Fit and Appropriation Model for Training: An Action Research Study to Advance Mobile Technology Training in Police Forces

A thesis submitted for the degree of Doctor of Philosophy

By:

Noorhan Abbas

University of Lancaster

University of Cumbria

January, 2020

Word count 75,870

Abstract

As police forces are information intensive organisations, the use of advanced Information Systems in policing has led to the transformation of the social and the organisational life in forces. Nevertheless, the results of a pilot study conducted after four years of the roll out of mobile Kelvin devices in a medium-sized Constabulary in the UK have revealed officers' resistance to using the full range of functionalities offered by these devices. The Kelvin devices' initial training did not accommodate for differences in officers' IT skills, experiences, roles, work contexts and police culture (ensuring the existence of a good-fit between all these factors). Hence, officers were unable to efficiently appropriate the Kelvin devices' functionalities in different contexts and to various tasks.

Therefore, guided by the data collected from the pilot study, a Fit and Appropriation Model for training (FAMT) is posited. FAMT aims to rectify the causes of officers' resistance by not only creating a learning environment that bridges the gap in technical knowledge and skills but also enables learners to use their work experiences to link technology features to various tasks and contexts. The impact of using FAMT on the learning process sheds light on the key deteriminants of delivering effective technology training in organisations. The findings of the study delineate fundamental super-user' characteristics and police culture aspects that can influence the learning process during training.

Furthermore, the study highlights the significant role of providing IT support during technology training. This role should not be underestimated by mangers as it impacts profoundly on the effectiveness of female learners' technology sense-making. Besides, incorporating collaborative training methods into FAMT have enhanced learners' ability to extend the use of features to different contexts. Therefore, using FAMT has been perceived by officers as an effective training method that facilitates a personalised technology training and extends their knowledge about useful features in their Kelvin devices.

Keywords: Police Mobile Technology, Police Technology Training, Mobile Technology Work-Context, Technology Appropriation Training, Scenario-based Learning.

Declaration

I hereby declare that the ideas, findings, analysis, results, and conclusions presented in this thesis are entirely my own work and have not been the subject of submission in any other academic institution. I also confirm that the researches and papers used have been properly referenced.

Noorhan Abbas

January, 2020

Acknowledgement

I would like to thank my lovely supervisor Dr. Nicoletta Policek for her professional help and support. No words can express my thankfulness and gratitude to her! Nicoletta, thank you so much for always being there for me …. Your dedication and kindness are much appreciated!

A special thanks goes to Professor Eric Atwell and Chief Inspector Janet McGilloway. I would not have achieved this degree without your kind assistance. Thank you for always believing in me throughout my PhD.

The ongoing encouragement of my mother and my belated dad have always inspired me to work harder to fulfil this dream. Thank you, mum and dad, for all your love and care.

I would also like to thank my husband and children for their patience, understanding and kindness. Ashraf, you are my rock! I would not have finished this degree without your support. Hania and Omar, thank you for providing a listening ear when things were not going well and for cheering me up when I felt down. Kareem, even though you are only 8 years old, thank you for always being understanding when I was busy, especially nearer to deadlines.

List of Figures and Tables

Table of Contents

Acronyms and Abbreviations

ACPO	Association of Chief Police Officers
AR	Action Research
AST	Adaptive Structuration Theory
BMT	Behavioural modelling training
CID	Criminal Investigation Department
CMUA	Coping Model of User Adaptations
CPM	Cyclical Process Model
CSE	Computer Self-Efficacy
CSO	Community Security Officers
ERP	Enterprise Resource Planning
FAM	Fit and Appropriation Model
FAMT	Fit and Appropriation Model for Training
GSS	Group Support Systems
HMIC	Her Majesty's Inspectorate of Constabulary
IS	Information System
IT	Information Technology
MDT	Mobile Data Terminal
NHS	National Health Service

NPIA	National Policing Improving Agency
PBC	Perceived Behavioural Control
PC	Police Constable
PCSO	Police Community Support Officers
PEOU	Perceived Ease of Use
PIIT	Personal Innovativeness with IT
PNC	Police National Computer
PS	Police Sergeant
PU	Perceived Usefulness
RCA	Researcher-Client Agreement
RV	Response Vehicle
SCO	Scene of Crime Officers
SCOT	Social Construction of Technology
SMS	Short Message Service
TAM	Technology Acceptance Model
TTF	Task-Technology Fit

Chapter One - Scope of Research

1.1 Introduction

The UK government investment in the Mobile Information Programme in 2008 aimed to achieve better efficiency and effectiveness in police forces (House of Commons Report, 2008). Some of the benefits of using this advanced technology have been realised. Nonetheless post-adoption resistance to using the full range of functionalities have been reported in a pilot study conducted in a medium-sized police force. A thoroughgoing review of the benefits of using mobile technology in policing is presented in this chapter along with previous research undertaken to explore how mobile devices are used in this context. Besides, research gaps are highlighted, and a comprehensive discussion of the aim and purpose of this research study is conducted.

1.2 Overview

As much of the police work consists of producing reports and updating records (which is viewed by officers as a time-consuming task that distracts them from doing their 'real police' work), advanced electronic recording and retrieval systems facilitate reducing the level of paperwork and make records easier to update and access (Ackroyd et al., 1992). Police officers constantly compete against time and in most instances, must respond to crime-investigation challenges in a timely manner. For this reason, efficiency gain is an important determinant of the technology usage. Efficiency gain denotes the degree to which an officer perceives that their task performance efficiency would be improved using technology (Lin, 2004).

The increased application of advanced technology in the police has been characterized as an entrepreneurial revolution where police are continuously scrutinized (Ackroyd, 1992). In general, policing is less advanced than the private sector in terms of adopting digital technology and working practices. Digital work in policing is too often about exciting technology projects, rather than identifying the best technology to support a fundamental and coherent plan to transform services (HMIC PEEL Report, 2016). This in turn, perhaps explain the existence of many Information Systems in police forces that do not integrate well together (Allen et al., 2014). The focus should be on transforming organisational structures, norms/values and work processes to facilitate technology advances (Allen et al., 2014). The impact of technology on policing is dependent on how technology interacts with existing cultural values, management styles, work practices and technical capabilities (Chan et al., 2001). All these aspects should be incorporated into organisations' development strategies, reflected clearly in technology training programmes and repeated on a regular basis to accommodate for changes in work context and officers' IT skills. In the next section, a comprehensive review of the key studies undertaken to explore the benefits and drawbacks of using mobile Information technology in UK police are presented.

1.3 A Review of Research Studies Undertaken to Investigate the Utilisation of Mobile Information Technology in UK Police Forces

1.3.1 Introduction

Undoubtedly, using mobile information technology in police forces has positively impacted on the decision-making process and the sharing of information leading to a better-informed officer (Allen and Shoard, 2005; Norman and Allen, 2005; Lindsay et al., 2009). It has also reduced the radio traffic-load significantly (Agarwal et al., 2003; Norman and Allen, 2005; Sørensen and Pica, 2005; Allen et al., 2008; Karanasios and Allen, 2014).

In the next section, the key studies undertaken to examine how mobile Information Systems like smart phones and specialised laptops are utilised in UK police forces and their benefits are presented. These studies are divided into two core areas. The first aims to understand the relationship between mobility, mobile devices and police activities. They used the 'third generation' Theory of Action (Engeström, 1999, 2001) and the Technology Acceptance Model (Davies, 1989). The second group of studies focus on studying the impact of virtuality and the work context among different police roles.

1.3.2 The Utilisation of Specialised Laptops (Mobile Data Terminals) in Policing

In 2009, an evaluation study was conducted by Lindsay et al. in Leicestershire Constabulary to investigate the impact of the use of mobile technology on the Force and on knowledge sharing processes. An empirical, ethnographic approach to the study was adopted. The findings of this study suggest that mobile technology has a positive impact on both policing and knowledge sharing. The mobile technology used by Leicestershire Constabulary was the Mobile Data Terminal (MDT) solution which is a Panasonic Toughbook that has a reliable wireless connection and can be removed from its in-vehicle docking station and used out of the vehicle as a portable device (Lindsay et al., 2009). These devices improved the availability of information for decision-making, helped speed up business processes, improved the timeliness and accuracy of data held and reduced significantly the use of radio. The authors reported that the ability to access photographic identification reduced the potential for false arrests and increased the accuracy of stop checks. Hence, the use of the mobile technology led to an increase in the number of arrests as officers had faster access to information and real-time access to intelligence. The enhancement in the quality of decisions made chime with the experience of mobile technology users reported in West Yorkshire Police by Allen and Shoard (2005) and by Norman and Allen (2005).

Another study was undertaken by Lindsay et al. (2011) in which a new modified model (M-TAM) was developed based on the Technology Acceptance Model (TAM), TAM2 and TAM3 for the adoption of MDTs in police forces. The original Technology Acceptance Model (TAM) was developed by Davis (1989) and intended to discover why users of a certain technology accept or reject that technology. TAM suggests that two attributes are used to measure the factors that influence the acceptance process; the Perceived Usefulness (PU) and the Perceived Ease of Use (PEOU). Davis (1989) states that PU is whether the technology will enhance user's job performance and the PEOU relates to whether using the system will be free from effort. This model has been extended to TAM2 by Venkatesh and Davis (2000) to include additional key determinants of TAM's PU constructs, incorporating social influences and cognitive factors. In 2008, Venkatesh and Bala developed TAM3 which combines TAM2 and the model of the determinants of perceived ease of use (MDPEOU) (Venkatesh, 2000) to explain PEOU in addition to the PU determinants, as per the TAM2.

The M-TAM developed by Lindsay et al. (2011) identified four categories that explain technology adoption in a police force; performance, security and reliability, management style and cognitive acceptance. In the technological context, performance factors included officer efficiency, data quality, inputting, accessing and sharing information and functionality of MDTs. Factors related to the security and reliability category were battery life, network coverage, connectivity and level of privacy from rear-seat passengers in the police vehicle. The latter two (management style and cognitive acceptance) extended Davis's (1989) original theoretical Technology Acceptance Model (TAM). The management style included the level of training, officer involvement and information for mobile data terminals (MDTs). Officer and public perception of MDTs, peer influence and organisational culture influenced the level of cognitive acceptance. The organisational culture was an important factor in the M-TAM due to the short timescale for officers to adjust to staying out the station and working more self-sufficiently. Lindsay et al. (2014) aimed to validate the mobile Technology Acceptance Model (M-TAM) and show that it was transferrable to other UK police forces. The model (M-TAM) was evaluated using a professional review method. The most appropriate experts in this research were project managers overseeing the implementation of mobile technology in other UK police forces. New factors emerged to the original M-TAM: local leadership and supervision; senior managers buy-in to encourage usage of the devices (these were incorporated into the existing management style factors) and tailoring the software functionality and training to each policing role (these were added to a new category 'local context'). The authors claimed that the new M-TAM was a high-level model that could be applied to any UK police force.

Moreover, Allen et al. (2008) used the Activity Theory to understand the activities performed by police officers during the Stop and Search of suspect persons and vehicles, traffic operations and community or neighbourhood policing. In the three case studies, the authors reported that the use of technology reduced the use of voice communication over the radio, officers were able to access the force's intelligence databases allowing them to become better informed about the jobs they were attending and also reduced the number of persons required to visit a police station to collect documents. The study also reported on the negative impact of introducing new technology in Forces without considering the different motives, expectations of outcomes and change in work habits that affect officers using them.

Norman and Allen (2005) investigated the impact of the implementation of laptops (MICT) with mobile Global System on two police roles; Criminal Investigation Department officers (CID) and Scene of Crime Officers (SCO). CID officers' work is usually office based and SCOs' work is heavily based outside of the office. The results of the analysis of the implementation of the new technology were categorized into five main themes; changes to work procedures, new capabilities because of the adoption of the new technology, relationships, equipment and infrastructure. Equipment and infrastructure were considered 'hygiene factors' in that "a failure to ensure that they support effective use will reduce the level of use to a point where it is not useful to observe changes in the other three categories" (Norman and Allen, 2005:210). The first category (changes to work procedures) was divided into two sub-themes; changes to officers' own ways of working and changes to boundaries and controls on working. For instance, the use of the devices allowed officers to have more control over their time and easier access to information. The second category (changes in capability) was concerned with the speed, thoroughness and accuracy of work done by officers. The MICT devices enabled officers to check a larger number of car registrations very late at night without the need to use their radio devices. The quality of information retrieved was perceived as being likely to improve because of police officers inputting the data themselves on the MICTs, thus, eliminating errors resulting from poor sound quality (over the radio) and mis-spellings. Lindsay et al. (2010) reported on several unconsidered data quality dimensions (such as accuracy, timeliness, relevance, understandability and consistency) because of using mobile technology in recording information in police databases.

The third theme (relationships), in Norman and Allen’s (2005) study, was sub-divided into relationships with colleagues, relationships with supervisors and relationships with others. The authors reported that the use of the MICTs did not impact negatively on the relationships of officers with their colleagues. Supervisors used the technology to communicate with officers and there was no fear of losing control over their teams. Besides, the authors argued that the public had a positive perception of the new technology used by police officers.

The equipment category in this study included connectivity, ease of use functionality and any concerns about the devices. The infrastructure was basically any support the officers need (e.g. training, IT support, ways of working, future potential). This study supported the idea that the introduction of MICT into the police force produced benefits to the officers, the force and the communities involved. Nonetheless, without planning, organisational adjustment and training, these results might not be achieved (Norman and Allen, 2005).

Hampton and Langham (2005) investigated the everyday use of Mobile Data Terminals (MDTs) in Sussex Police Force within vehicles. Three studies were conducted to evaluate the impact of the devices on officers, work efficiency and usability of the devices. The MDTs provided in-vehicle access to the Sussex Police Information System, through which the crew could be managed, receiving instructions from the Force Command and Control Centre and through which they could receive information on incidents in progress. Access was also provided to the Police National Computer, through which the details of suspect individuals and vehicles could be retrieved. The MDTs were found to have resulted in a reduction of the volume of radio traffic, productivity had risen and officers, particularly when double-crewed, were performing their jobs more effectively.

1.3.3 Mobility and Context of Work

Pica et al. (2004), Pica and Sørensen (2004) and Pica (2006) examined the relationship between the context of work activities and mobile information usage among two roles within a UK police force; the Scene of Crime Officers (SCO) and Community Security Officers (CSO). They explained how mobile devices created a virtual environment for interaction which diverted the attention from the physical one. The authors argued that the real environment has the potential to increase or limit officers' interaction with the virtual. They also noted that the flexibility of the technology depends upon its ability to cross contexts. There were two defining aspects of mobile device interaction in context reported by the authors: active versus passive environments and structured versus unstructured work that can impact on the use of technology in the workplace. An active relation requires constant attention to the physical space of interaction, e.g. CSOs patrol local communities by foot or on bicycle to have continuous involvement with the community. The authors argued that the success of mobile devices in active work environments is limited to voice-supported services. On the other hand, passive relations use both data and voice services on the mobile devices extensively. Structured work task is one that has a repetitive defined way of accessing information, e.g. SCOs gathering information from victims' houses and transcribing their notes into the systems. Hence, the study proposed a matrix that presented the relation between workers who use mobile devices and the environments they work in (active or passive) and work tasks nature (structured or unstructured). The interaction between the virtuality created using mobile devices, the work activities and the context was used to study the roles of the Scene of Crime Officers and Community Security Officers. Technology, in this study, was not viewed as a self-contained entity but a tool that was both affected by and affects the social settings in which it is used.

Furthermore, the use of mobile technologies for the support of another two roles in operational policing; Response Vehicles (RV) and Traffic officers was investigated using the concepts of mobility and virtuality in work contexts discussed above (Sørensen and Pica, 2005; Pica, 2006). Operational policing is the core of policing and is highly geographically distributed (Manning, 2003). Sørensen and Pica (2005) and Pica (2006) argued that efficient and effective operational policing work was dependent on the context in which these devices were used in and the type of activity performed by the officers. Five primary activity types of operational policing were specified in this study: waiting in the car before incident, driving to an incident, acting at the incident, driving from the incident and waiting in the car after the incident. Operational policing work iterates between 'coupling' and 'decoupling' with the technology according to the situation. For instance, RV officers tended to use the technology to collect information prior to engaging in an incident but as soon as they reached the incident, they decoupled from using their devices (except from using the radio device) and engaged in the incident. This coupling and decoupling with mobile technologies form a '*rhythm of interaction'* that characterizes the use of technology in operational policing roles (Sørensen and Pica, 2005; Pica, 2006).

1.3.4 The Utilisation of Smart Phones in Policing

A study conducted by Allen and Shoard (2005) evaluated the use of wireless mobile devices (BlackBerry handhelds) by senior officers and their secretaries in West Yorkshire Police. The BlackBerry devices included a diary, organizer applications and the facility of sending and receiving emails in addition to acting as a telephone with voice-mail facility. Allen and Shoard (2005) reported that the use of the e-mail facility changed the nature of communications; officers were able to send and receive messages anywhere and anytime. The volume of the messages did not change but the ability to deal with them was spread evenly throughout the day rather than in the office only (Allen and Shoard, 2005). The nature of the communication was found to have changed as a result of using the mobile devices in exchanging emails. Given the smaller keyboard and the use of the devices anywhere, users tended to send messages which were shorter and more precise but less formal and less complex than when using a standard PC (Allen and Shoard, 2005). Using the devices helped managers maintain better control over their workload, ease the pressure of work and to respond more promptly to incoming e-mails (resulting in less queuing of messages). Managers also reported that they regularly received irrelevant information to their roles as a result of officers wanting to cover their own backs or attempting to impress their supervisors regardless of the content of the message (Allen and Shoard, 2005). However, officers believed that the mobile devices helped them speed up decision making and collaboration with colleagues as they were able to give immediate responses to requests for information and authorisation. This was believed to have enhanced the quality of the decisions made (Allen and Shoard, 2005). The use of the devices also resulted in a reduction in paper-based communication but the level of face-to-face interaction with other officers was not changed.

Furthermore, as there was political pressure on the police to spend more time ‘on the beat’ and to increase police visibility to the public (House of Commons Report, 2008), the need to employ mobile technology in policing emerged to the extent that it was felt necessary to further explore this issue by undertaking a feasibility study. Karanasios and Allen (2014) conducted a qualitative study in 2008 that used the ‘third generation’ Activity Theory to understand the mediating role of smart phones rolled out to frontline officers on changing work processes. The study was undertaken in one of the earliest and most advanced police forces in using mobile technology in the UK (Karanasios and Allen, 2014).

In this study, the mobile devices adopted had the capability to perform person and vehicle checks, record crime reports, view data on a crime or incident anywhere, send/receive emails, access intelligence and issue tickets. They also had a built-in camera, but the captured images were not used as evidence in court. The authors reported that the new technology improved data entry efficiency, communications (less use of radio traffic-load between the control room and the officers), policing efficiency (officers were able to perform up to 10 times more person checks increasing the chance of arrests and spending more time on the beat) and officer safety (although it was argued by some officers that the use of the mobile devices can put them in danger as they concentrate more on the device rather than monitor the surrounding environment). The issue of officers' safety while using mobile technology was highlighted in several studies (Hampton and Langham, 2005; Norman and Allen, 2005; Lindsay et al., 2009). Therefore, Karanasios and Allen's (2014) study highlighted the main congruencies and contradictions between mobile technology and mobile working, and the relationship between the two. In the next section, the Mobile Information Programme which was funded by the Home Office in 2008 and its impact on officers' effectiveness and efficiency is further explored. Moreover, key gaps in previous research studies are highlighted.

1.4 The Mobile Information Programme and Key Research Gaps

1.4.1 Introduction

As a means of enhancing the effectiveness and efficiency in the police service, the use of Information Technology (IT) in police forces is highly encouraged by the UK government (House of Commons Report, 2008). The UK police rests, amongst others, on the principle of accountable officers (Mawby and Wright, 2005; Sørensen and Pica, 2005) which has become equivalent to ‘cost effective’ policing (Tilley and Laycock, 2014; Cockcroft, 2015). Technology has been and is still used as a mechanism of accountability (Sørensen and Pica, 2005). The idea of ‘Cost effective policing’ and the efficient use of police resources started in the early 1970s (Southgate, 1985), yet as Cockcroft and Beattie (2009) claim, the Home Office Circular 114 in 1983 is of significance as it introduced the “New Public Management” (NPM) to police forces. Financially, this suggested that increases in the police forces’ budgets will be granted only to forces that are able to allocate their resources in accordance to their priorities and targets (Home Office, 1983). Hood (1991) profiled the NPM’s seven principles that focused upon the enhancement of the effectiveness of the public sector organisations. The implementation of the NPM’s principles in policing has led to the adoption of some managerialist approaches that attempted to redefine the police role in narrower forms from the traditional visions of policing and they were however resisted by officers and by the Police Federation (Reiner, 1998). Ackroyd et al. (1992) called it the ‘entrepreneurial revolution’ in policing.

Similar resistance has been manifested against efforts to transform the police service to adopt Evidence-Based Policing (EBP) strategies which aim to base police actions on scientific evidence about ‘what works’ (Willis, 2013; Willis and Mastrofski, 2017), hence, enhancing officers’ accountability and professionalism. This resistance stems from one of the ‘core characteristics’ of police culture (Reiner, 2000) that views policing as a ‘craft’ (Wilson, 1968; Sherman, 1998, 2015; Lum, 2009), that is, hands-on experience not scientific knowledge is the foundation of effective policing. Therefore, police occupational culture will continue to resist any reform efforts as long as the core police culture aspects are not taken into consideration (Loftus, 2010; Willis and Mastrofski, 2018) and social transformation is not achieved (Loftus, 2010).

Nevertheless, the UK government's efforts to boost police officers' productivity and efficiency continued and is clearly manifested in its investment in the Mobile Information Programme.

1.4.2 The Mobile Information Programme Objectives and Funding

As police forces are information intensive organisations (Nunn, 2001), the use of information technology in policing has led to the transformation of the social and the organisational life in forces (Ackroyd et al, 1992). For instance, the use of the Police National Computer (PNC) in traffic policing has significantly reduced officers' time spent on checking data such as ownership, road tax and suspicious vehicles leading to enhancing the visibility and "the discretion and autonomy of the 'on ground' officers" (Ackroyd et al, 1992:120).

Furthermore, the presence or visibility of uniformed police officers on the street has a direct impact on the public's perception of reassurance (Povey, 2001; HMICFRS report, 2018). The number of officers on the street is partly a function of the number of officers available to deploy. The use of mobile technology in police forces is expected to increase officer time available for front-line patrol and other operational duties; e-policing is a term used to describe this programme of work (Povey, 2001). There is evidence that high visibility of patrol officers reduces disorder in hot-spot areas such as outside licensed premises at closing time (Povey, 2001). In addition, Balkin and Holden (1983) have already argued that the presence of uniformed public-sector workers who are working in communities in which they have a vested interest, significantly reduce fear and boost feelings of safety. As far back as 2006 the Association of Chief Police Officers (ACPO report, 2006) highlighted the positive impact of visible policing on enhancing a community confidence and public's perceptions of security.

Therefore, between 2008 and 2010, the Home Office distributed £71 million to police forces to fund the Mobile Information Programme and a further £9 million to the NPIA (National Policing Improving Agency) to deliver the management of the programme (House of Commons Report, 2012). This programme has enabled the roll-out of 41,000 mobile devices, called 'Kelvin devices' to police officers, allowing them to spend a greater percentage of their working time out of police stations. The main objectives of this programme are to increase visibility of police officers, boost efficiency and effectiveness of the police service and to reduce bureaucracy (House of Commons Report, 2012). Using these mobile devices as shown in figure 1.1 below, officers can perform policing tasks, such as issuing traffic tickets, complete Stop and Search forms, conduct PNC security checks on people and vehicles, write witness statements, record entries in the pocket Notebook application, view/update incident logs, take photographs, use Google Maps application, use the E-signature feature, write/receive E-mails and contact victims via texting or calling. It is worth noting that more than one third of police forces in the UK are using the Kelvin devices.[1]

However, during Her Majesty's Inspectorate of Constabulary (HMIC) police inspection for efficiency in 2015, it was reported that police forces' change programmes are focused largely on cost savings, rather than wider benefits for the public and the organization (HMIC PEEL Report, 2016). Hence, the need to understand the causes that prevent many police forces from realising the anticipated benefits of the mobile devices.

