YoS).

The voices of young people were central to the design of the app, their engagement in the co-design was an important characteristic and at times contradicted other stakeholders in the process such as magistrates. The co-design process ensured that all stakeholders were represented through the app. This tension of multiple views was a significant research outcome and has been documented in [R4, R5, R6].

Following availability of the app, a Train the Trainer workshop aimed at developing digital expertise in the use of the app, was delivered to all YoS in England, interested in attending. This workshop was attended by 21 case workers and their managers from 17 different YoS [S4]. In 2016, Further training was delivered to the Welsh Youth Offending Services: Monmouthshire & Torfaen, and Cwm Taf.

The professional body for Youth Offending team managers (https://aym.org.uk) requested a contribution in the form of a short article for their regular magazine. The article is available in reference [S5]. Similarly, Magistrates form another critical set of stakeholders. In February 2015, we were invited to present to a meeting of 20 magistrates from Worcestershire. Following a detailed discussion, we were invited to contribute a short article for their newsletter (See Reference [S2]). Both articles are an example of knowledge transfer to communities outside the academic sector.

International Reach

There has been international component to the impact. In 2016, The novelty and value of the work was identified by researchers at the University of Copenhagen who invited members of the team to join a research team seeking funding from the Innovation Fund of Denmark to address similar concerns in that country.

Human, Economic and Technological Impact

The project has had two further impacts. Firstly, value-sensitive design and co-design is essential practice where end-users are from marginalised communities. This has manifested itself through human, personal development. The lead developer on the original MAYOT project, Mr Lalith Athiappan gained significant requirements gathering and development experience and user interface design skills such that he was instrumental to a successful KTP proposal (No. KTP010041) working with a social enterprise Global Notice Board (http://www.gnb.com).

Athiappan was able to apply the good practice design guidelines and the ability to design for different types of end-users to develop a look and feel for user interface platform for use for a

commercially available estate agents app that was derived from his experience on the MAYOT app. He was also able to use his development experience from the MAYOT project to contribute towards the establishment of a software development team in India that specifically serviced the social enterprise (GNB) in London. In February 2018, Prof. B. Barn delivered a workshop on value sensitive design for mobile apps to the software development in India, emphasising the importance of understanding users in the co-design process and how values underpin acceptance of technology when working with marginalised users [S6/S5].

5. Sources to corroborate the impact (indicative maximum of 10 references)

[S1] "Innovative Practice: The YOS has been working with a multi-disciplinary academic team from Middlesex University and Royal Holloway University of London in piloting the Mobile Application for Youth Offending Teams (MAYOT). MAYOT is a smart phone application that provides a common platform for engagement and dialogue between the case worker and young person. The application allows communication around key activities, reminders for appointments, the provision of information and an activity meter/progress chart. Team members and young people from the South Worcestershire Team have been involved during 2014/15 in the iterative co- design and testing of the application. There are now twelve YOTs either using or planning to use the MAYOT application (Worcestershire Youth Justice Plan 2015-16: 8)". (See page 8 of PDF).

[S2] March 2015, we were invited to contribute a short article to the Magistrates Association newsletter. In the words of one magistrate: 'I was very interested to hear about the introduction of the MAYOT pilot study for young offenders. A mobile phone app that can remind these youngsters of important dates, key activities, even exclusion zone and progress on a court order can only help with compliance. It's an exciting development in the communication process between young offender and caseworker.' (Worcester magistrate). See: *https://www.dropbox.com/s/76nnrmtbggbw3y5/Magistrate%20February%20March%202015-MAYOT.pdf?dl=0*

[S3] Testimonial letter from Michael Kay, Essex Youth Offending Service.

[S4] Train the Trainer Event, Middlesex University, 25, June 2015. https://www.dropbox.com/s/s6wax0kgymsw6fe/Attendee%20Summary.pdf?dl=0 (Available)

[S5] In May 2015, the Association of Youth Offending Managers also invited us to contribute a short article to their newsletter. See: https://www.dropbox.com/s/gtqa0r0wouzg192/AYM%20Newsletter%20for%20May%2015v1.pdf?dl=0 (Available)

[S6] Training visit to India Software Development Lab for GNB – in letter.

[S7] Testimonial letter from the Betty McDonald, Head of Bromley Youth Offending Service.

[S8] Video produced by Essex YoS: https://www.dropbox.com/s/4u5ivkxpgm7vyxc/The%20Mayot%20Video.mp4?dl=0

[S9] Letter from Dr Phillip Lee, MP Under-Secretary of State for Justice inviting members of the team to present information about MAYOT to the Youth Justice Board.