[1] https://www.motorolasolutions.com/en_xu/products/command-center-software/records-and-evidence/pronto.html#tabproductinfo

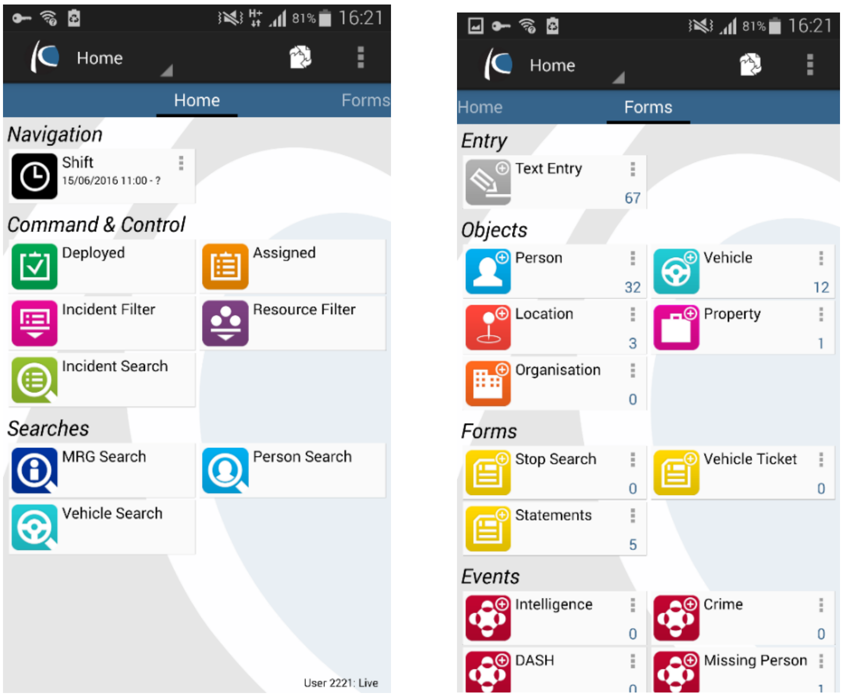

Figure 1.1 A Snapshot of the Mobile Kelvin Device Interface and Functionality

1.4.3 Key Research Gaps Identified in the Mobile IS Studies Conducted in UK Police Forces

The research studies presented in sections 1.3.2, 1.3.3 and 1.3.4 have provided valuable insights by facilitating the understanding of the different aspects that influence the use of mobile Information Systems in police forces among various police roles and in different work contexts. These studies adopted a qualitative methodology approach as it best fits the in-depth exploration goals of these studies. However, it is beyond their exposition to provide insights on the extent or magnitude of officers' adoption and utilisation of the mobile devices' various functionalities in their policing daily tasks. This is particularly significant as the NPIA's (House of Commons Report, 2012) evaluation of the increase in police officers' visibility, as a result of investing in the Mobile Information Programme presented in section 1.4.2, showed that on average officers spent around 18 minutes extra per shift outside a police station (as a result of using the mobile devices in performing policing tasks). Only one in five forces has used the technology effectively to improve their operational processes (House of Commons Report, 2012), therefore, the longer-term realisation benefits of the Mobile Information Programme have not been achieved.

Furthermore, in 2016, it was estimated that the total annual spending on police ICT was £1.5 billion per year (National Audit Office, 2016). In 2018/2019, an increase in police force budgets of up to £270 million was spent on police technology and special grants forces (Home Office, 2017). In addition to that, an extra £130 million will be provided to fund national programmes especially police technology to improve the productivity and make significant gains by enabling officers to spend extra time on the frontline (Home Office, 2017). The Home Office report (2017) claims that if all forces improved mobile working to the same degree as the outstanding forces, this could potentially free up the equivalent of 11,000 extra officers nationally. In addition, the HMICFRS (2018) report findings indicate that officers' visibility remains a key concern to the public. Consequently, the need to understand the reasons behind the diminished improvement in officers' visibility in police forces is paramount.

Wang et al. (2008) and Fadel (2012) argue that understanding the salient factors that characterise the depth or the extent of use rather than frequency of use of different technology features in the post-adoptive stage is under investigated despite being essential in promoting positive attitudes towards technology in organisations. Post-adoptive behaviour is defined as "the extent to which users are making use of features in their IT systems, as well as the extent to which they are gaining understanding of both the software and work processes through training and experiential intervention" (Clark et al.,2009:3).

Therefore, using not only qualitative but also quantitative data collection methods can "provide a richer, contextual basis for interpreting and validating results" (Kaplan and Duchon, 1988:575). Qualitative data can help explore the key reasons contributing to officers' resistance preventing them from using the full range of functionalities offered by their mobile Kelvin devices while quantitative data can use the main themes identified in the collected data to paint a clearer picture about the magnitude of this resistance and/or adoption among different roles and ranks in police forces. Furthermore, online surveys could be used to collect information from a larger sample of police officers about the main applications that they frequently use, useful applications that should be added to their mobile devices (Kelvin devices), general attitudes towards the mobile technology in police forces, the quality of the technology training provided, the adequacy of the training to officers' IT skills and the magnitude of technical support available for officers after the roll out of the Kelvin devices. In addition, online surveys can facilitate collecting valuable information about the significance of the role played by management and supervisors in promoting the use of the Kelvin devices among their teams. "Using quantitative data methods does not imply the acceptance of a positivist, objectivist epistemology. Rather, such data can (and should) be interpreted in the light of relevant social meanings, and their production as a social construction" (Mingers, 2001:247).

Therefore, adopting research methodologies that integrate quantitative and qualitative data collection methods will provide insightful guidance information about different effective methods of achieving a better fit between the mobile devices' features, officers' knowledge and technical skills, the task and the work context. These methods can help mitigate officers' resistance to using the full range of functionalities offered by the Kelvin devices and can promote efficient utilisation of the devices' features. Only then, the rectification is deemed congruent as the corrective responses are in congruence with the cause of resistance (Rivard and Lapointe, 2012). This study's objectives aim to increase the visibility of police officers through enhancing the efficiency and effectiveness of the police service as outlined in the House of Commons Report (2012). In the next section, the key objectives of this dissertation are presented in detail.

1.5 Research Study Objectives

The objectives of this study are threefold; first, to identify the key reasons for officers' resistance to using the full range of functionalities offered by their Kelvin devices in performing daily tasks. Second, to design technology training sessions that mitigate officers' resistance and promote efficient usage of the Kelvin devices' features. Third, to highlight the salient factors that impact the learning process during technology training sessions and can influence officers' attitudes in the post-adoption stage of the utilisation of the Kelvin devices at the Constabulary.

To achieve the first objective, a pilot study is conducted in a medium-sized Constabulary in the UK. The officers at this Constabulary have been using their smart phones since 2014 (pilot study conducted three years after the Kelvin devices roll out at the Constabulary). The pilot study consists of an initial focus groups phase followed by an online survey. The findings of the focus groups sessions are analysed and grouped into main themes. The online survey used these themes to collect more in-depth and accurate data about the benefits, general attitudes and barriers to using the smart phones. Negative attitudes towards the mobile Kelvin devices dominated the results of the pilot study. Officers reported some functionality limitations such as not having the intelligence application integrated to the Kelvin devices (which were promised by top management before the roll out of the Kelvin devices), as a consequence they reported to be obliged to visit the stations frequently to update the systems' databases. Many training-related problems were highlighted in the sessions. For instance, the initial Kelvin devices' training was a one-day training that covered the main functionalities of the devices as well as how to keep them secure in a lecture-based style with no hands-on practice. Officers had no data input method other than the Kelvin devices' small keyboard to perform all the policing tasks. There was a myriad of problems reported by officers because of the inability to appropriate the Kelvin devices' functionalities in different contexts and to various tasks. The Kelvin devices' initial training did not accommodate for differences in officers' IT skills, experiences, tasks, work contexts and police culture (ensuring the existence of a good-fit between all these factors). The context in which mobile Information Systems are used in is a substantial difference between mobile and stationary technology (Sawyer et al., 2003; Turel, 2006; Gebauer et al, 2010). Training should not just address technical use of equipment but should also cover changes in new communication and work protocols, and relevant health and safety practices (Lindsay et al., 2009).

Because of the restricted mobile technology training, many officers were unable to realise any efficiency gains out of using the devices and reverted to using pen/paper again. This adversely affected the quality of the information recorded using the devices and ultimately, the perceived usefulness aspects of the devices were questioned. The pilot study structure and findings will be presented in detail in chapter four. Similar training related problems were reported by Lindsay et al. (2009) in Leicestershire Constabulary. Lindsay et al. (2014) argued that the small amount of training and lack of real-life scenarios provided during the implementation process had a negative impact on the perceived usefulness of the mobile devices at Leicestershire Constabulary. Police technology training programmes should be designed to extend officers' skills beyond the basic use of the devices (Ioimo and Aronson, 2004). Venkatesh et al. (2002) and Bhattacherjee and Premkumar (2004) highly recommend organisations to invest in technology training programmes to create a positive user experience as it directly impacts on the technology's perceived usefulness (the most crucial belief driving IT usage) and attitudes of employees.

To achieve the second objective of this study; design technology training sessions that mitigate officers' resistance to efficient utilisation of the Kelvin devices' features, a conceptual model for technology training (Fit Appropriation Model for Training (FAMT)) is posited and validated. Face-to-face or classroom training style deemed more appropriate than the e-learning style frequently used by the Constabulary to accomplish the technology training goals identified in the pilot study. Three training sessions are conducted at the Constabulary where officers are trained on using new Kelvin devices features to enhance their perceptions of the usefulness of the devices, bridge officers' technical skills gaps, link the features to work contexts and promote satisfaction of the features among participating officers.

The third objective is achieved by analysing the observations collected during the three training sessions to identify the salient factors that impact the learning process during technology training influencing officers' attitudes and post-adoption utilisation of the Kelvin devices. Thus, extending our knowledge about the under researched area of identifying key factors that impact the learning process during technology training in mandatory settings like police forces.

1.6 Theoretical Approach and Methodology

The pilot study is theoretically based on Beaudry and Pinsonneault's (2005) Coping Model of User Adaptations (CMUA). Drawing on the Coping Theory (Lazarus and Folkman, 1984), Beaudry and Pinsonneault (2005) proposed CMUA to extend the knowledge about the mediating role of user adaptations or appropriations in the process of technology acceptance and/or resistance. CMUA facilitates understanding the cognitive and behavioural process that takes place when a new technology is introduced in an organisation, after implementing the new system and the post-adoption adaptations or appropriations on both the individual and the organisation levels. Therefore, using the CMUA to understand the key factors that influenced the acceptance and/or resistance of the utilisation of the Kelvin devices at the Constabulary can extend our understanding of appropriate management interventions that are in congruence with mitigating the 'resistance to change' in mandatory setting.

Furthermore, the design of the Fit Appropriation Model for Training incorporated officers' needs identified in the pilot study and methods of extending the use of the Kelvin devices' features to various work contexts. This entailed choosing new Kelvin devices features that best fit the daily tasks accomplished by front-line police officers and presenting them using behavioural modelling training techniques. The learning process was consolidated at the end of the training by using problem-based learning and scenario-based learning methods.

The appropriation training sessions are theoretically based on:

- The Fit Appropriation Model (Dennis et al, 2001) which incorporates the Task Technology Fit Theory (Goodhue, 1995; Goodhue and Thompson, 1995; Zigurs et al., 1999) and the appropriation concepts based on the Adaptive Structuration Theory (DeSanctis and Poole, 1994; Wheeler and Valacich, 1996) to enhance the utilization of newly adopted IT systems in organizations and boost users' performance.
- Behavior Modelling Training (BMT) techniques (Bandura, 1977a; Yi and Davis, 2001). These techniques (based on Bandura's (1977a) Social Learning Theory) are among the most effective training methods (Taylor et al., 2005) as they have been widely applied in the development of customer service skills, supervisory communications skills,

cross-cultural skills and computer skills training programmes (Gist et al., 1988;1989; Compeau and Higgins, 1995a; Simon et al., 1996; Simon and Werner, 1996; Yi and Davis, 2001).

- Collaborative learning techniques based on the Adult Learning Theory of Andragogy principles (Knowles, 1980) to improve officers' self-directed learning skills, long-term memory, problem-solving skills and the learning process in general (Boud and Felletti, 1997; Banta et al., 2001; Dochy et al., 2003; Docherty et al., 2005; Koh et al., 2008; Werth, 2011).

The study was conducted during the period 2016-2018 using a pragmatic multi-method Action research methodology approach. Data collection was carried out via focus groups sessions, unstructured interviews, online surveys, text messages (SMS), Q-cards ranking and observations.

1.7 Research Overview and Structure

This dissertation chapters' structures are organised as follows:

Chapter two presents the different aspects associated with the appropriation or adaptation process in the event of introduction of a disruptive IT in an organisation. This is followed by an illustration of the IT models that used the Task Technology Fit Theory along with the appropriation concepts to enhance users' performance in the IS domain. The significance of using collaborative learning methods that are based on the principles of Adult Learning Theory of Andragogy methods in technology training are discussed in addition to the main aspects of end-users' training techniques. The chapter concludes by the key determinants of post-adoption utilisation of technology in organisations and the role of management support and police culture on the adoption of technology.

Chapter three discusses Pragmatism as the underpinning philosophical paradigm adopted in this research study. Action research is adopted to study the causes for officers' resistance to using the full range of functionalities offered by the Kelvin devices and in delineating the key factors that impact the learning process during technology training. Action research is used to validate FAMT's effectiveness in boosting learners' perceptions of the features' usefulness and satisfaction in the post-adoption stage. This is followed by presenting the research design and its various aspects. The chapter concludes by highlighting the multi-method approach for data collection and data analysis.

Chapter four presents the pilot study methodology, data and analysis. A detailed literature review is conducted to demonstrate the various causes of resistance to change identified in previous research studies followed by the different methods adopted by users to adapt to the introduction of disruptive IT events in organisations. This is followed by presenting the methodology and data collection methods used in the pilot study. Three data collection methods were adopted; focus groups sessions, Q-Cards methodology and online survey. The data collected is analysed using Beaudry and Pinsonneault's (2005) Coping Model of User Adaptations and a comprehensive discussion of the key reasons for officers' resistance to change is presented.

Chapter five focuses on the role of top management in supporting the acceptance/resistance of the Kelvin devices at the Constabulary. The barriers to adoption of the mobile devices that were resolved as a result of reporting the pilot study's key findings to senior management are presented along with the unresolved causes for officers' resistance. The new features chosen to be presented in the technology training sessions and the reasons behind the choice of these features are highlighted. The design of the training sessions and the observations collected are demonstrated.

Chapter six discusses the findings and results of the study, linking them to the theories highlighted in chapter two. Hence, the research study findings are discussed in the context of extant literature to evaluate the key contributions made. The chapter concludes by an assessment of the technology training outcomes and impact on the learning process.

Chapter seven presents the contributions of the research study to both theory and practice. Finally, the limitations of the research and suggestions for future research to advance our knowledge in the field of technology training are highlighted.

1.8 Conclusion

In this chapter, key research gaps in previous research studies conducted to understand the usage of mobile Information Technology in policing are presented. There is a profound need to extend the explorative qualitative studies to multi-method approaches that adopt quantitative and qualitative data collection methods. Thus, furthering our knowledge about the key barriers to using the full range of the Kelvin devices' functionalities efficiently in police forces.

Therefore, the aim of this research study is to enhance the technology learning process through using the Fit Appropriation model for training (FAMT) that incorporates principles of the Task Technology Fit Theory, the concepts of appropriation in addition to collaborative learning methods (that are based on the Adult theory of andragogy principles) and behaviour modelling for training methods. Furthermore, examining officers' post-adoptive behaviours and coping mechanisms can facilitate enhancing technology training sessions' design to boost officers' use of the Kelvin devices' features.

Chapter Two - Literature Review

2.1 Introduction

In chapter one, key research gaps in previous studies have highlighted the necessity to vary data collection methods. Thus, integrating both quantitative and qualitative methods not only can facilitate the collection of rich data about actual causes of officers' resistance but can also inform research about the magnitude of this resistance and officers' adaptations to the Kelvin devices' use in various contexts and roles. Moreover, this study's research objectives provide a roadmap outlining the methods adopted to achieve these objectives.

In this chapter, a comprehensive literature review of the different aspects and dimensions of the technology appropriation process are discussed. The technology models that incorporated the appropriation concepts to promote users' performance and satisfaction in organisations in the post-adoptive stage of technology use are presented. Furthermore, a review of the key learning techniques like the Theory of Assimilation, enhancing learners' mental models through using exploratory methods, behavioural modelling techniques and collaborative training methods are illustrated. In addition, key determinants of post-adoption technology utilisation are highlighted. The impact of gender differences on the learning process and the role of police culture and top management support in promoting technology acceptance/ resistance are presented.

2.2 Aspects of the Fit and Appropriation Process of Technology

2.2.1 Overview

One of the most prevalent theories in Information Systems (IS) research that aims to explain the interaction process that takes place between users and the technology in organisations is the Adaptive Structuration Theory posited by Giddens (1984). According to the Adaptive Structuration Theory, when a new technology is first introduced into a group, an appropriation process takes place by which members of the group examine the structures of the technology (i.e., its spirit[2] and structural features[3]) and reach a common consensus on how to use them (DeSanctis and Poole, 1994). This process affects and is affected by the social structures and the norms of the group and/or organisation (DeSanctis and Poole, 1994). Similarly, a system is appropriable if the users can easily find ways of learning the system's functionalities to use it in different contexts (Saariluoma and Isomäki, 2009). Wirth et al. (2008) argue that there are other metaphors that have been used to describe the process of appropriation like 'domestication' (Silverstone and Haddon, 1996; Berker et al., 2005) and 'social shaping of technology' (Lievrouw and Livingstone, 2002).

Haddon (2006) defines domestication as the process whereby people encounter the technologies and deal with them, either rejecting the technologies or fitting them into their everyday routines. Social Shaping of Technology is an aspect of the Domestication Theory (Williams and Edge, 1996). The Social Shaping of Technology theory aims "to grasp the complexity of socio-economic, cultural and political processes involved in technological innovation and use, and to move beyond narrow technical considerations" (Hynes and Richardson, 2009:484). Within the

---

[2] Spirit is the "general intent about values and goals underlying a given set of structural features… The spirit is the "official line" which the technology presents to people regarding how to act when using the system, how to interpret its features, and how to fill in gaps in procedure which are not explicitly specified" (DeSanctis and Poole, 1994:126).

[3] Structures are resources, rules and capabilities embedded in a context (DeSanctis and Poole, 1994).

Social Shaping of Technology approach, the Social Construction of Technology Theory (SCOT) is of interest as it addresses the relationship between technology and society. This theory focuses on a very significant point namely ‘interpretive flexibility’. This denotes “the way in which different groups of people involved with a technology can have very different understandings of the technology, including different understanding of its technical characteristics” (Hynes and Richardson, 2009:484). However, interpretive flexibility does not continue forever “closure and stabilization occur, such that some technologies appear to have fewer problems becoming embedded in society” (Hynes and Richardson, 2009: 485). In this study, the term ‘appropriation’ will be used.

2.2.2 The Appropriation Process’s Social Moves and Dimensions

During the introduction of a new IT system in an organisation, any ambiguity about the value and the purpose of the new system or the sense-making process will create appropriation moves where group members try to interpret a technology’s value and methods of use (DeSanctis and Poole, 1994). Three modalities of social appropriation moves are identified by Jasperson et al. (1999): conformance, imitation and mutual discovery. “Conformance appropriation moves describe voluntary decisions and actions by individuals to observe the IT use norms of their social circles” (Jasperson et al., 1999:114). Imitation appropriation moves refer to “voluntary decisions made by individuals to learn from the actions of their social peers” (Jasperson et al., 1999:115). Mutual discovery appropriation moves describe the collaboration of members of a group with their peers in “joint sense-making and technology exploration” (Jasperson et al., 1999:115). The social influence created by the appropriation moves could impact on the use behaviours of the group (Jasperson et al., 1999).

Furthermore, Poole and DeSanctis (1990) outline three fundamental dimensions that influence the process of appropriation: faithfulness / unfaithfulness, attitude of the users towards the new technology (negative attitudes could affect the adoption and the appropriation process) and level of consensus (if members of an organisation agree over how structures of technology are used). Faithfulness of the appropriation process leads users to use the system in the same way as the designers' initial defined processes or "unfaithful" otherwise (Wheeler and Valacich, 1996). Faithful appropriations are consistent with the spirit and structural feature design of the technology used (DeSanctis and Poole, 1994). Unfaithful appropriation is not bad use of the system but rather the use that deviates from the spirit and the main purpose of introducing the technology. An example of unfaithful appropriation of technology is evident in Wiredu's (2007) findings. The author conducted a study in which he acted as a professional facilitator in a work-integrated learning (WIL) project in the National Health Service (NHS) to help twelve health professionals in using and appropriating the newly introduced PDAs (Personal Digital Assistants). The facilitation process helped health professionals adopt the devices in the context of personal use only (they used the PDA's calendar application, alarm, etc.) which called for the abandonment of the devices as they were not serving the initial purpose of using them (Wiredu, 2007).

Another major factor that can influence the appropriation process is users' attitude towards the technology. The extent to which users perceive the value and usefulness of the technology and their willingness to work hard and excel at using the IS can determine the success of the appropriation process (DeSanctis and Poole, 1994). Whilst the appropriation process may not be deliberate, members of an organisation make active choices in how technology is used within their groups. Greater agreement on the appropriation of the work processes and technology can lead to an enhanced consistency in the group's utilisation patterns (DeSanctis and Poole, 1994).

2.2.3 The Technology Appropriation Process

For the technology to have significant impact on user performance, both IT-user fit, and the IT-task fit must be realised (Beaudry and Pinsonneault, 1998). The concept of appropriation (DeSanctis and Poole, 1994; Giddens, 1984; Orlikowski, 1992, 2000; Tyre and Orlikowski, 1994, 1996) is central to achieving both fits as technology appropriation involves users' adjustments to the technology and to their skills, work processes and habits (Beaudry and Pinsonneault, 1998). Accordingly, Beaudry and Pinsonneault (1998:710) propose two dimensions of appropriation: *adaptation and adjustment* as shown in figure 2.1. "Adaptation is the process of assuring a fit between the technology and the user." "Adjustment, on the other hand, is the process of facilitating the fit between IT and the task it supports by modifying the technology, the work process, or both" (Beaudry and Pinsonneault, 1998:711). These two dimensions of appropriation form the 2 x 2 framework resulting in four quadrants; *Appropriation* (IT-user and IT-task fit), *Non-Appropriation* (IT-user and IT-task mis-fits), *Non-Adaptation* (IT-user mis-fit and IT-task fit) and *Non-Adjustment* (IT-user fit and IT-task mis-fit) (Beaudry and Pinsonneault, 1998).

In the case of 'Appropriation', a double fit is present and ultimately, positive impacts of technology on users' performance are expected. 'Non-Appropriation' represents a situation where the IT does not fit with either the task and the user. In this situation, the use of technology will have adverse effects on performance. In the 'Non-Adaptation' quadrant, there is a fit between the technology and the task but a mis-fit between the technology and the user. Hence, the effects of the fit and mis-fit are likely to cancel each other, and technology usage is expected to have no significant influence on performance. In the fourth quadrant; 'Non-Adjustment', there is a mis-fit between the technology and the task and a fit between the technology and the user. In this situation, the impact of technology usage on performance is negligible, as in the Non-Adaptation quadrant (Beaudry and Pinsonneault, 1998). The authors claim that these two processes (adaptation and adjustment), when applied recursively (through using the IT system), both IT-task and IT-user fits can be achieved.

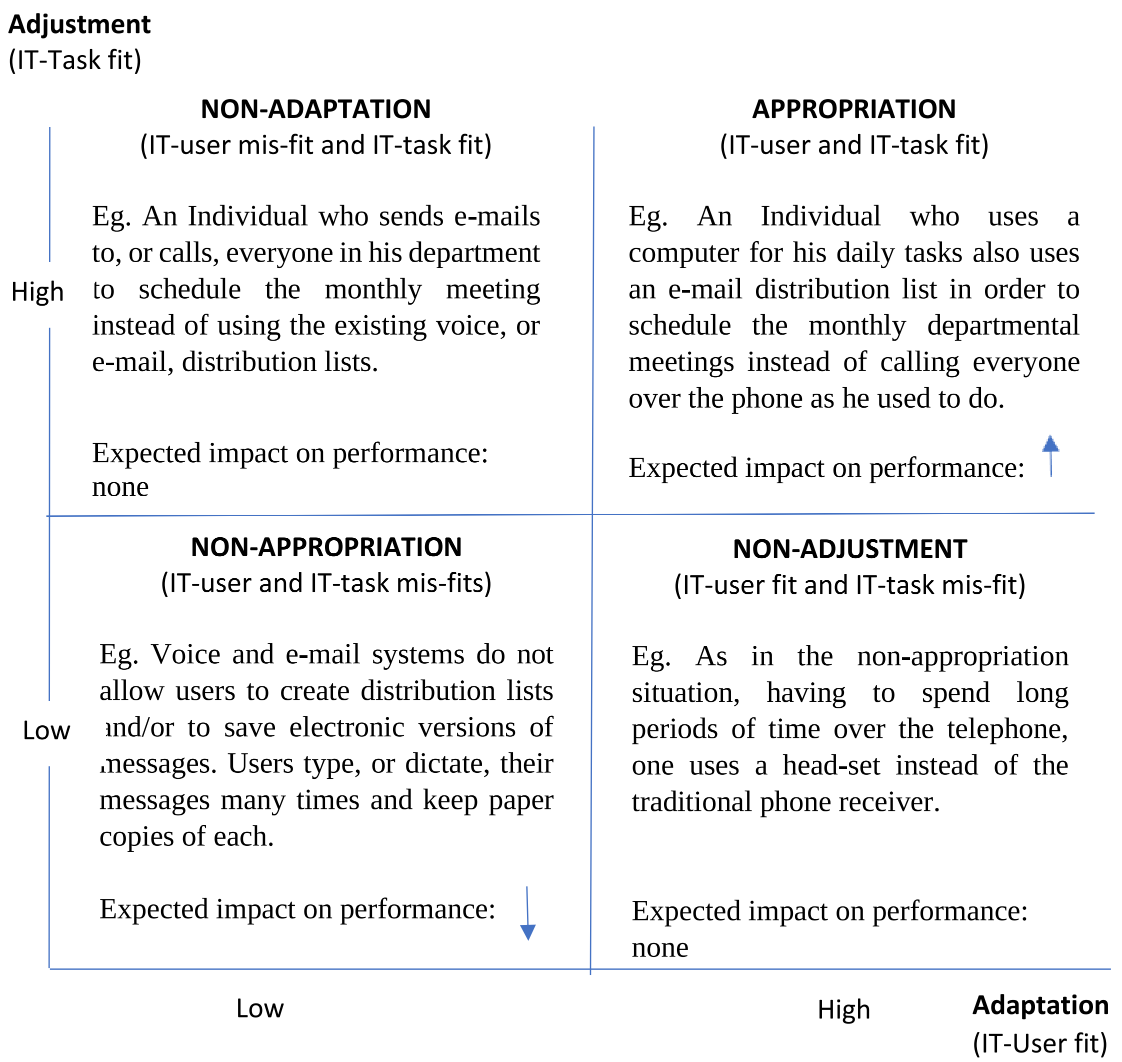

Figure 2.1 Appropriation of IT and Performance (Beaudry and Pinsonneault, 1998:711)

Beaudry and Pinsonneault's (1998) argue against the Task-Technology Fit (TTF) Theory's (Goodhue and Thompson, 1995) claim that the two fits should precede the use of the system rather than that the two fits are achieved through the utilization of the system (Beaudry and

Pinsonneault, 1998; Todd and Benbasat, 1999; Gebauer et al., 2010). Similarly, Barki et al. (2007) argue that the user-technology-task interactions and adaptations continue to shape IS use after the initial fit claimed by the TTF Theory.

Furthermore, two fundamental factors can influence the appropriation process: individual differences or aptitudes and appropriation support or scaffolding (Gupta and Bostrom, 2009; Gupta et al., 2010). Ackerman et al. (1999) defined aptitudes as the initial abilities of persons that influence behaviour in specific conditions. Appropriation support or scaffolding are means of enforcing the faithfulness of the appropriation process (Gupta and Bostrom, 2009; Gupta et al., 2010). Dennis et al. (2001:185) argue that appropriation support has a direct impact on users' satisfaction as it can eliminate the frustration developed when trying to apply an 'unfamiliar technology process'. It could be in the form of process guidance (facilitators and/or appropriation training) and/or process restrictiveness (limiting the user choices to a subset of all possible processes) to eliminate the uncertainty about the IT system (Wheeler and Valacich, 1996; Gupta and Bostrom, 2009).

Process guidance through training provides only an awareness of the 'heuristics' (structures which describe a specific activity) to the users of the technology but it does not ensure that these heuristics will be used or followed; hence it is a passive appropriation mediator (Wheeler and Valacich, 1996). Training only provides a common knowledge to all users on how to apply the heuristics (Wheeler and Valacich, 1996). Appropriation training extends the technical training (how to use IT) into when to use it to achieve tasks efficiently and effectively (Dennis et al., 2001; Fuller and Dennis, 2009). Wheeler and Valacich (1996) claim that active facilitation is the most efficient method in achieving faithful appropriation and improving group processes. This is because it provides both guidance and restrictiveness as the facilitator monitors and provides direct intervention to encourage faithful appropriation (Dennis et al., 2001). This facilitation-like expertise could be achieved through using a third-party facilitator and/or system announcement (Wheeler and Valacich, 1996). Multiple appropriation mediators can be used concurrently to increase the faithful use of the technology (Wheeler and Valacich, 1996). In addition, good guidance that incorporates personalised training/facilitation could enhance individuals' aptitudes (Gupta and Bostrom, 2009).

By using the theoretical frame of patterns approach (especially among virtual teams who communicate using the mobile technology), virtual teams could achieve a better fit specific to the context as argued by Zigurs and Khazanchi (2008). The authors posit that a pattern consists of three parts: a problem, a specific context and a solution. The problem is "a set of forces that occur repeatedly in that context. The solution is a certain 'spatial configuration' that allows the set of forces to resolve themselves" (Zigurs and Khazanchi, 2008:3). This approach can be used as a form of process guidance during the appropriation process.

2.2.4 Fit and Appropriation Model (FAM)

Among the diverse set of theories employed in the IS domain to understand the antecedents of technology acceptance in organisations is the Task-Technology Fit theory (TTF). It proposes that a good fit between the technology, the task, and the team/user can lead to better performance (Goodhue, 1995; Zigurs et al., 1999; Dennis et al., 2001). As the TTF theory is not based on attitude/behaviour models (like the Technology Acceptance Model (Davies, 1989)), it can be used to study technology utilisation in both voluntary and mandatory settings. The TTF theory has been successfully adopted in several mobile Information Systems' studies to examine IS use and performance (Gebauer et al., 2006; Gebauer and Tang, 2008; Gebauer and Ginsburg, 2009). Different aspects of TTF have been confirmed relevant for Information Systems technology in job performance (Goodhue and Thompson, 1995; Belanger et al., 2001; Norzaidi et al., 2009), as well as for specific technologies (Dishaw and Strong, 1998, 1999; Goodhue et al., 2000), and for a variety of tasks (Staples and Seddon, 2004; Majchrzak et al., 2005).

Another alternative perspective (based on the Adaptive Structuration Theory (Giddens, 1984) as mentioned in section 2.2.1) argues that performance depends on how teams appropriate technology's' features and the social structures that affect the use of technology as mentioned above (DeSanctis and Poole, 1994; Wheeler and Valacich, 1996; Majchrzak et al., 2000); resulting in the same IT being used in multiple ways in an organisation (Robey, 1995). The Fit-Appropriation Model integrates these two perspectives and has been used to assess its benefits within groups/teams newly introduced to Group Support Systems (GSS) (Dennis et al., 2001). GSS are software packages that facilitate the exchange of information and decision processes during group discussions.

The findings of Dennis et al.'s (2001) study reveal that a good fit without the needed appropriation support is less likely to improve performance. Similarly, appropriation is affected by the fit itself as a good fit is more likely to promote faithful appropriations that occur when group members' use of the technology matches/fits with the way the designer intended the IT to be used (Dennis et al., 2001). In other words, the use of the technology matches its' spirit. The organisations' norms and the appropriation mediators (like the group, task and the way in which the technology is used) can affect the appropriation process (Dennis et al., 2001). Appropriation support can contribute to users' satisfaction as it eliminates frustration because of the struggle to integrate the technology into their work processes (Dennis et al., 2001).

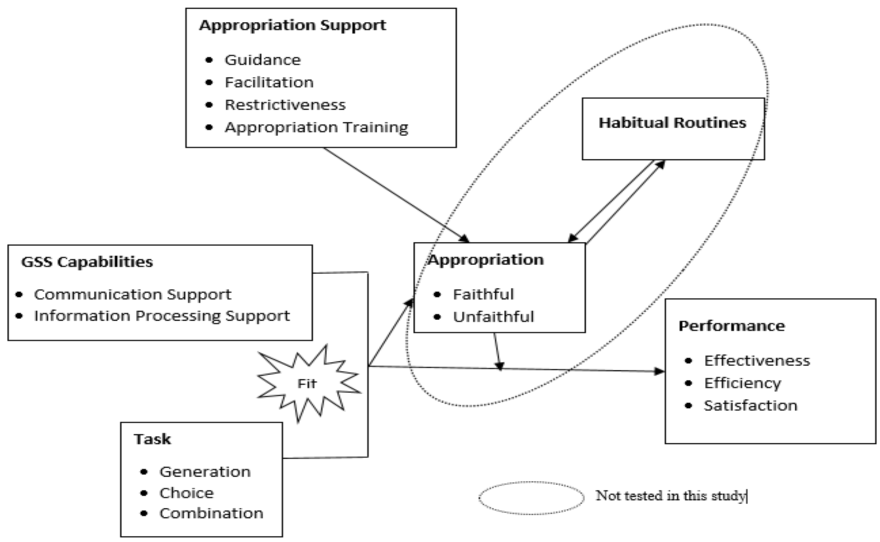

Figure 2.2. A Fit-Appropriation Model of GSS Performance (Dennis et al., 2001:174)

FAM has been extended by Fuller and Dennis (2009) to incorporate the 'time' in the model. Thus, "initially, TTF influences appropriation and that over time, appropriation influences TTF" (Fuller and Dennis, 2009:3). These findings are consistent with Beaudry and Pinsonneault's (1998) research findings. Fuller and Dennis (2009) argue that teams with poor-fit between tasks and technology, over time, appropriate their use of technology in different ways to improve their performance. Hence, appropriation plays a strong role in predicting performance than fit (Fuller and Dennis, 2009). Prior knowledge and experiences of team members can constrain the appropriation process as individuals attempt to appropriate "structures that are salient to them based on their level of knowledge and familiarity with the structures from prior use" (Fuller and Dennis, 2009:5). The process of appropriating structures will take place if team members believe that the gradual gain in performance is worth the cost of modifying their behaviours (Connolly and Thorn, 1987). The appropriation process performed repeatedly, over time, will develop new routine patterns and habits that can improve effectiveness and efficiency (Gersick and Hackman, 1990; McGarth, 1991).

Furthermore, Fuller and Dennis (2009) argue that much of the training provided to employees is ‘fit’ training where individuals are taught the features of the technology and how to use them to perform certain tasks. Therefore, Fuller and Dennis (2009) and Dennis et al. (2001) propose that organisations should include ‘appropriation training’ that enables individuals to recognise the need for change and methods of achieving it. Appropriation training is particularly important in mandatory settings (where the use of the technology is compulsory) as it engenders positive attitude towards the technology and its use as argued by Brown et al. (2002). Appropriation end-user training will be discussed in section 2.3 below.

2.2.5 The Impact of Work Context and the Use of TTF Theory in Understanding Mobile Information Systems’ Utilisation

Two studies undertaken by Ioimo and Aronson (2003, 2004) have used the Task Technology Fit Theory (TTF) in the policing mobile technology domain. The authors have aimed to measure the impact of the use of mobile technology on patrol officers, detectives, administrators and records personnel in a medium-sized police force in America. They have reported a variation in productivity improvements among different police roles because of using the technology in different contexts. These results are in congruence with the findings of Sørensen and Pica (2005) as they reflect the importance of appropriating the technology functionalities to the work context. Gebauer and Tang (2008) differentiate between functional and non-functional requirements when using the task-technology fit in studying mobile Information Systems. Non-functional features could be related to the operation of the devices such as processor speed, size of keyboard or screen or to the “availability of the technology in various use situations” (Gebauer and Tang, 2008:5). Non-functional requirements and the use context could impose constrains on the use of mobile technology as a result of reduced level of fit between the technology and the user (Gebauer and Tang, 2008).

Furthermore, Gebauer et al. (2006) and Gebauer et al. (2010) have developed a TTF profile for mobile Information Systems to support managerial tasks comprising of three fits. As mobile use context is a substantial characteristic of mobile Information Systems (Siau et al., 2001; Pica et al, 2004; Pica and Sørensen, 2004), it is included in the TTF profile. Gebauer et al. (2006) and Gebauer and Ginsburg (2009) have reported that in order to successfully apply TTF in a mobile environment, the fit between the use context and the technology must be considered in addition to the fit between the technology and the task.

As shown in figure 2.3, the first fit is between managerial tasks and the Information System. This fit is the construct most similar to the concepts of TTF. In the second fit, the focus is on the features of the mobile Information System to suit a mobile use context. In the third fit, fit 1 and fit 2 are joined to achieve the task-technology fit for mobile Information Systems in support of managerial tasks. Gebauer et al. (2006) emphasize an additional factor that impacts on the success of mobile Information Systems which was included in a previous study (Gebauer and Shaw, 2004); user IT experience. Gebauer et al. (2006) claim that users' IT experience usually increases over time as they become familiar with the mobile Information System and applications used.

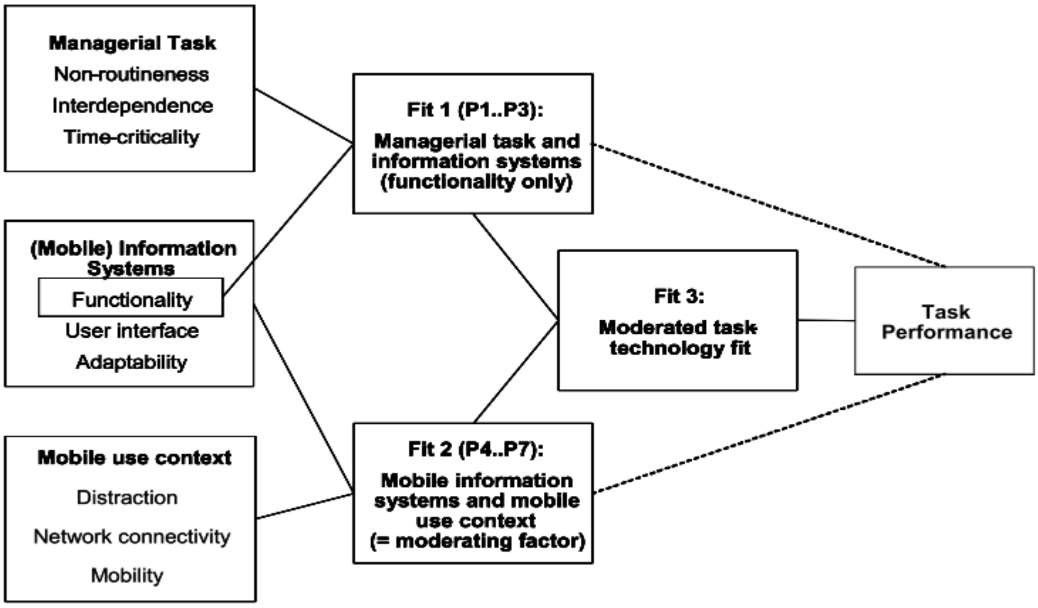

Figure 2.3. A moderated task-technology fit for a mobile Information System (Gebauer et al., 2006:31)

2.3 End- User Training Methods

2.3.1 Introduction

End-user technology training has been widely identified as an instrumental factor that ensures the successful adoption/utilisation of Information Systems in organisations (Nelson and Cheney, 1987; Davis and Bostrom, 1993; Compeau et al., 1995; Venkatesh et al., 2002). Training can influence Information Systems' adoption through its effect on users' perception of usefulness and ease of use (Agarwal and Prasad, 1999). A study conducted by Amoako-Gyampah and Salam (2004) to investigate the benefits of using effective training as a useful management intervention tool to boost utilisation of Enterprise Resource Planning (ERP) systems in organisations shed the light on the positive impact of training in the formation of positive beliefs/attitudes about the benefits of using IS, and ultimately on shared beliefs which influence both the perceived ease of use and perceived usefulness. ERP systems encompass an integrated suite of software tools and a central database used to manage multiple business operations in an organisation (Scott and Kaindl, 2000). The authors argue that through training, users gain hands-on experience of the system which allows them to explore both the technical and the functional perspectives of the technology (Amoako-Gyampah and Salam, 2004).

Within this context, Davis and Bostrom (1993) proceed to delineate two general classes of training features; process features and structural features. Process features like learners' reasoning process (induction versus deduction), level of programming (exploration learning, by its nature, implies trial and error while instruction-based learning with its programmed format minimises the occurrence of trials and reduces the number of errors) and control of learning (the learner has more control of the learning process in the case of exploration learning while in the instruction-based learning, the learner has no option but to follow the instruction) (Davis and Bostrom, 1993). Structural features include level of completeness (the amount of task-relevant information provided to the learner (Carroll et al., 1985)) and learning orientation (exploration learning focuses on broad outcomes or tasks compared to instruction-based learning that tends to focus on specific features).

2.3.2 Integrating the TTF Theory and Appropriation Concepts in End-user Training

The outcome of a comprehensive review of end-user training literature that has been conducted by Gupta and Bostrom (2009) and Gupta et al. (2010), have identified two philosophical schools in this discipline: the structuralist (also referred to as the deterministic, variance or contingency approach) and the voluntarist (or the process approach). The structuralist approach assumes that factors not controlled by the learner like the training method and individual differences can affect the outcomes from an Information System and impact on the development of the learners' mental models (Piaget, 1970). On the other hand, the voluntarist approach assumes that the learner makes real choices and can influence the learning outcomes (Giddens, 1984). This approach ignores the role played by external influences on achieving the learning goals or outcomes (Hansman, 2001). Gupta et al. (2010) argue that the two approaches not only lack theoretically grounded frameworks stemming from them but also fail to address contemporary training methods such as technology-mediated training methods (e-learning) and collaboration training methods.

Therefore, Gupta et al. (2010) have used the Adaptive Structuration Theory (AST) (DeSanctis and Poole, 1994) as a meta-theoretical framework that combines both approaches into one comprehensive framework. In AST, the task and the technology are inputs to the training process, facilitating the investigation of the interactions between different training methods using the Task Technology Fit theories (DeSanctis and Poole, 1994). AST adopts a socio-technical perspective (Bostrom and Heinen, 1977), hence, it encompasses the learners, their interactions, the technology they use and the task they perform (Gupta et al., 2010). Moreover, it describes learning in terms of appropriation (different learners and training methods used in a given context and time can influence patterns of behaviour) (DeSanctis and Poole, 1994). The spirit of the training is derived from the training goals and epistemological perspective taken by the designer or the trainer as shown in figure 2.4 (Gupta et al., 2010).

During the training and the learning process (the second part) as shown in figure 2.4, participants learn and appropriate the training methods based on their interpretation of the spirit (Fulk, 1993; Poole and DeSanctis, 2004). The training methods' design affect learners' use and learners' use also affects the training method's design (Orlikowski, 1992); a reciprocal causation between learners and training methods (Brown et al., 2004). Hence, AST can be used to examine not only traditional training methods but also the contemporary ones (Gupta et al., 2010). In addition, AST focuses on measuring the training impact and the knowledge gained by learners (in the post-training stage) in light of the training goals identified in the pre-training stage (Gupta et al., 2010). Therefore, Gupta et al.'s (2010) framework will be adopted in this study.

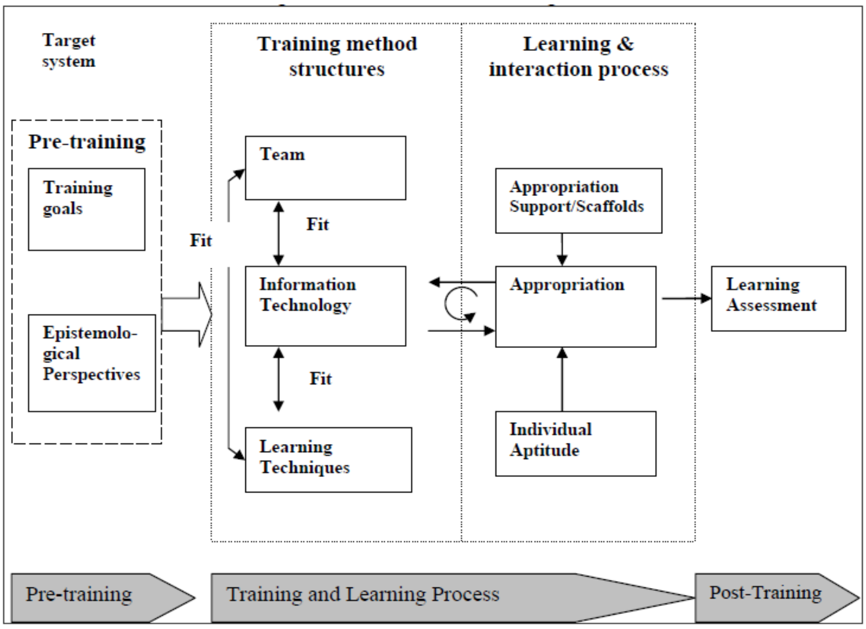

Figure 2.4 Framework for Reviewing End User Training Literature
(Gupta et al., 2010:12)

As shown in figure 2.4, the development of a technology training programme involves three phases: pre-training stage, formal training (includes the learning process) and post training.

2.3.2.1The Pre-training Stage

The pre-training stage or initiation phase deals with the epistemological perspectives of the training programme and identifying the training needs or goals (Compeau et al., 1995). Epistemological perspectives focus on the different knowledge states and learning outcomes.

Four main classifications of epistemological perspectives in the field of IS and education literature are commonly adopted: behaviourism, cognitivism, constructivism and collaboration (Leidner and Jarvenpaa, 1995; Mowrer and Klein, 2001). The behaviourist view assumes that human behaviour is predictable, and that learning occurs as a result of an individual's response to a stimulus in the form of a new behaviour or a change in behaviours (Peel, 2005). Direct instruction in the form of lectures is the most popular form of learning method based on this perspective. The cognitivist perspective assumes that the learning process is based on the cognitive structures and causes modifications in the learners' knowledge mental representations. Thus, tasks have a predefined goal and the learner is supplied with information necessary to reach the goal but the process of cognition of the information is dependent on the learner (Shuell, 1986). Behaviour modelling is an example of a learning method based on cognitive perspectives. Constructivism assumes that individuals construct new ideas based on prior experiences and knowledge (Yarusso, 1992). Thus, each reality is different as it is based on the learners' experiences and biases (Yarusso, 1992). Unguided case studies are an example of this learning method. Constructivism learning is assumed to occur on the individual level, however, collaboration learning occurs as a result of interactions of individuals with other individuals through discussion and information sharing (Slavin, 1995).

On the other hand, training goals are the desired outcomes of the training programme. Training goals can be classified as skill-based goals, cognitive goals, affective goals and meta-cognitive goals (Gupta et al., 2010). The authors state that skill-based goals focus on the learner's ability to use the system while cognitive goals focus on learner's mental awareness and efficient judgement facilitating their ability to transfer the learning to new situations. Affective goals deal with the emotional aspects of learner's behaviour like the usefulness of the software, reducing their perceived anxiety and promoting learner's satisfaction with the training process.

Meta-cognitive goals refer to learner's perception regarding their own learning like self-efficacy.

2.3.2.2 Learning Techniques or Training Methods

The training methods or techniques encompass a set of materials and activities designed to deliver specific knowledge to end-users based on users' needs and training goals (Compeau et al., 1995). The authors argue that the effectiveness of the training depends on the training methods and the learning process (the second phase). Different learning techniques are presented in the next sections.

2.3.2.2.1 The Impact of Theory of Assimilation on the Learning Process

Early research on training methods have studied the use of different conceptual models in end-user training. Most of these conceptual models are based on the Theory of Assimilation or Subsumption Theory (Ausubel, 1968). The Assimilation Theory defines two types of learning: meaningful learning and memorization (rote learning). Meaningful learning occurs when an individual connects new information with knowledge that already exists in memory. This type of learning facilitates understanding the concepts of newly acquired knowledge and an ability to apply those concepts to new situations (Ausubel, 1968). On the other hand, rote learning relates new knowledge to existing knowledge in an arbitrary way. In this situation, rote learners simply memorize information with little regard for its meaningful connection to their prior knowledge (Ausubel, 1968). Rote learning is measured by the ability of the learner to recall information presented during the training (usually without understanding the underlying concepts) while meaningful learning is measured by the ability of the learner to apply knowledge to new situations using problem-solving skills (Davis and Bostrom, 1993).

Mayer's (1981) illustration further describe the meaningful learning process as shown in figure 2.5 below:

1. **Reception** (1)**:** This occurs when the learner is presented with new information and transfers it to short-term memory.
2. **Availability** (2): Consequently, the learner searches long-term memory for appropriate relevant ideas or concepts.
3. **Assimilation** (3): Then, this prerequisite knowledge is transferred to short-term memory where it is used to connect it to the new information.

Therefore, the Assimilation Theory suggests that meaningful learning can occur **only** if all three (reception, availability and assimilation) of these conditions are met (Davis and Bostrom, 1993). Davis and Bostrom's (1993) study support the proposition of the Assimilation Theory; that to achieve meaningful learning, the learner must integrate new knowledge with knowledge that already exists in long-term memory.

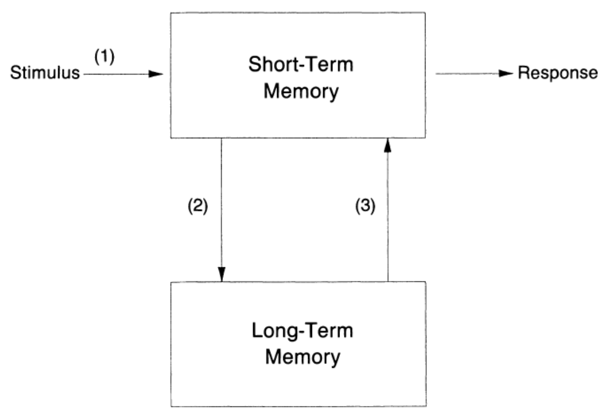

Figure 2.5. Mayer's (1981) Process of Meaningful Learning (Davis and Bostrom, 1993:64)

2.3.2.2.2 Enhancing Learners' Mental Models Using Exploration Training Methods

The effects of using exploration (also called self-paced) and instruction-based training methods on learning computer systems have been evaluated by Carroll et al. (1985, 1987), Raban (1988) and Simon and Werner (1996). The authors of these studies argue that exploration training is more effective than instruction-based learning in the context of training users on how to use word processor systems and data processing systems. Gallivan et al.'s (2005) research outcomes endorse the significance of using technology exploration training methods in organisations and emphasise the importance of the role of co-workers in enhancing the individual's IT usage.

An empirical study has been conducted by Lim et al. (1997) to compare two types of exploratory computer learning methods: self-exploration versus co-exploration (involves two users working together to learn a system) have concluded that co-exploration learning enhances learners' mental models facilitating the inference potential of the learners. Wilson and Rutherford (1989:619) offer a definition of mental models based on their integration of the different definitions discussed in the literature:

> *"A mental model is a representation formed by a user of a system and/or task, based on previous experience as well as current observation, which provides most (if not all) of their subsequent system understanding and consequently dictates the level of task performance."*

Co-exploration is beneficial as it forces learners to interact with their peers and reconcile their differences in opinions until they reach a unified approach to the problem they are solving (Lim et al., 1997). These interactions help learners engage in cognitive restructuring (Bearison, 1982). This includes enhancing their current cognitive structures, correcting any misunderstandings and filling in knowledge gaps which leads to improvement in the learners' mental models (Lim et al., 1997). Co-exploration learning environments promote a deeper-level of thinking among learners which facilitate the generation of better inferences and predictions (Lim et al., 1997).

2.3.2.2.2 Social Cognitive Theory Based Training Techniques

The most widespread theory used to understand the learning process in IS research is the Social Cognitive Theory that has been posited by Bandura (1977a) (Gupta et al., 2010). Behavioural modelling training (BMT) techniques (based on Bandura's (1977a) Social Learning Theory) are among the most effective training methods (Taylor et al., 2005; Gupta et al., 2010). They have been widely applied in the development of customer service skills, supervisory communications skills, cross-cultural skills and computer skills training programmes (Gist et al., 1988,1989; Compeau and Higgins, 1995a; Simon et al., 1996; Simon and Werner, 1996; Yi and Davis, 2001). Gist et al. (1988, 1989) consistently have reported higher learners' performance in the BMT condition over those with the computer-aided instruction. Compeau and Higgins (1995a) have compared the traditional lecture-based techniques with BMT in spreadsheet training and they have confirmed the effectiveness of using behaviour modelling over the lecture-based methods. Simon et al. (1996) and Simon and Werner (1996) have compared BMT with both a self-study program (using a manual) and a lecture-based program and have reported the positive impact of BMT on the learning process over the other two methods.

BMT encompasses the four component processes identified by the Social Learning Theory (Bandura, 1977a): attentional, retentional, reproduction and motivational processes (Taylor et al., 2005). *Attentional processes* relate to learners observe a modelling stimulus such as films of model persons behaving effectively in problem situations or depicting desired behaviours (Taylor et al., 2005). Attentional processes are believed to transfer the observed stimulus to short-term memory while retentional processes are necessary to transfer the learning to long-term memory (Taylor et al., 2005). *Retentional processes* relate to symbolic coding that is "transforming key elements of modelled activities into a pattern of verbal symbols and mentally practicing the modelled activities (cognitive rehearsal)" (Yi and Davis, 2001:523). Symbolic coding is best achieved through providing a list of learning points such as rules to be followed (Taylor et al., 2005). Symbolic coding in Yi and Davis's (2001) study has been used to help users remember different formulas and sequence of steps to perform tasks when using Microsoft Excel packages.

Reproduction and *motivational processes* occur when learners practice the skills that have been presented to them (behavioural rehearsal) through modelling and then apply the learnt skills in their jobs (Taylor et al., 2005). Trialability of an IT system can reduce risk and uncertainty about the expected consequences of using the technology facilitating a risk-free environment to explore and experiment the different features (Karahanna et al., 1999). The practice of skills can include social reinforcement or feedback from other learners and/or trainer to allow trainees to identify gaps in skills and to develop more accurate mental models through trial and error (Yi and Davis, 2001; Taylor et al., 2005). Training effects on actual changes in job behaviour (during behavioural rehearsal) are significantly greater when learners practice work-related scenarios that they have developed themselves (Taylor et al., 2005). Through practising trainees' work-related scenarios, greater self-efficacy for training transfer and retention is generated as a result of the social reinforcement trainees receive from their peers and trainer in applying the newly learned skills to work-related scenarios (Taylor et al., 2005).

An example of using BMT in computer training is demonstrated in Gist et al.'s (1989) study. The authors have used BMT by presenting the steps required to complete various computer tasks through a video display which has been paused between steps to enable learners to practice each step. Learners have been given computer feedback on their performance afterwards.

2.3.2.2.3 Collaborative Training Techniques Based on Theory of Andragogy

2.3.2.2.3.1 Introduction

The initial focus of end-user training research has been to study only the impact of individuals' learning (Gupta et al., 2010). However, recent learning strategies are shifting towards more group or collaborative centred ones especially in the area of adult learning. In the policing discipline, innovative police training programmes that incorporate the adult learning principles of andragogy such as problem-based learning or scenario-based learning help officers develop policing specific skills in addition to problem-solving and critical thinking skills (Bradford and Pynes, 1999; Birzer, 2003; Vander Kooi, 2006; Cleveland and Saville, 2007; Werth, 2011). Indeed, some police forces in the UK have used scenario-based instruction in their communication skills training programmes and have reported massive development in their officers' communication skills and a positive effect on building strong relationship with local communities (HMICFRS PEEL: Police Legitimacy Report, 2017).

However, the adult learning theory of andragogy principles are not yet adopted in technology training programmes in police forces where training only covers the main functionalities of Information Systems. As has been discussed above, mobile technology training programmes should not only focus on presenting the key functionalities of the mobile devices (fit training), but it also should ensure that learners can use the functionalities in different contexts to perform various sets of tasks (appropriation training). Therefore, providing appropriation technology training programmes that incorporate the adult learning theory of andragogy can extend officers' knowledge and skills and enable them to appropriate the technology faithfully to different contexts. Birzer (2003) argues that a mix of both lecture-based approach and a student-directed approach could enhance officers' learning skills and performance. In the next section, the main principles of the adult learning theory of andragogy will be presented followed by a discussion of problem-based/scenario-based methods.

2.3.2.2.3.2 The Theory of Andragogy

Until the end of World War I, most of the education in Europe was provided to children only (Knowles, 1984). After that, an increased interest in adult education has taken place but teachers continued to use children teaching methods that they knew best (Knowles, 1984). Knowles (1980) argues that the adult learning process is distinctly different from that of children. He defines his theory of andragogy as "[andragogy] is a theory which is vastly in contrast with the traditional pedagogical model and it advocates both the self-directed learning concept and the teacher as the facilitator of learning" (Knowles, 1990:57).

Furthermore, Knowles (1980) states that andragogy is dependent on four crucial assumptions about the characteristics of adult learners. These assumptions are that, (1) adults are self-directing human beings; (2) their experiences become a key resource for learning; (3) their readiness to learn is more oriented towards the developmental tasks of their social roles; and (4) their time perspective changes to immediacy of application of knowledge rather than a postponed one, and consequently their learning orientation shifts more towards problemcenteredness. Birzer and Tannehill (2001) define the facilitator role as being crucial to providing a conducive environment to learning.

The principles of self-directed learning and learning that incorporates the student experiences have been widely adopted in adult education (Houle, 1984; Cross, 1981; Cotton, 1995). In the context of police training, Birzer and Tannehill (2001:240) list four main advantages to using the andragogic model in this domain: “(1) it draws on the trainee’s past experiences, (2) it treats trainees as adults, (3) it adapts to diverse needs and expectations of participants, and (4) it develops critical thinking, judgement, and creativity in the learner.” White and Escobar (2008:124) claim that if this approach is adopted in police training academies and programmes, it will bring “realities of police work through critical discussion, role plays, and interaction between officers and instructional staff”.

However, Heslop (2006) argues that there are some limiting factors that undermine the benefits of using andragogic model of adult learning in the trainer training programs in the British police. The British police “is a hierarchical disciplined organisation which has clear organisational rules, goals and constraints. Most trainer police training courses have fairly rigid curricula and clear aims and objectives linked to National Occupational Standards (NOS)” (Heslop, 2006:336). Consequently, the focus of the learning is mainly on the needs of the organisation rather than on the needs of the students. In addition, the current approach to learning focusses on passive memorisation of facts and competence-based assessments which contradict with the main principles of adult learning that promote student-centred and self-directed learning education (Heslop, 2006; Constable and Smith, 2015).

Police training is generally underpinned by the notions of ‘acquisition and transfer’ (Heslop, 2011:327). However, Heslop (2011) argues that officers’ learning is situated culturally and socially; hence, integrating different forms of training such as participatory learning methods to knowledge acquisition methods can be more effective. This is particularly important as policing is viewed as a practical activity or a ‘craft’ (Wilson, 1968; Sherman, 1999, 2015; Lum, 2009) within a situated workplace or a ‘field’ as depicted by Chan (1997, 2001) and Chan et al. (2003). Therefore, adopting ‘acquisition’ and ‘participation’ training approaches can facilitate handling different aspects of learning effectively (Sfard, 1998; Heslop, 2011). This learning does not only change recruits’ habitus (Chan et al., 2003) but more importantly, influence the process of ‘becoming’ police officers (Heslop, 2011). ‘Habitus incorporates both the subjective, personal dispositions and the collective structural pre-dispositions shaped by class, race and gender that are combined in each individual’ (Heslop, 2011:333). In turn, the process of ‘becoming’ police officers also influence their learning (Heslop, 2011).

2.3.2.2.3.3 Problem-based Learning/Scenario-based Learning

Collaborative training techniques like problem-based learning or scenario-based learning are student-directed active learning methods that provide both motivation and feedback during the process of learning (Wood, 2004). Barrows (1996), Wood (2004) and Werth (2011) describe how a problem-based learning class might operate. Students should be arranged in a circle of small groups (between 6 and 8 participants) to facilitate a deeper level of understanding of the problem and develop personal skills such as active listening, team collaboration and constructive feedback or criticism (Neufeld and Barrows, 1974). Furthermore, face to face contact between participating students not only facilities verbal communication but also non-verbal communication crucial for the learning process (Wood, 2004). The group is supervised by a ‘facilitator’ who guides the group and keep them focused on the problem being discussed (Barrows, 1996; Wood, 2004; Werth, 2011). The facilitator ensures that the session’s climate is a friendly one and that no student feels threatened. Moreover, facilitators must be aware of the various ways of which students can behave; fight (showing hostility), flight (withdrawal from active participation) and pairing (where a conversation exists between two students only excluding the rest of the group) (Wood, 2004).

According to the Learning Pyramid which originated from the National Training Laboratories (NTL) for Applied Behavioural Science in the USA, shown in the figure 2.6 below, the least effective method of teaching is the lecture.

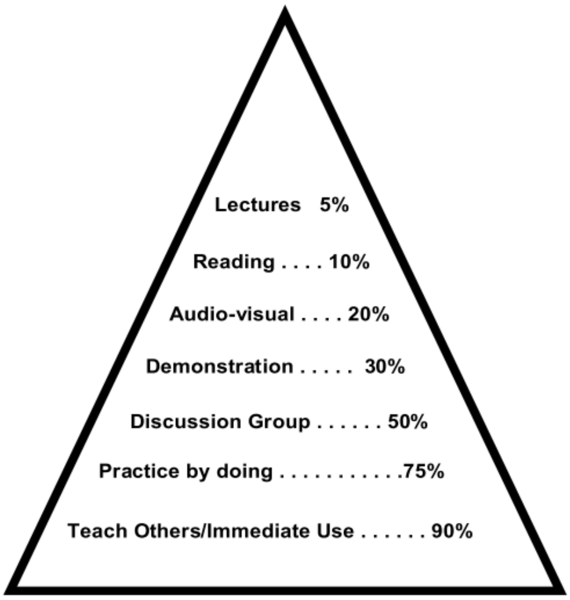

Figure 2.6. The Learning Pyramid

“The learning pyramid originates from the National Training Laboratories (NTL) for Applied Behavioural Science, 300 N. Lee Street, Suite 300, Alexander, VA 22314, USA. The percentages represent the average "retention rate" of information following teaching or activities by the method indicated. In fact, this diagram was originally developed and used by NTL in the early 1960s at NTL’s Bethel, Maine, campus, but the organisation no longer has or can find the original research that supports the numbers given. In 1954, a similar pyramid with slightly different numbers had appeared in a book, Audio-Visual Methods in Teaching, published by the Edgar Dale Dryden Press, New York. Bligh (1998) gives some evidence for the effectiveness of different teaching methods (Wood, 2004:4)".

Teaching techniques at the bottom of the pyramid encourage students to be active during the process of learning which in turn promotes deep learning, better information processing and digestion of information (Wood, 2004; Lalley and Miller, 2007). This is consistent with the Cognitive school of learning theories where students are believed to learn more from "experience, by doing, and that the learning that comes from the experience is fitted into the framework of [the students'] existing knowledge" (Wood, 2004:6). This process helps students make-sense of the information they learn (Barrow, 1996; Wood, 2004). An important aspect of problem-based learning is in using feedback during the learning process (Wood, 2004). Feedback from the facilitator or group members reassures students that the learning process is successful.

Whilst some research studies have debated the benefits of problem-based learning over other traditional teaching methods (Colliver, 2000; Norman and Schmidt, 2000), it is now accepted that this method of learning is effective in improving self-directed learning skills, long-term memory, problem-solving skills and the learning process in general (Boud and Felletti, 1997; Banta et al., 2001; Dochy et al., 2003; Docherty et al., 2005; Koh et al., 2008; Werth, 2011). Problem-based learning is successfully used in a few police training studies in the US (Birzer and Tannehill, 2001; Birzer, 2003; Cleveland and Saville, 2007; Werth, 2011).

2.3.2.3 Learning and Interaction Process

The learning process involves a cognition process of interaction among individual aptitude, training methods and scaffolds provided during the training (Gupta et al., 2010). The appropriation process has been discussed in detail in section 2.2.

2.4 The Impact of Gender Differences in Technology Learning

Gender can moderate technology adoption and can shape continued technology utilisation behaviours in workplaces (Venkatesh et al., 2000; Venkatesh and Morris, 2000; Ahuja and Thatcher, 2005). Research has shown that during the introduction of new technology in an organisation, women are more greatly influenced by peers' opinions more than men (Venkatesh et al., 2000). Attitude (which is determined by perceptions of usefulness (Davis et al., 1989; Mathieson, 1991; Taylor and Todd, 1995; Venkatesh et al., 2003)) towards using a technology is more crucial to men in the workplace which reflects instrumentality to use IT (Venkatesh et al., 2000). On the other hand, women' use of technology is strongly influenced by subjective norm (peer's and superior's influence (Mathieson, 1991; Taylor and Todd, 1995)) and perceived behavioural control (Taylor and Todd, 1995; Venkatesh et al., 2000). Perceptions of behavioural control (PBC) relate to the extent to which individuals believe that they have control over factors that influence their behavioural performance like computer self-efficacy (CSE) and facilitating conditions (i.e. training, IT support) (Ajzen, 1991, 2002; Mathieson, 1991; Taylor and Todd, 1995). PBC not only impact intentions to use IT (Venkatesh, 2000; Ajzen, 2002; Venkatesh et al., 2003; Morris et al., 2005) but also determines actual behaviour (Elie-Dit-Cosaque et al., 2011). IT support has been conceptually and empirically shown to impact users' PBC (Cragg and King, 1993; Harison et al., 1997).

Furthermore, computer anxiety which is negatively related to IT adoption and utilisation (Durndell and Haag, 2002; Beaudry and Pinsonneault, 2010) has been empirically shown to negatively influence PBC as a result of reducing perceptions of CSE among technology users (Thatcher and Perrewé, 2002; Elie-Dit-Cosaque et al., 2011). Empirical evidence indicates that women have been found to have significantly more computer anxiety and less computer confidence than men (Durndell and Haag, 2002). Saleem et al.'s study (2011) report that personality traits like neuroticism (emotional instability), extraversion (energetic and self-dramatizing) and agreeableness (tactful and independent) are significantly related to computer self-efficacy for women but not for men. An increase in women's workload may result in a reduction in trying to innovate and explore technology in the workplace while it positively correlates with trying to explore technology for men (Ahuja and Thatcher, 2005). In the context of a blended learning setting (like using Moodle in universities and schools), perceptions of technology playfulness (also defined as intrinsic motivation (Venkatesh, 2000)) impact female learners' intentions to using the technology while perceptions of technology usefulness mediate this impact among men (Padilla-Meléndez et al., 2013).

Cognitions of gender roles in society, partly, perceive men as being more task-oriented than women (Lynott and McCandless, 2000). In the context of technology usage, task orientation refers to the completion of organisational tasks that may require technology (Venkatesh and Morris, 2000). However, in the context of technology utilisation, women tend to focus on the methods used to complete tasks, hence, are more process-oriented (Venkatesh and Morris, 2000). Gender shapes the initial decision process that drives technology adoption and influences sustained usage (Venkatesh et al., 2000). These results are aligned with Venkatesh and Morris's (2000) confirming that perceived usefulness of technology is more salient to men while perceived ease of use (which is closely related to self-efficacy (Bandura, 1977b; Venkatesh and Davis, 1996)) are more important to women both after the initial training and over time. In addition, research has shown an inverse relationship between computer self-efficacy and computer anxiety which can lead to lower ease of use perceptions among women (Venkatesh and Morris, 2000). Similar findings were reported by Ong and Lai (2006) in the context of e-learning where women are strongly influenced by perceptions of computer self-efficacy and ease of use while men are influenced by perceptions of usefulness of e-learning.

To maximise overall technology adoption and sustained usage in organisations, Venkatesh et al. (2000) and Venkatesh and Morris (2000) recommend designing training programmes tailored to encompass productivity-enhancement factors (like usefulness) which are more important to men (they are more driven by instrumental factors) and a more balanced approach that includes productivity aspects, process issues and co-workers' testimonials that are more salient to women (as they are more motivated by process (perceived ease of use and social factors)). This is particularly important because the impact of gender differences on the adoption and the continued utilisation of technology is proved to have a lasting effect even when key variables such as income, education and self-efficacy are considered (Venkatesh et al., 2000; Venkatesh and Morris, 2000).

2.5 The Impact of Police Culture on Officers' Learning

2.5.1 Introduction

Research studies investigating aspects of police culture have sought answers to prominent issues of police behaviour and generated 'a wealth of knowledge regarding the police, their behaviour and their values' (Cockcroft, 2013:4). Police culture is commonly defined as "widely shared attitudes, values, and norms that serve to manage strains created by the nature of police work…and the punitive practices of police management and supervision" (Paoline, 2004:207). Schein (2004:17) further clarifies the concept of police culture by defining it as " a pattern of shared basic assumptions that were learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems." Many research studies have highlighted certain police cultural manifestations as key characteristics of a universal police culture (Reiner, 2010; Cockcroft, 2013) which have withstood the test of time (Loftus, 2008, 2009, 2010). Police solidarity/social isolation and gender are two key aspects of police culture that can impact the learning process in technology training.

2.5.2 Police Solidarity/Social Isolation and the Co-worker' Influence on Learning

Police solidarity and social isolation are two interrelated factors that contribute to officers' working personality and ultimately to police culture (Skolnick, 1994; Cockcroft, 2013). Police officers rely on one another for support, the assumption being that they back up one another (Westley, 1970; Punch, 1983, 2009; Reuss-Ianni, 1983; Brown, 1988; Skolnick 1994; Paoline et al., 2000; Terrill and Mastrofski, 2002; Paoline, 2004; Reiner, 2010; Workman-Stark, 2017). This refers to 'police solidarity' or 'support and backing' in the line of duty but, more importantly, emotionally and personally (Reuss-Ianni, 1983; Paoline, 2004; Reiner, 2010; Workman-Stark, 2017). Past police cultural analysis research has suggested that officers often socialize only with one another (Westley, 1970; Walsh, 1977; Skolnick, 1994; Reiner, 2010) furthering in-group loyalty and alienation from the broader community. This in turn, solidifies the police culture because officers tend to reinforce one another's behaviours and impressions of the culture (Westley, 1970). Despite Paoline and Terrill's (2014) claim that this isolation has reduced, Charman's (2017:269) study findings emphasis the significance of 'solidarity' in police culture and describes it as "an extremely important element of policing organisational cultures….[yet] this was not solidarity without limits." Please refer to Cockcroft (2013) for a detailed discussion of the various reasons that contribute to police solidarity and social isolation, in addition to, its impact on police work and the public.

Therefore, the co-workers' influence in the police culture plays a major role in understanding officers' behaviours and attitudes. Fulk (1993) identified two main social influences of work groups on individuals; 'internalisation' and 'compliance'. Internalisation refers to "individual's private acceptance of group messages and the incorporation of group meanings and attitudes into their own constructions of reality" (Fulk, 1993:924). Compliance refers to "individual's behaviour that conforms to perceived group pressures" (Fulk, 1993:924). Fulk (1993) argue that the key moderator of internalisation and compliance effects is the individual's attraction to a group. Hence, high attraction to a group (as in the case of police officers) leads to internalisation which aims to enhance communication and bonding between group members and reduce tensions/pressures.

In case of compliance, individuals in a group do not experience the same need for agreement (Fulk, 1993). They might show behavioural compliance fearing recrimination but not attitudinal compliance or internalisation (Fulk, 1993). Therefore, Fulk (1993) claims that when the individual's attraction to a group is high, they conform to group norms and attitudes that mirror that particular group. The results of the research conducted by Fulk (1993) show that individuals relied on co-workers for help/support in using technology features that they did not use regularly even though all members of the organisation received the same formal training in using the electronic mail system. Hence, formal or informal peer training should be supported by managers (Fulk, 1993; Lewis et al., 2003; Spitler, 2005).

The presence of co-workers, who are both "knowledgeable and confident IT users", draws the attention to a key factor that can boost IT utilisation in organisations as argued by Gallivan et al. (2005:179), Morris and Venkatesh (2000) and Spitler (2005). Information influence occurs when co-workers or peers share their own personal experience and evaluation of the technology or when they observe each other using the technology (Orlikowski et al., 1995; Karahanna et al., 1999; Lucas and Spitler, 1999; Spitler, 2005). Use by peers can be an effective method of technology evaluation (Bandura, 1977b; Burkhardt, 1994). Co-workers influences, and computer self-efficacy have significant indirect impact on behaviour intentions to technology utilisation (Davis et al., 1989; Taylor and Todd, 1995; Kashefi, 2014). The co-workers' influence is evident in Charman's (2017) study, in which, she reports on the profound impact of the tutor constable training provided to new recruits during the Initial Police Learning and Development Programme (IPLDP) not only on the effectiveness of the learning process but also on developing new officers' behaviour. The tutor constable is the second strand of training in the IPLDP which must be completed by new recruits in which they receive on-the-job training with a tutor constable and shift colleagues to which that recruit is assigned. New recruits in Charman's study (2017:225) viewed this strand of the programme as the most appropriate form of learning because class-room based learning cannot teach 'the peculiarities of each type of incident that the officer might be exposed to.' This view stems from perceiving policing as a 'craft' (as mentioned in section 2.3.2), that is, hands-on experience is the foundation of effective policing (Wilson, 1968; Sherman, 1998, 2015; Chan et al., 2003; Lum, 2009). In Charman's study, junior officers reported perceiving both tutor constables and other colleagues as 'the most influential people' in the development of their policing skills. These results are consistent with Chan et al.'s (2003) and Heslop's (2011). Therefore, social interaction, whether formal (i.e. class-based learning) or informal (i.e. learning from colleagues), play a major role in shaping new recruits' knowledge and skills (Charman, 2017).

Formal and informal socialisation is one of six strategies described by Van Maanen (1978) whereby organisations can adopt to help socialise their new members.

Co-workers' perceived training quality has a direct impact on the individual's own beliefs about training quality (Gallivan et al., 2005). General beliefs about computers (whether personal beliefs or peers' beliefs) are strongly anchored to perceived ease of use of Information Systems even after significant direct hands-on experience with the system as long as system's features fit with users' expectations (Venkatesh and Davis, 1996; Venkatesh, 2000). Perceived ease of use had a strong influence on users' intentions during technology training interventions (Venkatesh et al., 2002). In general, beliefs not only influence individuals' subsequent behaviours, but they can be shaped by management interventions such as training (Starbuck and Webster, 1991; Olfman and Mandviwalla, 1994; Compeau and Higgins, 1995a; Venkatesh and Davis, 1996; Venkatesh, 1999) to enhance users' perceived ease of use of IS (Venkatesh et al., 2002).

Therefore, knowing the magnitude of IT use of co-workers in their jobs can help in predicting individuals' level of IT use (Gallivan et al., 2005). Managers can achieve better IT usage if they can identify super-users (IT confident users who use the technology's features on regular basis to complete tasks) who hold positive attitudes toward the training they received, to influence other employees' IT usage (Gallivan et al., 2005; McNish, 2002). Brown et al. (2002), Venkatesh et al. (2003) and Saeed and Abdinnour (2013) have reported similar results about the co-worker's impact on enhancing technology utilisation in organisations.

2.5.3 Police Culture and Gender

Police forces are male-dominated organisations (Reiner, 1992; Skolnick, 1994) where policewomen have suffered from inequality not only in the roles they undertake but also in getting accepted by their male colleagues (Brown, 1997), as well as, getting promoted to senior ranks (Rabe-Hemp, 2009). A persisting belief that female officers are incapable of doing police work rests on the concept of 'hegemonic masculinity' which is associated with aggression, danger and risk taking (Young 1991; Fielding, 1994; Morash and Haarr, 2012). In interpreting the 'cult of masculinity', Rabe-Hemp (2008[a,b]) argues that its stereotypical value may be read as an almost pure form of 'hegemonic masculinity', strongly grounded in heterosexuality where particular notions of masculinity govern. With the perception that police work involves strength, action and danger, the concept of physicality becomes a defining element of the ''cult of masculinity'' and so the work of policing becomes securely defined as 'men's work'. This hegemonic masculinity is maintained through 'authority, heterosexism, the ability to display force, and the subordination of women' (Rabe-Hemp, 2009:116).

However, pushing for women's physical unsuitability as a justification for their continued exclusion becomes less tenable as women move upwards in the police hierarchy, with police leaders being the least likely to be called upon to exhibit physical displays of strength and courage. Consequently, it could be argued that on achieving rank, women will no longer endure discrimination and exclusion as they no longer face the demands of physicality in the same way as their rank-and-file counterparts. As women progress through the ranks, female officers continue to face a gendered environment where masculinity persists. However, this time, they are faced with a different kind of masculinity one where physicality is less obvious, but where traits associated with 'managerial masculinity' dominate. Changes brought about as a result of the movement towards greater quality of service has served to create a ''smart macho'' (Silvestri, 2007; 2017) culture of police leadership. Therefore, we have that female officers who engage with developing alternative conceptions of police leadership come to be labelled not as progressive or innovative, but as weak, passive and unable to withstand the rigours and demands required of policing.

Nevertheless, more policewomen have managed to broaden their opportunities at work and get promoted to higher ranks (Silvestri, 2007; Morash and Haarr, 2012). Adopting 'transformational' style of leadership in police forces has been identified as a pivotal factor to achieving more effective organisational and cultural changes (Silvestri, 2007; Cockcroft, 2014). This leadership style is underpinned by the principles of participation and inclusion of employees to create a working environment that encourages open communication and loyalty in organisations (Silvestri, 2007). Senior policewomen interviewed by Silvestri (2007) have revealed their adoption of transformational leadership styles that foster more participatory approaches compared to the transactional leadership approaches adopted by many of their male colleagues. Transactional leadership styles rest on exchanging rewards or punishments based on employees' performance.

It is also noteworthy that an increasing number of studies are moving beyond the traditional interpretations of the dominance of 'the cult of masculinity' in police culture and developing the notion that policing is divided more by rank and role than gender (Waddington, 1999; Dick and Jankowicz, 2001; Cain, 2012; Charman, 2017). Recent research suggests that communication and interpersonal skills are highlighted by officers as the 'most impressive' skills for a good police officer not physicality (Chan et al., 2003; Charman, 2017; Willis and Mastrofski, 2017).

2.6 Key Determinants of Post-Adoptive Technology Utilisation

2.6.1 An Overview

Post-adoption or continuance of Information System (IS) utilisation research is focussed on studying the cognitive behaviours and attitudes of users who choose to continue using an IS after the adoption phase because of a first-hand experience with the system (Bhattacherjee, 2001). The post-adoption process is largely voluntary even if technology utilisation is made mandatory in an organisation because users can choose to use a sub-set of the functionalities of the IS to meet task requirements rather than explore the full range of the IS features (Hartwick and Barki, 1994; Carlson and Zmud, 1999; Jasperson et al., 2005; Thatcher et al., 2011). The extent of technology features used to perform work tasks has been described as the 'extended use' by Saga and Zmud (1994), 'deep usage' by Schwarz (2003) and 'feature extension' by Jasperson et al. (2005).

Few research studies and models have been developed to study the key factors that influence the continuance usage of ISs compared to those constructed to study the adoption and use of newly introduced systems in organisations (Karahanna et al., 1999; Bhattacherjee, 2001; Bhattacherjee and Premkumar, 2004; Jasperson et al., 2005; Limayem et al., 2007; Clark et al., 2009; Wang et al., 2015). Post-adoptive behaviours can lead to better usage of technology and can also lead to a diminished use where the IT is resisted or used in a limited routinised fashion (Hiltz and Turoff, 1981; Cooper and Zmud, 1990; Hartwick and Barki, 1994; Saga and Zmud, 1994; Kay and Thomas, 1995; Jasperson et al., 2005). The key factors that influence technology post-adoption utilisation are discussed in the next sections.

2.6.2 The Role of Satisfaction, Habit and Feature-Centric View on Post-adoption Technology Utilisation

Post-acceptance satisfaction has been highlighted by many studies as a fundamental factor that can determine individuals' post-adoptive or continuance use of technology in organisations. Bhattacherjee (2001) has used the Expectation-Confirmation Theory (Oliver, 1980) to propose a model of IS continuance use intentions. Bhattacherjee's (2001) model formulates that satisfaction with IS use is the strongest predictor of individual's post-adoption utilisation intentions followed by the perceived usefulness of continued IS use intentions. Post-acceptance satisfaction is accurate and robust as it is based on users' first-hand experience with the IS (Bhattacherjee, 2001; Thong et al., 2006; Bhattacherjee et al., 2008; Wang et al., 2015). Both satisfaction and perceived usefulness are determined by the degree to which users' expectations of the system are confirmed (Bhattacherjee, 2001; Staples et al., 2002; Bhattacherjee and Premkumar, 2004; Jasperson et al., 2005; Thong et al., 2006; Bhattacherjee et al., 2008; Saeed and Abdinnour, 2013; Wang et al., 2015). This confirmation can lead to an enhanced technology sensemaking (Griffith, 1999; Jasperson et al., 2005), more exploration and usage of various system features (Jasperson et al., 2005; Saeed and Abdinnour, 2013; Wang et al., 2015), and can also lock users into routine usage patterns (Venkatesh et al., 2000; Jasperson et al., 2005; Saeed and Abdinnour, 2013). Bhattacherjee's (2001) IS Continuance model has been validated by Wang et al.'s (2015) study conducted in a large manufacturing firm in China where the use of an ERP system is mandatory.

In addition, Bhattacherjee (2001) and Thong et al. (2006) validated the IS Continuance model and extended it to include perceived ease of use and perceived enjoyment in the context of mobile internet services in Hong Kong. Thong et al. (2006) and Wang et al. (2015) note the usefulness of the model for understanding post-adoption usage behaviours. Moreover, Bhattacherjee et al. (2008) have validated the IS continuance model and have added the Perceived Behavioural Control construct (consisting of IT self-efficacy and facilitating factors) to extend the model to include both IT continuance intentions and IT continuance behaviours. IT self-efficacy has a significant impact on IT continuance intentions to use the IS while facilitating factors that influence IT continuance behaviours. Bhattacherjee et al.'s (2008) extended IT continuance model have been empirically tested among administrative and staff personnel using a Document Management System at a City Hall in Ukraine.

Similar to Bhattacherjee's (2001) findings, Lee et al. (1995) have developed a causal model for Information Systems' end-user training programmes. The authors have argued that end-user IS acceptance and end-user IS satisfaction are two major direct antecedents of end-user job satisfaction. End-users expectations of the adopted Information Systems (to be easy to use and to boost their performance) must be confirmed for the employees to accept it (Lee et al., 1995). Hence, managers should identify end-users' specific job performance needs first and then design training programmes that consider those needs (Lee et al., 1995).

Furthermore, Limayem et al. (2007) have added the 'habit' construct to Bhattacherjee's (2001) model as it is proved to suppress or moderate users' intention to continue using the full range of functionalities offered by an IS. Limayem et al. (2007:705) defines habit in the context of IS usage as "the extent to which people tend to perform behaviours (use IS) automatically because of learning." The role of habit in predicting future behaviours and intentions have been studied by psychologists and empirical evidence supports the direct impact of past behaviour on future intentions and behaviours (Eagly and Chaiken, 1993; Ouellette and Wood, 1998). Limayem et al. (2007) argue that there are four primary antecedents to habit development:

frequency of repeating a behaviour, extent of satisfaction with the outcome, stable contexts and the comprehensiveness of usage of the various features of the IS. With stable contexts, past behaviour has a greater impact on future behaviour than the effect of intention (Bagozzi and Kimmel, 1995; Norman and Smith, 1995; Ouellette and Wood, 1998). A key criticism to Limayem et al.'s (2007) study is the absence of users' prior IT use from the model which is empirically shown to be a key antecedent to technology habit formation (Lankton et al., 2010).

Moreover, Jasperson et al. (2005) have proposed that prior use, habit and a feature-centric view of technology are the three main aspects that determine the extent of post-adoption of Information Systems. Using a feature-centric view to understand technology post-adoption is valuable because the set of technology features used by users is likely to change over time and it is the specific features in use at any point of time that determine performance (Hiltz and Turoff, 1981; Orlikowski, 1992; DeSanctis and Poole, 1994; Goodhue, 1995; Goodhue and Thompson, 1995; Griffith, 1999; Jasperson et al., 2005). Technology features are the building blocks of the technology (Griffith and Northcraft, 1994; Griffith, 1999). Some of these features are core (if removed or altered, an overall change to the nature of the technology occurs) while others are tangential (optional technology features not the main defining features of the technology) (DeSanctis and Poole, 1994; Griffith, 1999). Few studies have empirically examined technology utilisation at a feature level of analysis (Hiltz and Turoff, 1981; Ginzberg, 1981; Kay and Thomas, 1995; Straub et al., 1995; Bhattacherjee, 1998; Jasperson et al., 2005).

Additionally, Jasperson et al. (2005:535) argue that over time, "post-adoptive behaviour becomes habitualised unless interventions occur to disrupt the formation of deep, non-reflective mental scripts. When individuals attend to these interventions, the interventions produce periods of substantive technology use." These interventions can help individuals use already-used features in an innovative way, learn new features or discover new uses of existing features (Jasperson et al., 2005). Jasperson et al. (2005) claim that both management interventions and training are critical in the post-adoption stage as they can facilitate the process of adjusting the use of technology to ongoing changes in the work process.

Therefore, for interventions to influence individuals' cognitive processing and trigger the sensemaking process, three types of stimuli are suggested by Louis and Sutton (1991). The situation must be unfamiliar or novel, the individual senses a discrepancy between reality and expectation and there is deliberate initiative to induce individuals to regard their behaviour (Louis and Sutton, 1991). The three types of stimuli are functions of the situation and the individual (Louis and Sutton, 1991). Thus, the technology sensemaking of a technology can be influenced by managing both the technology features and the user background (i.e. user experience and training) (Griffith, 1999). Consequently, performance benefits are realised when individuals recognise a fit between the technology features and the task and then, alter their post-adoptive behaviours accordingly by choosing to use these features (Goodhue, 1995; Goodhue and Thompson, 1995; Todd and Benbasat, 2000).

2.6.3 The Role of Technology Trust in Post-adoption Technology Utilisation

Individuals develop a trust relationship with the adopted technology if their expectations and technology reliability are realised (Lippert, 2007). Trust in technology directly influences perceived usefulness (which has the strongest influence on future intention to use as argued by Davis et al. (1989), Taylor and Todd (1995) and Venkatesh et al. (2003). This is because it encourages positive attitudes about use particularly in mandatory settings (Brown et al. (2002)) and promotes both technology utilisation and perceived ease of use (Thatcher et al., 2011;

Lippert, 2007). Lippert (2007) and Mcknight et al. (2011) claim that the role of trust in technology is a key determinant in sustaining post-adoption utilisation in organisations. Technology trust affects the individual's intention to explore the full range of functionalities of the adopted IS and consequently can limit the post-adoption utilisation preventing organisations from achieving the benefits anticipated from investing in the technology (Jasperson et al., 2005; Lippert, 2007; Mcknight et al., 2011; Thatcher et al., 2011). Technology trust can mitigate feelings of risk and uncertainty associated with innovative and exploratory behaviours (Mcknight et al., 2011; Thatcher et al., 2011; Tams et al., 2018).

In this context, Thatcher et al. (2011) argue that trust in technology has three dimensions: Functionality belief, Helpfulness belief and Predictability belief. The authors define functionality belief as "the belief that the system has the capability, functions, or features to do for one what one needs to be done" (Thatcher et al., 2011:4). The helpfulness belief refers to the ability of the system to provide help and guidance (through helpful tips, a user-friendly interface and/or human assistance). Technology support has been conceptually and empirically shown to influence perceptions of behavioural control (Cragg and King, 1993; Harrison et al., 1997). Perceptions of behavioural control relate to the extent to which individuals believe that they have control over factors that influence their behavioural performance like computer self-efficacy (Ajzen, 1991). The predictability belief refers to the system's consistency and the ability to forecast system behaviour. Thatcher et al. (2011) emphasise the importance of treating these dimensions as 'reflective indicators' where they influence and reinforce each other.

To understand how trust impacts post-adoptive technology utilisation, Tams et al. (2018) have used the Model of Proactive Work Behaviour (MPWB) (Crant, 2000; Frese and Fay, 2001;

Parker et al., 2006) to explain the mediating role of computer self-efficacy on trust. MPWB refers to "the extent to which an individual takes self-initiated action" (Tams et al., 2018:174). MPWB suggests that within the Information Systems domain, users who explore the full range of functionalities are engaging in proactive behaviours (Tams et al., 2018) as this is generally not required by organisations (Jasperson et al., 2005). Since exploring the full range of functionalities embody risk as users experiment with new features proactively which encompasses high potential for mistakes and loss of time (Ahuja and Thatcher, 2005), users' self-efficacy beliefs are crucial to motivate its performance (Taylor and Todd, 1995; Tams et al., 2018). Computer self-efficacy (CSE) refers to "people's beliefs in their ability to use a computer system successfully in support of their work" (Tams et al., 2018:174).

There is experimental evidence that support the impact of CSE on perceived ease of use because users (in the absence of direct system experience) will base their judgment about how easy or difficult a new Information System will be to use on their computer abilities (Venkatesh and Davis, 1996; Agarwal et al., 2000). Besides, prior research has shown that CSE will continue to affect perceived ease of use even after significant usage experience with the Information System (Venkatesh and Davis, 1996; Venkatesh, 2000). CSE has two facets; an internal CSE and an external CSE (Thatcher et al., 2008). Internal CSE depends on the functions offered by the system; users will use the system efficiently if the system's functions are aligned with the tasks (Thatcher et al., 2008). Internal CSE exerts a significant positive effect on ease of use as users who have positive beliefs about their abilities usually have lower levels of computer anxiety and view systems as simple to use (Thatcher et al., 2008).

On the other hand, external CSE is a belief about the users' ability to use the IS when it provides support or assistance (Thatcher et al., 2008). When users receive extensive support in learning complex software systems, this support correlates negatively with external CSE because of users' beliefs of their lack of control over completing a task which magnifies computer anxiety (Compeau and Higgins, 1995b; Compeau et al., 1999; Thatcher et al., 2008). In contrast, when users are learning simple software packages, external CSE does not reduce ease of use (Thatcher et al., 2008; 2011). Therefore, trust in functionality attributes directly influence internal CSE while trust in helpfulness and predictability beliefs/attributes influence external CSE (Tams et al., 2018).

2.6.4 Technology Post-Adoptive Enhanced Use Construct

IT enhanced use refers to novel ways of using technology features (Bagayogo et al., 2014). The authors conceptualise enhanced use as having distinct forms and attributes. Technology enhanced use forms "include using a formerly unused set of available features, using an IT feature for additional tasks, and using features extensions [developing or adding feature to IT]" (Bagayogo et al., 2014:362) while the attributes include locus of innovation, extent of substantive use, and adaptations. Locus of innovation refers to the source of the idea that lead to the enhanced use of technology whether it is the IT user or provided by a third party. The extent of substantive use refers to the different states of users' cognitive engagement with the technology. The authors argue that the activities that occur around enhanced use and facilitate its completion define the different adaptations that characterise enhanced use. The different patterns of technology enhanced use are influenced by task characteristics or complexity, knowledge used (like IT personnel, IT knowledge of managers and users' IT knowledge) and technology type (like enterprise IT, network IT and functional IT).

This study's findings reveal that the locus of innovation; the first attribute of enhanced use is shaped by the analysability of the task and the technology type while the extent of substantive use (the second attribute of enhanced use) is influenced by the task complexity and the IT-related knowledge. On the other hand, adaptations (the third attribute of enhanced use) are shaped by the task interdependence and types of IT. Future research can further enrich the knowledge about factors that impact individual adaptations like individual differences and context of use. Therefore, managers need to consider the factors that influence the three attributes of technology enhanced use to be able to provide adequate support to their employees (Bagayogo et al., 2014).

2.6.5 Conceptual Enterprise Resource Planning Post-Adoptive Model

On the condition that actual system benefits are not achieved (as expected during the implementation phase), management interventions must focus on providing the help needed for employees to modify their technology use patterns. A conceptual model has been posited by Clark et al. (2009) to demonstrate how organisations can maximise the post-adoption usage of Enterprise Resource Planning systems (ERP) as shown in figure 2.7. ERP systems encompass an integrated suite of software tools and a central database used to manage multiple business operations in an organisation (Scott and Kaindl, 2000).

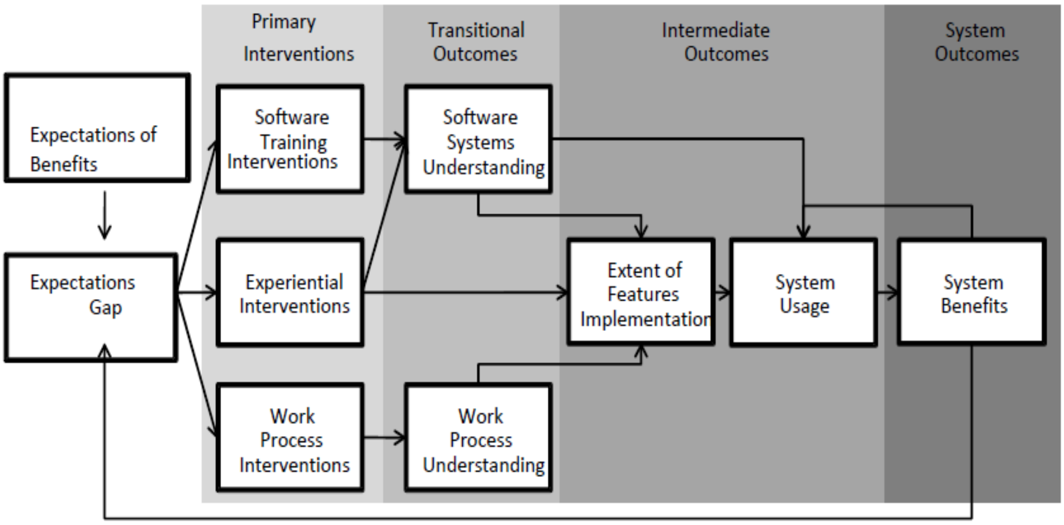

Figure 2.7. Conceptual ERP Post-adoptive Model (Clark et al., 2009:5)

During the primary interventions phase, training on how to use the software and appropriate the work processes takes place. These primary interventions can promote a better understanding and sense-making of the functionalities of the software and the work processes. Consequently, users' abilities are extended to use a wider range of technology features leading to an enhanced system use (Jasperson et al., 2005; Clark et al., 2009). Through initial training, prior knowledge, knowledge gained from peers and support desk help, users can develop experiential skills which can enable them to come up with innovative ways of using the system and in turn, make better sense of the different functionalities (Jasperson et al., 2005; Clark et al., 2009).

The sense-making process occurs when users start to use the different functionalities and compare the outcomes of their post-implementation activities to their pre-implementation activities (Orlikowski and Gash, 1994; Griffith, 1999). Post-implementation sense-making (Bhatacherjee, 2001; Jasperson et al., 2005) promotes learning and exploration of different ways of performing the task. Over time, this learning reaches a point where users perform tasks automatically (Limayem et al., 2007) and more primary interventions are needed to reduce the gap between the desired and the actual benefits of the system (Clark et al., 2009).

Bhattacherjee and Premkumar (2004) and Bhattacherjee et al. (2018) highly recommend organisations to invest in technology training programmes to create a positive user experience as it directly impacts on the technology's perceived usefulness (the most crucial belief driving IT usage) and attitudes of employees. Lucas (2010) and Bhattacherjee et al. (2018) recommend recruiting champions or super-users in delivering technology training to influence the less enthusiastic users.

2.7 The Impact of Top Managements' support to Technology Utilisation in Organisations

Institutional factors in the form of top management support have positive impact on employees' beliefs about the usefulness and ease of use of technology in organisations (Lee et al., 1995; McNish, 2002; Lewis et al., 2003). Moderate management support reduces computer anxiety among employees (Venkatesh and Bala, 2008) which has a negative impact on IT adoption and utilisation (Durndell and Haag, 2002; Beaudry and Pinsonneault, 2010). Besides, computer anxiety has been empirically shown to negatively influence perceived behavioural control because of reducing perceived CSE (Thatcher and Perrewé, 2002; Ellie-Dit-Cosaque et al., 2011).

Furthermore, Lewis et al. (2003), Kashefi (2014), Wang et al. (2015) and Haddara and Moen (2017) argue that top management commitment and support help shape individuals' beliefs that the technology is useful and that they will be valued if they use it. Top management should support IT use and best practice to foster effective outcomes in the post-adoption stage (Jasperson et al., 2005; Bhattacherjee et al., 2018). The ease of use is manifested as a result of aiding overcome obstacles in learning through training and IT support (Leonard-Barton and Deschamps 1988; Fichman, 1992; Lewis et al., 2003). Management can encourage/discourage technology utilisation explicitly through expressed preferences (Leonard-Barton and Deschamps 1988; Moore and Benbasat 1991) or implicitly through incentives (Leonard-Barton, 1987; Bhattacherjee, 1998) and using control structures such as computer usage monitoring (Bhattacherjee, 1998).

2.8 Conclusion

Understanding the fit and appropriation process that underpins the adoption and utilisation of mobile technology in mandatory settings (like police forces) in the post-adoption stage can shed light on the key determinants of technology acceptance/ resistance in these organisations. In turn, this can facilitate identifying appropriate management interventions that are in congruence with the causes of resistance to promote post-acceptance satisfaction of the technology features among its users.

Designing appropriation technology training programmes that consider these determinants can boost users' abilities/ skills, enabling them to efficiently appropriate technology features to fit different contexts and roles. Several training techniques can be used to deliver successful training programmes. The use of behavioural modelling techniques coupled with exploration learning methods can lead to an enhancement in users' technology sense-making process and their ability to efficiently appropriate work processes. Consequently, this can extend users' abilities to use a wider range of technology features. Furthermore, problem-based learning and scenario-based learning can boost users' self-directed learning skills, long-term memory and problem-solving skills. Top management's support has a pivotal role in influencing employees' attitudes and beliefs about the usefulness of the technology.

Chapter 3 - Research Methodology

3.1 Introduction

In the previous chapter a comprehensive literature review of the research project has been presented. This chapter aims to present pragmatism as the appropriate underpinning philosophical paradigm that enhances relevance through paradigm pluralism in Information Systems' research. Pragmatism offers an attractive philosophical partner for Action Research and has been proven to be a great tool in extending and exploring ideas as it focuses on asking the right questions and getting empirical answers to those questions.

There are many forms of Action Research that suit different research goals. Canonical Action Research; the form adopted for this study is presented and the challenges of conducting Action Research are discussed. Besides, aspects of recruiting participants for the study, gaining access to the Constabulary and ethical approval issues are highlighted. Finally, the different data collection methods are presented.

3.2 Justification and Purpose of the Study

As mentioned in chapter 1 (section 1.4) of this dissertation, there is a need to understand the reasons behind the diminished improvement in officers' visibility in police forces despite all the generous spending by the UK government on adopting advanced mobile policing technology. Officers' post-adoptive behaviours and patterns of utilisation of the mobile technology implemented in police forces have not been examined. Hence, a pilot study is conducted to identify the reasons behind officers' diminished utilisation of their Kelvin devices' various features. The pilot study results reveal that officers did not perceive the Kelvin devices' features as providing any efficiency gain compared to using their traditional methods of recording policing data (pen and paper). Different reasons have been highlighted in the focus groups' sessions to explain this behaviour. For instance, the initial Kelvin devices' training is limited to one day training covering the main functionalities of the device and how to keep it safe. The main applications (available on the device at the time of the training) have been presented to officers by the Constabulary's chosen champions or super-users officers. These super-users conduct the training in a lecture mode, covering only the main forms that officers fill in to complete daily tasks. The advanced features of the Kelvin devices have not been included in the training to avoid any confusion to the less IT-able officers and the inability to fit all the features in one training day. Consequently, officers who are IT-skilled can use the advanced features (through self-exploration of the features) but the majority of officers are unaware of the availability of many of the useful features on the device. To compound the problem, little IT support has been provided, thus, the gaps in officers' IT-skills are never bridged to facilitate the efficient utilisation of the Kelvin devices' features. Besides, the Kelvin devices' features presented in the training sessions differed to some extent across the three Areas of the county (North, South and West). For instance, West and South are not trained to use some applications while North officers have reported using them on a regular basis. To overcome this problem, Sergeants at West, circulated guidance information on how to use some of these applications.

Furthermore, the training did not take account of a unique aspect of using mobile technology; use context. This dissertation's pilot study claims that the 'use context' is a key determinant of the magnitude of utilisation of the mobile technology features. Thus, incorporating the 'use context' of the different Kelvin devices' features into the training sessions' design can boost the devices' usefulness perceptions among front-line officers profoundly. Therefore, adopting a multi-method approach is essential to facilitate collecting both qualitative and quantitative rich data about the extent of utilisation of the mobile technology features in the post-adoption phase among front-line officers in police forces. This research study uses quantitative data to explore and validate the extent of the qualitative data collected.

This dissertation posits the Fit Appropriation Model for Training (FAMT) as a valid conceptual model for technology training. FAMT adopts Fit and Appropriation Model concepts, Behaviour Modelling Training techniques (Bandura, 1977a; Yi and Davis, 2001), IT support and collaborative learning methods (based on the principles of Adult Learning Theory of Andragogy (Knowles, 1980, 1984, 1990; Barrows, 1996; Wood, 2004; Werth, 2011)) to create a learning environment that bridges the gaps in technical knowledge and skills. Moreover, it enables learners to use their work experiences to link the technology features to tasks and to relevant contexts, in addition to, consolidating the learning process through using real-life scenarios for practice.

Furthermore, this dissertation seeks to identify the different factors that impact the learning process during technology training of the mobile devices such as cultural norms, IT skills, supervisors' support, IT support and co-workers' effect. The use of FAMT aims to enhance the quality of processes, training and guidance to achieve better utilisation of the mobile devices. The quality of the systems, processes, information and services have been identified as the main factors contributing to the success, user satisfaction and the adoption of Information Systems by DeLone and McLean (1992, 2003). Therefore, an Action research multi-method approach is the most appropriate methodology that can facilitate answering this study's research questions. Furthermore, the adoption of a pragmatic approach to extend our knowledge about the interplay between learners and technology features during technology training can shed light on the key determinants of delivering effective technology training in mandatory use settings as will be presented in the next sections.

3.3 Pragmatism

3.3.1 Overview

There are three well-known research paradigms or epistemologies in Information Systems research: Positivist, Interpretivist and Critical approaches (Orlikowski and Baroudi, 1991; Walsham, 1995; Klein and Myers, 1999; Myers and Avison, 2002; Richardson and Robinson, 2007). However, Goles and Hirschheim (2000) looked in to the significance of considering Pragmatism as an underpinning paradigm that enhances relevance through paradigm pluralism in Information Systems' research. It "is concerned with action and change and the interplay between knowledge and action. This makes it appropriate as a basis for research approaches intervening into the world and not merely observing the world" (Goldkuhl, 2012:2). Hence, Pragmatism offers an attractive philosophical partner for Action Research (AR) undertaken in the Information Systems discipline (Baskerville and Myers, 2004; Goldkuhl, 2008b; Kaschek, 2008; Savin-Baden and Major, 2013). It is a great tool in extending and exploring ideas as it focuses on asking the right questions and getting empirical answers to those questions (Baskerville and Myers, 2004; Savin-Baden and Major, 2013). Pragmatism provides a method to help explain the problem (Baskerville and Myers, 2004) and is seen as instrumental in relation to the change of existence (Dewey, 1931) where the role of the researcher is to promote this change (Goldkuhl, 2012).

3.3.2 Key Aspects of Pragmatism

One of the pivotal ideas within pragmatism is that the meaning of a concept is the practical consequences of that concept (Peirce, 1878). Hence, the meaning of a concept is derived from the different actions conducted based on the belief in that concept (Peirce, 1878). This makes actions in the empirical world the primary concern to a pragmatist researcher (Goldkuhl, 2004; Kaschek, 2008). These actions are guided by the research purpose and its accompanying research questions (Goldkuhl, 2004). A thorough understanding of the practice context is essential for conducting successful research as it determines which actions are adequate within the practice (Avison et al., 2018). Furthermore, abstracted concepts must be translatable to practical reality to ensure making a positive difference in practice (Goldkuhl, 2004). A pragmatist researcher does not only have an interest in what actions worked, how and why but also in what did not work, how and why as argued by Goldkuhl (2004). Therefore, the author argues that finding effective methods for analysis and description can help the researcher keep a pragmatic mode of inquiry. Dewey's (1938) concept of inquiry is central to applying pragmatist thoughts and methods in research. Dewey (1938:108) defines inquiry as "the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituents, distinctions and relations as to convert the elements of original situation into a unified whole." "This means that an inquiry is an investigation into some part of reality with the purpose of creating knowledge for a controlled change of this part of the reality. Inquiries are conducted with scientific purposes or as activities in ordinary life" (Goldkuhl, 2012:7). Hence, the aim of inquiry is to create knowledge in the interest of change and improvement (Goldkuhl, 2012).

3.3.3 Pragmatism in Information Systems Research

Goldkuhl (2008b) identifies three different kinds of pragmatism in IS research: Referential pragmatism (knowledge about action), Methodological pragmatism (knowledge through action) and Functional pragmatism (knowledge for action).

Referential pragmatism, as shown in figure 3.1 below, focuses on generating knowledge through studying the actions (Goldkuhl, 2008b). This follows Blumer's (1969:71) claim that "the essence of society lies in an ongoing process of action – not in a posited structure of relations. Without action, any structure of relations between people is meaningless. To be understood, a society must be seen and grasped in terms of the action that comprises it." Thus, Blumer (1969) argues that actions should be the primary empirical and theoretical focus. There are many action theories which have influenced IS research like Structuration Theory (Giddens, 1984) and the Activity Theory (Engeström, 2015).

Figure 3.1 Knowledge-Action Relation in Referential Pragmatism (Goldkuhl, 2008b:11)

Methodological pragmatism is concerned about how knowledge is created (Goldkuhl, 2012). It involves the development of knowledge as a result of the continual interaction between knowing and acting (Goldkuhl, 2008b). Knowledge is based on actions and reflections on actions (Goldkuhl, 2008b). Methodological pragmatism builds on the idea of a planned intervention in the world to gain knowledge through inquiry (Dewey, 1938). Thus, experimentation and exploration are fundamental to the inquiry processes (Goldkuhl, 2008b). Methodological pragmatism (as shown in figure 3.2 below) is adopted in Action research as it involves exploring new strategies and planning interventions to solve practical problems (Goldkuhl, 2008b).

Figure 3.2 Knowledge-Action Relation in Methodological Pragmatism (Goldkuhl, 2008b:12)

In Functional Pragmatism, knowledge should be useful for constructing action and change (Goldkuhl, 2008b). Hence, in IS research, the use of models, frameworks and methods is important in Functional Pragmatism because it gives guidance in practical endeavours (Goldkuhl, 2008b). Dewey (1931) writes, with reference to William James (1907), that theories should be perceived as instruments and that action has an intermediary role to change existence provided it has purpose and knowledge. Action research is seen as Functional Pragmatism as it aims to solve practical problems in addition to contributing to scientific knowledge (Goldkuhl, 2008b). Functional pragmatism is adopted in this study and will be discussed in detail in section 3.3 below.

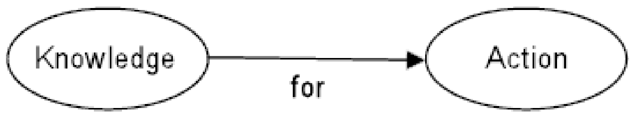

Figure 3.3 Knowledge-Action Relation in Functional Pragmatism (Goldkuhl, 2008b:10)

3.4 Research Methodology: 'Canonical' Action Research

3.4.1 Introduction

Baskerville and Wood-Harper (1996) and Baskerville and Myers (2004) have considered Action Research (AR) as a highly-involved type of research study which enables researchers in the Information Systems field to make their work more relevant to practice. It aims to solve current practical problems while expanding scientific knowledge (Avison et al., 2001; Baskerville and Myers, 2004). The authors argue that AR methods could potentially improve the practical relevance of IS research. Baskerville and Myers (2004) claim that AR is conducted in a simple two stage process; the diagnostic stage followed by the collaborative change stage. The first stage involves a collaborative analysis of the social situation by the researcher. In the second stage, the change is introduced, and the effects are studied. Baskerville and Wood-Harper (1998) describe AR processes to be iterative and reflective.

McKay and Marshall (2001) posit a model that includes two parallel cycles of AR; one addresses the client's interests while the other addresses the researcher's scholarly interests. A slight modification was introduced to AR by Goldkuhl (2008a) to achieve creating scientific knowledge of practical value which he called Practical Inquiry (PI). PI involves contributing to general practice that shares common features (Goldkuhl, 2008a). In PI, intervention is not necessary although it might often occur (Goldkuhl, 2008a). Hence, PI "is research about the practical and in favour of the practical" (Goldkuhl, 2008a:6).

AR can have several forms: the original 'canonical' form of AR, management consulting, soft systems methodology and organisational learning (Baskerville and Wood-Harper, 1998). This study adopts the original 'canonical' form of AR to facilitate achieving the goals of the study as will be discussed below. The term 'canonical' "is used to formalise the association with the iterative, rigorous and collaborative process-oriented model developed by Susman and Evered (1978) that has been widely adopted in the social sciences” (Davison et al., 2004:66).

As mentioned in chapter one, in the context of studying the utilisation of mobile technology in UK police forces, solely qualitative studies have been conducted to understand and explore the utilisation of the mobile technology among different police roles (Pica et al., 2004; Pica and Sørensen, 2004; Allen and Shoard, 2005; Hampton and Langham, 2005; Norman and Allen, 2005; Pica, 2006; Allen et al., 2008; Lindsay et al., 2009).

3.4.2 Description of the AR Method

The term ‘Action Research’ was first used by Kurt Lewin (1947a, b, 1951) who viewed it as “a way of learning about organisations through trying to change them” (Robson, 2011: 188). However, another group working at the Tavistock Clinic developed a similar method to deal with the psychological and social disorders caused by prisoner-of-war camps (Trist, 1976). The evolution of AR is presented in Baskerville and Wood-Harper (1996, 1998). AR has been adopted and developed successfully as an approach to Information Systems research (Avison et al., 1999; Davison et al., 2012; Malaurent and Avison, 2015; Baham et al., 2017; Baird et al., 2017; Yang et al., 2017).

Lewin’s work (1951) posit a general theory of how social change can be managed. His original model of AR is comprised of iteration of six phased stages: analyses, fact-finding, conceptualisation, planning, implementation of action and evaluation (Baskerville and Wood-Harper, 1996). However, to achieve scientific rigor, additional structure has been added by Susman and Evered (1978) and has been described as an ‘ideal’ exemplar of the original model of AR (Baskerville and Wood-Harper, 1996). This cyclical, five phased process is shown below in figure 3.4. The five phases are: diagnosis, action planning, action taking, evaluating and specifying learning (Baskerville and Wood-Harper, 1996). This approach requires the establishment of a client-system research environment that fosters collaboration between researchers and practitioners (Baskerville and Wood-Harper, 1996).

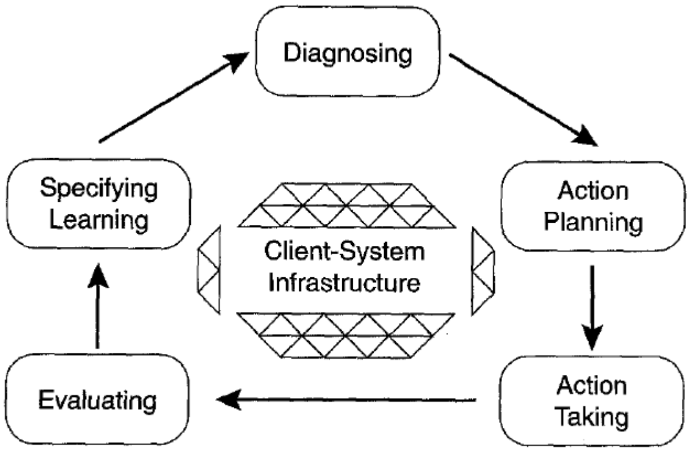

Figure 3.4 The Action Research Cycle (Susman, 1983)

retrieved from (Baskerville and Wood-Harper, 1996: 238)

Diagnosing corresponds to the identification of the key problems and includes a detailed understanding of the surrounding environment in a holistic fashion (Baskerville and Wood-Harper, 1996; Davison et al., 2004). The diagnosis will inform the planning of actions; the second phase. In this phase, practitioners and researchers must collaborate, guided by the theoretical framework to plan the change and the approach to achieving it (Baskerville and Wood-Harper, 1996; Davison et al., 2004). The intervention/action-taking phase might be directive where the researcher directs the change or might require the utilisation of catalytic change agents like project champions, process experts or external stakeholders to implement the planned action (Baskerville and Wood-Harper, 1996; Davison et al., 2004). The practitioners and the researchers collaborate in the active intervention and cause the appropriate change to take place (Baskerville and Wood-Harper, 1996). The data collection methods employed in this stage must ensure a rich pool of data for subsequent analysis (Davison et al., 2004). After the planned actions are conducted, evaluations of outcomes should be compared to project goals and expectations. This includes an assessment of whether the theoretical effects of the actions have been realised and whether the problems are rectified (Baskerville and Wood-Harper, 1996). The assessment must be thorough and include some framework for the next iteration of the AR cycle if the interventions are unsuccessful (Baskerville and Wood-Harper, 1996). If the interventions are successful, the specific mechanisms that caused the improvement should be specified (Davison et al., 2004). Finally, the fifth phase; the activity of specifying learning is usually an ongoing process and should guide three audiences (Baskerville and Wood-Harper, 1996). First, the restructuring of organisational norms to reflect the new knowledge gained. Second, where the interventions were unsuccessful, the additional knowledge may provide guidance for further AR. Third, the success or failure of the theoretical framework will provide useful information to the scientific community intending to conduct similar research work.

Table 3.1 below presents how the five phases of AR have been implemented in this study.

Phase 1: Diagnosing	A pilot study was designed with the aim to collect rich data about the key reasons of the causes for officers' resistance to using the full range of features of the Kelvin devices. The pilot study comprised two stages; focus groups sessions and online survey. All the focus groups sessions were audio recorded and semi-transcribed to

	delineate the key causes of the problem. Besides, the Q-card ranking methodology was used (at the end of each focus groups session) to help officers prioritise and focus on the main barriers to using the Kelvin devices efficiently. The key findings of the focus groups sessions were used in the design of the online survey to allow more officers to express their viewpoints. Furthermore, the online survey aimed to collect more focused data about the different applications that officers use on daily basis to perform policing tasks. The pilot study is discussed in detail in chapter four.
Phase 2: Action Planning	The key findings of the pilot study were collated in a report and submitted to senior management at the Constabulary. Based on the findings reported, the Constabulary was able to resolve some of the barriers to using the devices. However, there were essential actions that need to be conducted for the benefits of the mobile technology to be realised. The researcher collaborated with senior management to design technology training sessions that can rectify the causes for officers' resistance. This involved conducting four meetings with super-users, three meetings with technology trainers and seven meetings with senior management. As a result of

	the collaboration, a set of features were delineated for the training sessions. Senior management approved the researcher's training sessions' design which adopted behavioural modelling techniques of training and problem-based/scenario-based learning methods. The action planning phase is presented in detail in chapter five, sections: 5.2, 5.3, 5.4, 5.5 and 5.6.
Phase 3: Action Taking	Super-users were recruited by the Constabulary to deliver the technology training to front-line officers. In only one session (at West), the researcher conducted the first part of the training. All the three training sessions were audio recorded (a total of three hours) and transcribed. The researcher took notes in the sessions and all the observations' fieldnotes were written on the same day of the training; just after the session. The observations were compared to the audio recordings' transcription to provide data for subsequent analysis. The data collected for this phase is presented in chapter five section 5.8.
Phase 4: Evaluating	To assess the achievement of the training goals, two methods of officers' feedback were used in addition to analysing the observations' fieldnotes and the audio recordings. Officers were encouraged to send short

	messages service (SMS) to the researcher to inform her promptly about the effectiveness of the Kelvin devices' features in actual work contexts. As SMS are naturally short, it was not perceived by officers as an extra job on top of their daily tasks and they were able to send several SMS at their convenience. The second feedback method was via an online survey which was sent to all participating officers to collect rich data about the influence of using exploratory learning methods on the learning process. This method facilitated collecting data about how officers linked the features' use in different contexts and their evaluation of using real-life scenarios in technology training. Furthermore, the survey results revealed that officers positively appraised the new features and reported a significant positive change in their attitude towards the devices. The observations field notes analysis highlighted significant gender differences in the technology learning process. The evaluation of the effectiveness of the training sessions is presented in chapter six (section 6.4.2.2, section 6.4.3).
Phase 5: Specifying Learning	A report with all the key findings and recommendations for conducting effective technology training sessions at the Constabulary was submitted to senior management.

	Also, academic papers will be published to extend the scientific knowledge in this area of study.

Table 3.1 This Study's Five Phases of AR

Conducting Action research entails many challenges. In the next section, the key challenges of conducting Action research at the Constabulary will be presented and methods of overcoming them will be discussed.

3.4.3 Challenges of Action Research

Three key challenges of AR are identified: its rigour, the researchers' ability to maintain collaboration and subject learning, and its restrained generalisation. These three challenges will be presented and discussed below.

3.4.3.1 Rigour of Action Research

AR has been criticised as lacking rigor (Chapman et al., 2011) and praised for the relevance of its results (Baskerville and Wood-Harper, 1996). AR aims to address organisational problems while at the same time contributing to academic knowledge (Davison et al., 2004). A set of principles are delineated by Davison et al. (2004, 2012) to promote the rigor and relevance of canonical AR.

3.4.3.1.1 The Principle of the Researcher-Client Agreement (RCA)

The RCA is the guiding basis for an effective AR project (Øgland, 2014). It is necessary that the client understands how AR works and what the responsibilities of the client and the researcher entail (Davison et al., 2004). A well-structured RCA should provide a solid foundation for building mutual trust among stakeholders and contributes to the validity of the project (Davison et al., 2004).

In this study, a consented agreement between University of Cumbria and a UK Constabulary was signed to allow a PhD student to investigate the key causes for officers' resistance to using the full range of their Kelvin devices' features and conduct rectifying actions. The PhD student/researcher was assigned a Superintendent as a single point of contact. The researcher was granted full vetting clearance to access the different facilities of the constabulary before the start of the project. After conducting the pilot study, the researcher shared all the key findings, intervention plan and objectives of the project's planned interventions with the Superintendent. The Superintendent demonstrated full commitment to the project and welcomed the researcher's intended interventions to overcome the status quo which had adversely impacted the quality of policing data and undermined the generous investments made. The responsibilities of the researcher and the Constabulary were negotiated repeatedly until an agreement was reached. The Constabulary agreed to arrange the venues for the training sessions, recruit young officers (age ranged between 25-35), provide IT support in the sessions and recruit super-users to deliver the training. The researcher was responsible to explain the design of the sessions to trainers before the sessions, attend the training as an observer and share the key findings of the study with the Constabulary. The researcher suggested that male and female officers should have separate training sessions as the pilot study's results revealed some differences in their technical skills. The Superintendent disagreed with the researcher as they believed that this decision will not be in congruence with the Constabulary's culture and norms. The number and locations of the training sessions, in addition to, the data collection methods were agreed with the Superintendent before the interventions began. Hence, both the Constabulary and the researcher understood their responsibilities at all stages of the project.

3.4.3.1.2 The Principle of Cyclical Process Model (CPM)

The next step after establishing the RCA is to follow a CPM. As mentioned in section 3.4.2, the researcher followed the CPM proposed by Susman and Evered (1978) and a full description is presented in table 3.1.

3.4.3.1.3 The Principle of Theory

Action researchers need to rely on one or more theories to guide their activities (Davison et al., 2004, 2012). This is particularly important to avoid the 'irrelevant subject' failure (Avison et al., 2001) whereby a researcher conducts a study for a client that is perceived as insignificant by the research community despite being important to the client's interest. Hence, in this case, the presence of a theoretical framework diminishes this danger (Davison et al., 2004). The theoretical model should play two important roles: to frame the focal problems and to guide the intervention (Davison et al., 2004, 2012). Thus, these theories are used as an initial guide for identifying these factors and as a guide for appropriate intervention.

In the pilot study, Beaudry and Pinsonneault's (2005) Coping Model of User Adaptions (CMUA) was adopted to study the primary causes for officers' resistance to using their Kelvin devices' full range of features. According to Gregor's (2006) taxonomy of types of Information Systems theories, the application of Beaudry and Pinsonneault's (2005) CMUA can be categorised as theory for explaining; hence the theory itself is an end product and will not lead to predictive theory. The main contributions of this type of theory lies in explaining something that was imperfectly understood. However, the theory was not used in a rigid way but was extended to incorporate the context of use as it is a key factor in determining the magnitude of utilisation of the features in the discipline of mobile Information Systems.

Furthermore, the Fit and Appropriation Model concepts and the appropriation concepts (Giddens, 1984; Orlikowski, 1992; DeSanctis and Poole, 1994; Tyre and Orlikowski, 1994)), Behaviour Modelling Training techniques (Bandura, 1977a; Yi and Davis, 2001) and collaborative learning methods that are based on the principles of Adult Learning Theory of Andragogy (Knowles, 1980, 1984, 1990; Barrows, 1996; Wood, 2004; Werth, 2011) are used in the design of the Fit and Appropriation Model for Training (FAMT) to understand the factors that impact on the learning process during technology training. Therefore, the training sessions' theories can be categorised as theories for explaining and predicting (Gregor, 2006). The theories used to construct FAMT rely explicitly on causal reasoning and claim to predict individuals' satisfaction with the mobile technology utilisation as a result of the confirmation of officers' expectation about the strengths and limitations of the Kelvin devices' features in different work contexts.

It is worth noting that the theoretical frameworks adopted in the design of FAMT integrate the two main streams of research in the Information Systems field; the variance approach and the process approach. The variance approach focuses on the antecedents of adoption and usage of technology and has yielded various models of user acceptance (Venkatesh et al., 2003). On the other hand, the process approach argues that performance depends on how teams appropriate technology's' features and the social structures that affect the use of technology (Orlikowski, 1992, 2000; DeSanctis and Poole, 1994; Tyre and Orlikowski, 1994; Wheeler and Valacich, 1996; Majchrzak et a., 2000); resulting in the same IT being used in multiple ways in an organisation (Robey, 1995).This stream examined user adaptations and described how they modify their work processes and change their skills, beliefs and attitudes to cope with the technology. Hence, by integrating both streams into the design of FAMT, this dissertation fulfilled Beaudry and Pinsonneault's (2005) call to develop Information Systems frameworks that integrate the two approaches to overcome fragmentation of extant research. Therefore, the use of theoretical frameworks in this study fulfilled Davison et al.'s (2004) third principle and can extend the scientific knowledge in this under researched discipline.

3.4.3.1.4 The principle of Change Through Action

The essence of AR is to take actions to change the current situation (Davison et al., 2004). For the change to take place, the client and the researcher must be motivated to improve the existing situation and it must be agreed that the intervention can rectify the diagnosed problems (Davison et al., 2012). As mentioned above in the RCA principle (section 3.4.3.1.1), the Constabulary and the researcher were highly committed to boost officers' attitudes as well as the efficient utilisation of the Kelvin devices. The report submitted to the Constabulary after the completion and the analysis of the pilot study's data detailed all the causes of the problem. The Constabulary rectified some of the problems. However, there were specific problems that required intervention to be resolved. The researcher highlighted the significance of bridging the technical gaps in officers' IT-skills, the importance of using exploratory training methods during technology training and the benefits of using scenario-based/problem-based learning to link the features to the context of use. The Superintendent discussed the planned actions with the researcher and volunteered to prepare real-life policing scenarios to be used in the training sessions. The results of the intervention were assessed three weeks after the training session via an online survey. Nevertheless, officers were encouraged to send the researcher text messages and/or emails straight after the training if they needed help/support or to share with her how they used the features in performing daily tasks.

3.4.3.1.5 The Principle of Learning through Reflection

The reflection and learning processes are crucial aspects of AR. Learning enables organisations to restructure their norms to reflect the knowledge gained during the research and inform further intervention within the current project (Davison et al., 2012). It contributes to the advancement of knowledge by re-informing existing theory or generating new theory (Davison et al., 2004). Consequently, the reflection and learning should encompass implications for practice and for the scientific community (Davison et al., 2004). After the completion of the training sessions, a thorough analysis of the data collected was performed (please refer to chapter six) and implications for both practice and theory were highlighted (please refer to chapter seven). Furthermore, academic papers that explain how the project was conducted and its key findings will be published in academic journals to help advance the knowledge about mobile Information System AR projects in mandatory settings like police forces. A similar report was submitted to the Constabulary delineating the key findings of the study and suggesting recommendations for enhancing future technology training.

3.4.3.2 Maintain Collaboration and Subject Learning

A characteristic aspect of rigorous AR is the careful handling of the collaboration with the subjects of the study. Their knowledge is critical for the discovery of important aspects of the theory under test (Baskerville and Wood-Harper, 1996). Action researchers should avoid dominating the diagnosis and action planning phases (Baskerville and Wood-Harper, 1996). Moreover, the cycle of subject learning is significant to claim any idiographic usefulness for the theory under test (Baskerville and Wood-Harper, 1996). Subjects' feedback can lead to imperative modification of action-taking and sustaining the action cycle (Baskerville and Wood-Harper, 1996).

In this research study, various methods of data collection have been used to allow a larger number of officers to contribute to the diagnosis phase. The pilot study's online survey facilitated collecting rich data about the causes for officers' resistance to using their Kelvin devices and furthered the understanding of the key themes identified from analysing the focus groups' data. Thus, the multi-method approach in the pilot study facilitated different styles of collaboration with the subjects to avoid any researcher domination at the diagnosis stage. The researcher made extensive use of the valuable contribution of the super-users and the trainers about the benefits and drawbacks of the features of the Kelvin devices in the action-planning phase. Additionally, an online survey was circulated after three weeks of the training sessions' completion to collect officers' feedback about the learning process and the sessions' structure. Their feedback was imperative to understand the necessary future actions needed to enhance the learning process during mobile technology training sessions.

3.4.3.3 Restrained Generalisation

The nature of AR being idiographic, context-bound and multivariate can present conflicts regarding the generalisation of the studies' findings. However, it is generalisation that makes theories relevant (Baskerville and Wood-Harper, 1996). Keen (1991) believes that such relevance is as important as rigour in the achievement of significant IS research. An AR project can never be repeated as the intervention is into a unique organisational setting (Baskerville and Wood-Harper, 1996). Hence, Kirk and Miller (1986) posit that synchronic reliability is a necessary premise of generalisability. Baskerville and Wood-Harper (1996:243) argue that "this form of reliability is based on the consistency of observations within the same time period. This data would never be identical but should be consistent with the theory under test." Furthermore, Gummesson (2000) argue that validity is a sounder criterion for generalisation.

Validity refers to the degree to which the research study has accomplished its goals. Baskerville and Wood-Harper (1996) claim that action researchers can legitimately generalise their research findings based on their research validity. In addition, researchers can embed synchronic reliability into the design of their projects (Baskerville and Wood-Harper, 1996). Theories will evolve under the pressure of further study when the research projects' results are circulated to the scientific community (Baskerville and Wood-Harper, 1996).

In this AR study both synchronic reliability and validity were fulfilled. Synchronic reliability is pivotal in the design of the study where three identical technology training sessions were conducted in the same Constabulary to front-line officers. Observations of the three sessions were recorded in fieldnotes and compared. Key similarities and differences in the learning process across the three sessions were discussed in detail in chapter six. Furthermore, the study accomplished all the three goals delineated at the start of the study (please refer to section 1.5). The FAMT conceptual model was validated and the online survey results indicated that officers perceived the training techniques used as effective. Therefore, this AR study fulfilled the reliability and the validity criterion necessary for generalisation in the IS field of study. Moreover, this study can claim to offer generalisation to theory (Lee and Baskerville, 2003) as it modified the pilot study's initial guiding theoretical model based on the findings from the pilot study's data and offered a thick description of the results of applying the theories used in the design of FAMT which can be useful for both researchers and practitioners in the IS research discipline.

3.4.4 Characteristics of Different Forms of Action Research

AR for the IS practitioner and researcher can have several forms: the original 'canonical' form of AR, management consulting, soft systems methodology and organisational learning (Baskerville and Wood-Harper, 1998). Four key characteristics distinguish the different forms of AR are identified by Baskerville and Wood-Harper (1998): process model, structure, typical researcher involvement and primary goals.

3.4.4.1 Process Model

Three distinct process models characterise the different forms of AR are highlighted by Baskerville and Wood-Harper (1998): An iterative process, a reflective process and a linear process. An iterative process model involves cycling between problem diagnosis and action activities (Blum, 1955). A reflective process model is iterative but focuses more on reflective analysis and less on problem diagnosis. A linear process model does not involve iteration but a single sequence of activities (Baskerville and Wood-Harper, 1998). This research study adopts a linear process model where the results of each phase feeds into the next. Hence, the pilot study results were used to guide the action planning phase and all the interventions were based on the diagnosing and the action planning phases.

3.4.4.2 Structure

Two distinct forms of structural guidance differentiate the different forms of AR: rigorous structure and fluid structure (Baskerville and Wood-Harper, 1998). Rigorous structure is characterised by "delineated stages, steps or activates carried out in a sequence or cycle or selected according to rules or heuristics" (Baskerville and Wood-Harper, 1998:95). Fluid structure defines activities loosely. This study adopts a rigorous structure by following the five phases of AR posited by Susman and Evered (1978) and presented above in table 3.1.

3.4.4.3 Typical Researcher Involvement

Researcher involvement with their study subjects can take different forms. Collaborative involvement "implies that the researcher is an equal co-worker with the study subjects. The study tasks are shared without distinction and the participants' backgrounds are assumed to be equally valuable" (Baskerville and Wood-Harper, 1998:95). A Facilitative involvement "distinguishes the researcher as an expert among the study subjects. While the work is still cooperative, the tasks of the researcher and the subjects are quite distinct" (Baskerville and Wood-Harper, 1998:95). The task of the researcher is to provide technical knowledge or expert advice; however, the subjects are responsible for determining what interventions will be created (Baskerville and Wood-Harper, 1998). An Expert involvement is like a Facilitative involvement, but the researcher determines to a large degree what interventions will be conducted (Baskerville and Wood-Harper, 1998). In this study, the researcher provided expert advice to senior management at the Constabulary on the actions needed to rectify the problems identified in the pilot study, hence, the researcher's involvement was as an expert one.

3.4.4.4 Primary Goals

There are different primary goals that are associated with the different forms of AR. Organisational Development involves a primary goal of developing the social conditions of the organisation like structural efficiency, structural effectiveness and higher morale among the individuals involved in the organisation (Baskerville and Wood-Harper, 1998). System design involves a primary goal of modifying or creating organisational systems while Scientific

Knowledge implies a primary goal of contributing to the scientific literature in the field (Baskerville and Wood-Harper, 1998). This study's primary goals are focused on enhancing officers' efficiency through using exploratory training methods, bridging officers' IT-skills gaps and linking the features' use to the work context level. Besides, AR has not been used before in the field of policing mobile IS in the UK. Therefore, by reporting about the key findings of the study and the methodology adopted, other researchers will be able to extend the knowledge in this field of study. Thus, Organisational Development and Scientific Knowledge are the primary goals of this AR study.

3.5 Participants

The participation was voluntary in both the pilot study and the training sessions. Both the pilot study's focus groups and training sessions participants were recruited by the Constabulary. As for the pilot study, it was unfeasible for the researcher as an outsider to arrange the focus groups' sessions as the this involves recruiting officers from different ranks working in different Areas across the county. The number of participants in the focus groups sessions was limited to ten officers per session. Participants were selected by the Constabulary based on the researcher's specific requests for representation from various roles, ranks, Areas of service and IT skills. A detailed description of the pilot study's data collection methods and participants is presented in sections 3.8 and 4.4.

Like the pilot study, all participants of the training sessions were recruited by the Constabulary. The researcher requested that the number of officers attending each training session would be limited to five or six front-line police constables and that officers' ages must be ranged between 25 and 35 years of age. A detailed description of the training sessions' participants is presented as follows: section 5.8.1.3 for North officers, section 5.8.2.3 for West officers and section 5.8.3.3 for South officers.

3.6 Access

The researcher was granted a full vetting clearance to access the Constabulary's different facilities prior to the start of the study. However, the researcher was delayed several times at the data collection phase. At the beginning of the study, the SPOC (Single Point of Contact) responsible for organising the focus groups sessions changed roles due to a work promotion and the hand over process was not achieved resulting in long delays until another Superintendent oversaw the research work. Understandably, the new Superintendent had a high work load and it took a considerable amount of time to start the data collection phase.

3.7 Ethical Approval

University of Cumbria' research ethics panel approved the participant consent forms as well as the participant information sheet to be used in the process of collecting data for the pilot study and the field work. A copy of the participant information sheets and consent forms are presented in appendix 3 (the pilot study forms) and appendix 4 (the training sessions forms). Participating officers were provided with information sheets to read and consent forms to sign before collecting any data. The researcher assured participants several times that the results of the study will be presented to the Constabulary in a report and/or a presentation with completely anonymised data. This was particularly important to build a trust relationship between the officers and the researcher. Officers were happy for the data to be used in publishing academic papers and in a doctoral dissertation. Officers were aware that at the end of the study, the audio files will be stored on a password protected USB and kept for a maximum of two years in the University of Cumbria and then destroyed. Officers were also informed that any screenshots of the Kelvin devices or the applications will be anonymised.

Furthermore, ethical approval from George Mason University was granted to the researcher permitting the use of parts of their survey in the pilot study's online survey rolled out at the Constabulary. George Mason University's online survey (Koper et al., 2015) aimed to examine how key technologies affect various aspects of police work to understand how best can police use current and new technologies in the US.

3.8 Data Collection Methods: Using a Multi-Method Approach

This research study uses a multi-method approach. Using this approach facilitates addressing confirmatory (quantitative) and exploratory (qualitative) research questions simultaneously (Teddlie and Tashakkori, 2003). Combining qualitative and quantitative methods "provides a richer, contextual basis for interpreting and validating results" (Kaplan and Duchon, 1988:575). Collecting data using different methods from different sources enhances the ability to paint a fuller picture of the problem researched (Bonoma, 1985; Venkatesh et al., 2013; Almalki, 2016) and boosts the 'robustness of results' through triangulation (Yin, 1984; Bonoma, 1985; Benbasat et al., 1987; Breitmayer et al., 1993; Adami, 2005; Allen et al., 2014; Almalki, 2016). This approach is widely used in Information Systems research (Mingers, 2001). Mingers (2001), Patton (2002) and Seale et al. (2007) argue that better-quality research work is produced if a multi-method approach is adopted and methods are appropriately selected to suit the context of the research conducted. Mingers (2001:241) claim that "different research methods (especially from different paradigms) focus on different aspects of reality and therefore a richer understanding of a research topic will be gained by combining several methods together in a single piece of research or research program". This claim has been supported within the Information Systems discipline by many authors (Trauth and O'Connor, 1991; Landry and Banville, 1992; Galliers, 1993).

In exploring the utilisation of mobile technology in policing, the multi-method approach has been adopted by Allen and Wilson (2004), Pica and Sørensen (2004), Colvin and Goh (2005), Sørensen and Pica (2005), Lindsay et al. (2009), Dunkerley et al. (2014), and Karanasios and Allen (2014). In the next section, the different methods adopted for data collection are presented.

3.8.1 Focus Groups

3.8.1.1 Aim, Participants and Researcher Role

Focus groups are a data collection method that seeks to collect information about a specific topic through conversation with a limited number of individuals (Merton et al., 1990; Kitzinger, 1996; Morgan, 1997). Exploratory focus groups, like the sessions conducted in this study, aim to increase the researcher's understanding of an issue through group interactions (Calder, 1977; Folch-Lyon and Trost, 1981). Focus groups are particularly useful for understanding the social and cultural realities of a group through direct access to their experiences (Hughes & DuMont, 1993). Focus groups are not as strong as participant observation in their ability to understand a phenomenon in context nor as strong as in-depth interviews in providing comprehensive knowledge about participants, however, focus groups are better at combining those two goals than either method alone (Morgan, 1997). A focus group's guide for the key issues for discussion was agreed with the Constabulary. Each session was attended by a homogenous group of officers in terms of role and the Area they serve in, but heterogenous in terms of age, experiences and gender. The purpose of the focus group should dictate the degree of its homogeneity (Calder, 1977). This group structure facilitated collecting rich data about the various sets of the Kelvin devices' features used in different policing roles and how the utilisation varied with respect to age, gender and experiences.

The optimal number of sessions is to be determined when the response saturation state is reached (Stewart and Shamdasani, 2015). Hence, even though ten focus groups sessions were initially arranged by the Constabulary, the data collected from nine sessions were rich enough for data analysis; the tenth session was cancelled. The sample size in each session was between nine and ten officers as advised by Howard et al. (1989) to facilitate group interactions. The researcher in this study acted as a moderator. Basch (1987:415) describes the role of the moderator as to "create a non-threatening supportive climate that encourages all participants to share views; facilitating interaction among members; interjecting probing comments, transitional questions and summaries without interfering too brusquely with the dialogue; covering important topics and questions while relying on judgements to abandon aspects of the outline, noting non-verbal responses."

3.8.1.2 Audio Recording and Analysing Focus Groups' Sessions

As the researcher acted as a facilitator or a moderator, it was difficult to take notes and moderate. Hence, all the pilot study's focus groups' sessions were audio recorded using a Dropbox audio recorder application (it saved audio files straight to a password protected Dropbox folder for online easy access and data protection). Walsham (2006) emphases the importance of recording interviews as it enables researchers to return to the transcript later for alternative forms of analysis, it frees the researcher from taking notes and helps the researcher to engage more with the interviewee. The main drawbacks of audio recordings are transcription is time-consuming and/or expensive to do and it might make the interviewee less open or less truthful (Walsham, 2006). To eliminate any discomfort and ensure anonymity for officers, the pitch of the audio files was modified using the Audacity program.

Thematic coding analysis was used to analyse the main themes recurring in all focus groups audio data. The set of principles of thematic analysis identified by Braun and Clarke (2006) were used to find, analyse and report patterns within the collected data. Coding is the first step of data analysis, as it helps to move away from statements to more abstract interpretations of the focus group data (Gibbs, 2007; Charmaz, 2014). Another subsequent phase of coding is axial coding, defined by Strauss and Corbin as "the act of relating categories to subcategories along the lines of their properties and dimensions" (Strauss and Corbin, 1998:123). The aim of axial coding is to add depth and structure to existing categories (Corbin and Strauss, 2015). Hence, the main themes identified in the focus groups sessions' data were in line with the first goal or objective of this dissertation; identifying the key reasons for officers' resistance to using the full range of functionalities of their Kelvin devices.

The audio recordings were analysed using a qualitative analysis software program Atlas.Ti. for semi-transcription and analysis. Audio files were split into short audio clips (on average each clip is 2 minutes long) and transcribed. A full transcription of each clip was added along with a corresponding theme. All themes/codes were displayed visually in a network layout to paint a complete picture of all the issues raised by officers during the focus groups sessions. This method is used to keep the raw data easily accessible and stored in a structured way that facilitates the analysis phase and saves massive time spent in the transcription phase. Please refer to chapter four (section 4.3.1) for a detailed discussion of this method.

3.8.2 Q- Cards Methodology

Q-cards methodology presents an innovative approach to qualitative research through "a quantification of patterned subjectivities" (Shemmings, 2006:147). This methodology has been devised and developed by William Stephenson in the 1930s (McKeown and Thomas, 2013). The main objective of this method is the desire to eliminate subjectivity by allowing individuals to represent their ideas and to decide about the ideas meaning and significance from their own perspectives through a process called Q-Sort (Coogan and Herrington, 2011). The Q-study starts by collecting an appropriate set of statements that are representative of the topic from various standpoints and cover all the sub-issues within the concourse of the topic to enable individuals to truly reveal and express their views (Coogan and Herrington, 2011). These statements are compiled in to categories of cards and participants are asked to sort them (Coogan and Herrington, 2011). The meaning of the statements and the subjectivity is only revealed after the sorting process is completed (Watts and Stenner, 2005). A Q-grid is used for the sorting process. The statements with the most meaning are placed at the upper rows of the Q-grid (Coogan and Herrington, 2011). The participants place statements on the grid according to the extent of their agreement with the sentences (Coogan and Herrington, 2011). A weight is assigned to various slots of the grid (Coogan and Herrington, 2011). In this study, Q-cards methodology was used in the pilot study focus groups sessions as the researcher felt there was obvious subjectivity among participants' viewpoints. In some sessions, it was felt that the presence of the Sergeants discouraged some officers from sharing their actual views (some officers would be enthusiastic about sharing their views before the arrival of their Sergeant to the focus group but keep silent during the session even if the researcher encourages them to talk).

Hence, the audio recordings of the first two focus groups sessions were used to compile three decks of cards covering all the topics and sub-topics discussed with officers. The three decks covered the benefits of using the mobile devices, the main barriers to using them and the possible enhancements that would promote utilisation of the mobile devices. All statements were compiled and formatted using officers' actual words in the focus groups. Officers were divided into groups of twos and asked at the end of the session to sort the cards on a grid that represents a diamond shape for simplification. The process was explained to them and the decks had more cards than the slots in the diamond shaped grid; hence officers had to do compromises and get rid of some cards. This process helped officers reflect about their views, eliminate some cards that reveal lower priority to them and reveal their actual views with little subjectivity. A weighted average was calculated for each diamond. The results were helpful and were used extensively in the online survey conducted later. Please refer to chapter four (section 4.3.2) for a detailed discussion of this method.

3.8.3 Online Survey

Using online surveys in collecting data can profoundly increase the number of potential participants (by being self-administered) and preserves the anonymity of the respondents (Wright, 2006). It also delivers data that could be exported to statistical software packages thereby avoiding the need for lengthy data entry and enabling the researcher to use the powerful analysis tools offered by these packages in analysing the data (Wright, 2006). In this study, all officers' responses were exported to MS Excel and the researcher used MS Excel's analysis tools such as filters, pivot tables and graphs to produce a report of all the survey results. The main disadvantage is the low response rates reported by researchers who use online surveys

(Palmer, 2011). However, since the pilot study's online survey intended to collect further information about specific issues that were highlighted in the focus groups' sessions, the response rate was good enough to paint a better picture about these specific issues. The post training sessions' online survey's response rate was 75% which is considered high enough for performing analysis on the data. To establish trust with the survey respondents, the first page of both surveys included an explanation of the purpose of the study, how data will be used and who will have access to it as suggested by Simsek and Veiga (2001).

3.8.3.1 The Pilot Study Online Survey

An online survey was developed using Google Forms to collect data and to save it to an Excel spreadsheet accessible to the researcher. The survey was piloted in the Constabulary by the Superintendent. Nevertheless, the Constabulary's firewall blocked the access to the survey as it does not support the access to the researcher's google account for security reasons. Hence, the researcher had to use an alternative secure web-based tool to develop another copy of the survey. The Bristol Online Survey tool was used as it was fully compliant with the UK data protection laws and does not have a limitation on the number of participants allowed. This tool is available for all students and staff at the University of Cumbria to use in their research projects.

The survey questions were a combination of open-ended and closed-ended questions. The closed-ended questions used Likert-scale measures to measure general attitudes and views of officers towards the technology implemented in the Constabulary. Some of the closed-ended questions were adapted from George Mason University Technology survey (Koper et al., 2015) after getting a formal permission to use parts of the online survey.

The open-ended questions focused on the Kelvin applications and functions. All survey questions were approved by the Superintendent in charge. The data collected from the online survey was exported to an Excel spreadsheet. Officers' age column was modified to show an age range to facilitate comparisons with other columns. Similarly, officers' years of policing experience column was expressed as a range. Pivot tables were used to draw comparisons and compare results between different spreadsheet parameters. Graphs were used to display the results of the analysis in the final report. The report was submitted to senior management at the Constabulary. Please refer to chapter four (section 4.3.3) for a detailed discussion of this method. A copy of the survey is presented in appendix 1.

3.8.3.2 The Post Training Sessions' Online Survey

An online survey was developed using the Bristol Online Survey tool to collect officers' feedback about different aspects associated with the learning process after the conduction of the training sessions. The survey questions were a combination of open-ended and closed-ended questions. The closed-ended questions used Likert-scale measures to measure any change in officers' attitudes towards their mobile devices as a result of an enhancement in officers' perceptions of the usefulness of the features, using behavioural modelling training techniques and linking the features' use to various work contexts. The open-ended questions intended to collect officers' opinions about the different contexts that they used the Speech to Text feature in, the quality of the technology training they received and how to enhance technology training at the Constabulary in general.

Furthermore, all the data was exported to MS Excel and analysed using data filters and pivot tables. These tools facilitated collecting invaluable information about technology utilisation gender differences. Besides, it was feasible to compare the learning processes' outcomes across the three Areas (North, South and West). Please refer to chapter five (section 5.8.4) for a detailed discussion of this method. A copy of the survey is presented in appendix 2.

3.8.4 Unstructured Interviews

To be able to choose the appropriate Kelvin devices features to be presented in the training sessions, seven unstructured interviews with the Superintendent and four unstructured interviews with serving police officers who are also super-users were held at the Constabulary. The meetings focused on the features that can boost officers' efficiency in performing daily tasks. Furthermore, three unstructured interviews were conducted with the trainers before the training sessions to inform them about the structure of the sessions and to collect information about their use of the features to be presented in the session.

3.8.5 Observations

3.8.5.1 Overview

Observations are a fundamental qualitative tool to understanding a culture (Silverman, 2014). It involves "the systematic description of events, behaviours, and artefacts in the social setting chosen for study" (Marshall and Rossman, 1995:79). Besides, observations help to improve the validity of a study (Bernard, 1994). Through observation, the researcher can examine participants' nonverbal expressions, evaluate how they interact with each other and help the researcher get the feel of how things are organised (Schmuck, 2006; Savin-Baden and Major, 2013). There are several types of observation: exhaustive, focused and selective (Savin-Baden and Major, 2013). Exhaustive observation in which the researcher observes anything and everything while focused observations are guided by participants' responses from interviews (Savin-Baden and Major, 2013). Selective observations are like focused observations but focus more on various types of participants' activities to identify differences among them (Angrosino and Mays de Perez, 2000). This research study' observations are focused on officers' interactions during the training sessions and the key factors that impacted on their learning process, hence, the observations are both focused and selective.

3.8.5.2 Researcher Stance during Observation

Observation roles may be viewed on a continuum that ranges from a researcher who is 'most involved' to that who is 'least involved' (Savin-Baden and Major, 2013). This involvement could vary with the different stages of the research project. In this dissertation, the level of involvement of the researcher with officers during the technology training sessions varied across the three sessions depending on the circumstances of each session. For instance, at North training session, the researcher's level of involvement was 'Passive' (Savin-Baden and Major, 2013), attempting to be unobtrusive as possible to avoid biasing the observation. Nevertheless, at West training session, as the trainer was unfamiliar with the features to be presented, the researcher had to deliver the first part of the training to officers; thus, performing 'Active Participation' (Savin-Baden and Major, 2013) and then she switched to 'Balanced Participation' for the rest of the session (providing IT support only). At South, the researcher's level of participation was mostly 'Passive' except at some occasions where there was a need to become more involved to clarify few aspects concerning the appropriation of the features to officers.

3.8.5.3 Observations Recording

Observations should fit with the purpose of the study and the research questions (Merriam, 1998; Wolcott, 2009). They should pay careful attention to 'subtle factors' (Creswell, 1998) like nonverbal or symbolic communication. The researcher seeks to observe these things and considers their significance in the light of the research questions (Savin-Baden and Major, 2013). Creswell (1998) suggests that researchers may wish to focus on: physical setting, participants, activities, interactions and 'subtle factors.' In this study, all observations were categorised using Creswell's (1998) method into: trainer, researcher role, participants, training sessions' mood and physical setting and training session observations (includes all the interactions, activities and 'subtle factors').

3.8.6 Short Message Service (SMS)

Using SMS has been successfully used as a data collection method in the medical field (Johansen and Wedderkopp, 2010; Kew, 2010). It was used to collect patient medical information, in reminding patients to attend face-to-face visits and in completing medications' evaluations (Kew, 2010). SMS is user-friendly and can be answered/sent at users' convenience (Johansen and Wedderkopp, 2010; Kew, 2010). Furthermore, transmission is quick and cheap which made SMS a powerful tool in getting in touch with study subjects (Kew, 2010). In this study, SMS was used to collect officers' feedback about the effectiveness of using the Kelvin devices' features in actual work contexts. As SMS are naturally short, it was not perceived by officers as an extra job on top of their daily tasks. Many officers used the Speech to Text feature in dictating the messages and were able to send several SMS at their convenience.

3.9 Summary

In this chapter, the different types of pragmatism in Information Systems research are presented: Referential pragmatism, Methodological pragmatism and Functional pragmatism. Action research is seen as Functional Pragmatism as it aims to solve practical problems in addition to contributing to scientific knowledge. Hence, this study adopts Functional pragmatism as an underpinning philosophical paradigm.

Action Research (AR) can have several forms; the original 'canonical' form of AR, management consulting, soft systems methodology and organisational learning. This study adopts the original 'canonical' form of AR to facilitate achieving the goals of the study. The term 'canonical' "is used to formalise the association with the iterative, rigorous and collaborative process-oriented model developed by Susman and Evered (1978) that has been widely adopted in the social sciences" (Davison et al., 2004:66). Susman and Evered's (1978) AR model encompass five phases: diagnosis, action planning, action taking, evaluating and specifying learning. Table 3.1 presents how the five phases of AR have been applied in this study.

Furthermore, conducting AR entails many challenges. First, AR has been criticised as lacking rigor (Chapman et al., 2011) and praised for the relevance of its results (Baskerville and Wood-Harper, 1996). A set of principles delineated by Davison et al. (2004) to promote the rigor and relevance of canonical AR are used in this study. Another challenge is in maintaining collaboration and subject learning and the third challenge lies in its' restrained generalisation. Methods of overcoming the three challenges are presented in detail in this chapter.

The four characteristics of AR are discussed: the process model, structure, researcher involvement and primary goals. A description of the criteria for participants' recruitment, gaining access to conduct research in the Constabulary and ethical approval aspects are presented. Finally, the different data collection methods used in this study are discussed. Data collection methods are: focus groups, Q-cards methodology, online surveys, unstructured interviews, observations and short message service (SMS).

Chapter Four – The Pilot Study

4.1 Introduction

In chapter three, the methodology of the pilot study and the training sessions are outlined. A pluralistic approach of data collection methods is undertaken to collect rich data about the problem researched (Venkatesh et al., 2013; Almalki, 2016) and to boost the 'robustness of results' through triangulation (Yin, 1984; Benbasat et al., 1987; Adami, 2005; Allen et al., 2014; Almalki, 2016).

In this chapter, a comprehensive analysis of the key findings of the pilot study' data along with a discussion of the primary reasons contributing to officers' resistance to change at the Constabulary are presented. Also, the implications of holding effective training sessions are highlighted.

This chapter starts with a literature review of the key research studies undertaken to investigate the causes of technology resistance in organisations and the different users' coping behaviours or patterns in response to IT adoption. This is followed by presenting the data collected from: the focus groups' sessions, Q-cards methodology and online survey in a medium-sized police force in the UK. Finally, a comprehensive discussion of the implications of the pilot study findings is presented. Hence, the first objective of this dissertation is accomplished.

4.2 Literature Review

4.2.1 Overview

The vast majority of Information Systems' research have examined IT acceptance and utilisation in voluntary settings where users have a choice over their use. These studies typically measure the utilisation of technology in an organisation in terms of how frequently the Information System is used as well as users' intentions to use the technology which does not necessarily imply increased organisational or individual benefit (Jasperson et al., 2005;Burton-Jones and Straub, 2006; Wang et al., 2008; Fadel, 2012; Lapointe and Beaudry, 2014; Bhattacherjee et al., 2018). Several models and theories have contributed to this area such as Theory of Planned Action (Ajzen, 1991), Theory of Reasoned Action (Fishbein and Ajzen, 1975), Technology Acceptance Model (Davies, 1989), Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), Diffusion of Innovation (Rogers, 1983), Task-Technology Fit (Goodhue and Thompson, 1995) and Self-efficacy Theory (Bandura, 1997b).

Whilst these studies are useful in furthering our understanding of the antecedents of adoption and usage of new IT systems (Venkatesh et al., 2003), they can not be applied to understand the utilisation of technology in mandatory settings where users have no choice other than to use the organisation's Information System regardless of their self-efficacy, personal preferences and intentions of technology use (Koh et al., 2010; Kashefi, 2014). Understanding the factors that shape the quality or depth of use of technology in mandated organisational Information System is still under-researched (Cooper and Zmud, 1990; Saga and Zmud, 1994; Barki et al., 2007; Wang et al., 2008; Fadel, 2012).

Furthermore, Markus (1983) and Hirschheim and Newman (1988) claim that forced use of technology often leads to dissatisfaction and user resistance, which impact negatively on the productivity and work quality in organisations. User resistance to change is regarded by many Information System professionals as the primary reason for the failure of many Information Systems in organisations (Hirschheim and Newman, 1988). Consequently, research on IT resistance offers a better theoretical lense to investigate factors that engender user resistance in mandatory settings (Bhattacherjee et al., 2018). Some research studies have reported on the benefits of functional resistance in organisations such as forcing management intervention to remove or enhance a dysfunctional system (Markus, 1983; Rivard and Lapointe, 2012; Bagayogo et al., 2013; Stein et al., 2015; Bhattacherjee et al., 2018). The theoretical models used to study resistance focus on interaction (Markus, 1983), passive resistance and misuse of technology (Marakas and Hornik, 1996), multilevel nature of resistance (Lapointe and Rivard, 2005; Bagayogo et al., 2013; Rizzuto et al., 2014), workarounds (Ferneley and Sobreperez, 2006) and avoidance (Beaudry and Pinsonneault, 2005; Kane and Labianca, 2011). These theoretical models will be discussed in detail in the next section.

Moreover, understanding the process of users' adaptations and its effect on individuals' performance can provide invaluable insight on the complex user responses to disruptive IT events (where the technology newly adopted involve radical changes in the organisational processes (Lyytinen and Rose, 2003; Hsiao-Lan et al., 2005)). Hence, using the Coping Theory (Lazarus and Folkman, 1984) to explore the underlying factors driving the acceptance and/or resistance of technology in an organisation can shed light on the diverse set of users' responses accounting for different emotional and behavioural reactions that may coexist in mandatory use settings (Beaudry and Pinsonneault, 2005; Ellie-Dit-Cosaque and Straub, 2011; Fadel, 2012).

While many aspects of resistance to Information Systems could be examined, this research study focuses on the key reasons of resistance to technology in the post-adoption stage and the various officers' responses and adaptations manifested in the process of ustilisation of the Kelvin devices (the mobile devices used by police officers to complete their daily policing tasks) in a medium-sized Constabulary in the UK. Before the roll out of the Kelvin devices at the Constabulary, officers used pen/paper to record policing information; hence, the introduction of the Kelvin devices is a disruptive event and has led to significant changes in work processes and officers' adaptations.

4.2.2 Information Systems' Users Resistance

User resistance to technology adoption and efficient utilisation of Information Systems is a complex phenomenon (Jiang et al., 2000; Ali et al., 2016). Research studies suggest that user resistance is a key factor associated with IT project failures in organisations (Jian et al., 2000; Meissonier and Houze, 2010). A classification of the key factors that contribute to user resistance in organisations has been developed by Markus (1983) as derived from the study conducted by Kling (1980). There are three theoretical perspectives for user resistance: system oriented, people oriented and interaction oriented (Kling, 1980; Markus, 1983). The system-oriented approach suggests that user resistance occurs because of technology-related factors like ease of use, performance and reliability factors and system interface while the people-oriented approach suggests that user resistance occurs because of users' attitudes, experiences and skills, backgrounds and traits (Kling, 1980; Markus, 1983). The interaction-oriented approach suggests that users resist a system because of the interaction between characteristics related to the people and others related to the system such as acquiring different social and political meaning in different settings and that different users perceive the effects of the system differently (Jiang et al., 2000).

Hirschheim and Newman (1988) have demonstrated some of the complexity of user resistance in their case study conducted in a UK insurance company. They have listed the main causes of resistance to IT adoption in organisations: innate conservatism which they defined as “a reluctance to change the status quo”(P. 399), lack of felt need (where users resist change because they have not been convinced of the benefits of the Information System), training, uncertainty (when employees perceive the new technology as a threat and possess a fear of), lack of involvement in the change, organisational invalidity (when there is a mismatch between specific technology features and the users’ work patterns), lack of management support and poor technical quality. Moreover, Hirschheim and Newman (1988) and Jiang et al. (2000) claim that the causes of resistance to change are varied and it is the interaction between the different causes that generate a specific instance of resistance. Similar causes of resistance to the ones identified above by Hirschheim and Newman (1988) are also highlighted by Marshall (2014) and Marshall and Bidmead (2018) in the discipline of telemedicine.

Besides, age differences among workers has a strong influence on adoption, post-adoption behaviours and attitudes towards technology utilisation in organisations (Morris and Venkatesh, 2000). The authors have conducted their study at a US financial firm. The results of their study argue that younger workers are more driven by attitudinal factors (technology usefulness aspects) while older workers are motivated by social and perceptions of behavioural control (relate to the extent to which individuals believe that they have control over factors that influence their behavioural performance like computer self-efficacy and facilitating conditions (i.e. training, IT support) (Ajzen, 1991, 2002; Mathieson, 1991; Taylor and Todd, 1995)) factors. Social factors diminish in the post-adoptive stage as older workers gain more experience with the technology and begin to internalise the opinions of others (Warshaw, 1980; Oliver and Bearden, 1985; Morris and Venkatesh, 2000). Age has been shown to negatively impact employees perceived behavioural control over technology use through an increase in computer anxiety (Chua et al., 1999; Mikkelsen et al., 2002; Elie-Dit-Cosaque et al., 2011). Similar results are reported by Poon et al. (2004) who claim that US younger physicians are more comfortable to use the new medical Information System adopted than the more senior doctors. This could be attributed to the possible lack of first-hand experience with similar systems during their education (Morris and Venkatesh, 2000; Poon et al., 2004).

Rizzuto et al. (2014) posit that understanding resistance to change can be better achieved using a multilevel perspective. The authors have explored how users' resistance to change operate at two levels of cognitive specificity (distal and proximal) and two levels of analysis (user and context). Distal resistance to change "is characterised as generalised and stable dispositional beliefs about change", whereas proximal resistance to change is "specific and dynamic perception about a given change event" (Rizzuto et al., 2014:480). Both distal and proximal perspectives can be conceptualised at two levels of analysis: the person-level and the context-level.

Furthermore, Lapointe and Beaudry (2014) propose a typology of technology use (engaged, resigned, dissident and deviant) based on two dimensions of users' mindsets (acceptance versus resistance) and technology usage policy compliance (compliant versus non-compliant). They define 'mindset' as a "complex multidimensional mental state that is based on cognitions and emotions that predispose an individual to perform IT related behaviours of a certain type" (Lapointe and Beaudry, 2014:4622). Lapointe and Beaudry (2014) have added a fifth category (ambivalent) that can be associated to "mild behavioural manifestations from any of the four quadrants" (Lapointe and Beaudry, 2014:4624). The five quadrants are not mutually exclusive, and users' mindsets could change over time as a result of the use of incentives and training sessions triggering better compliance with IT usage policies in organisations (Lapointe and Beaudry, 2014).

Van Offenbeek et al. (2013) have presented a two-factor view of users' reactions to Information Systems' implementation. The authors integrated resistance and acceptance research using orthogonal dimensions of acceptance/non-acceptance and support/resistance. Examples of support include "active participation in an implementation team, promoting system use to a colleague and adapting one's work routines to facilitate others' system use" (Van Offenbeek et al., 2013:438). This framework accommodates for the users of Information Systems in mandatory settings who must use the system but may still show resistance towards it (Boudreau and Robey, 2005; Van Offenbeek et al., 2013). Van Offenbeek et al.'s (2013) framework distinguishes four groups: supporting users, resisting users, resisting non-users and supporting non-users. Hence, technology resistance is not equivalent to non-use and is not the opposite of technology acceptance (Bhattacherjee and Hikmet, 2007; Bagayogo et al., 2013; Van Offenbeek et al., 2013; Stein et al., 2015).

Bagayogo et al. (2013) propose a mapping of the studies conducted on technology-related user behaviours along two dimensions. The first dimension represents acceptance/resistance and the second dimension represents the extent of users' conformance/ not conformance with IT terms of use (Bagayogo et al., 2013). The authors claim that terms of use could be in the form of policies, training, user interfaces, manuals and interactions with IT support teams. Moreover, the IT terms of use must be aligned with organisational intent and goals to yield the anticipated benefits of using the Information System (Bagayogo et al., 2013). Hence, IT-related behaviours that are characterised by both acceptance and conformity to IT terms of use will generally lead to positive impacts. On the other hand, if users' acceptance is coupled with non-conformity with IT terms of use, adverse consequences can be manifested. Similarly, if users' resistance is associated with conformance to IT terms of use, some productivity gains can be achieved but users will mostly be unwilling to use all the features of the Information System. The fourth category is when users' resistance is coupled with non-conformity with IT terms of use (dysfunctional resistance (Rivard and Lapointe, 2012)), this can lead to non-use (Bhattacherjee and Hikmet, 2007), deliberately committing errors (Markus, 1983), workarounds (Ferneley and Sobreperez, 2006) and avoidance (Kane and Labianca, 2011).

Furthermore, Rivard and Lapointe (2012) have presented a taxonomy of the implementers' responses to users' resistance that comprises four categories: inaction (a lack of action), acknowledgment (actions limited to recognition of users' resistance), rectification (corrective responses) and dissuasion (coercive responses). The authors claim that inaction and acknowledgement implementers' responses will cause increase in the level of resistance while rectification actions will decrease the level of resistance. Dissuasion (especially in mandatory settings) can decrease resistance levels if it "included a demonstration of the importance of the project or explained a rationale for the implementation of the IT" (Rivard and Lapointe, 2012:909).

4.2.3 Users' Adaptation Behaviours

By exploring the underlying factors that influence the different users' adaptation behaviours and coping strategies to the adoption of disruptive IT in organisations, many research studies used the Coping Theory developed by Lazarus and Folkman (1984) to extend the knowledge about the mediating role of these adaptations in the process of technology acceptance and/or resistance (Beaudry and Pinsonneault, 2005, 2010; Ellie-Dit-Cosaque and Straub, 2011; Fadel, 2012; Kashefi, 2014; Wu et al., 2014; Kashefi et al., 2015; Stein et al., 2015; Bhattacherjee et al., 2018). Beaudry and Pinsonneault (2005) developed the Coping Model of User Adaptations (which is based on the Coping Theory) to understand the cognitive and behavioural process that takes place when a new technology is introduced in an organisation, after implementing the new system and the post-adoption adaptations or appropriations on both the individual and the organisation levels. The model is shown in figure 4.1 below. A study of six account managers in two large North American banks was conducted by Beaudry and Pinsonneault (2005) to study their cognitive and adaptation behaviours. Beaudry and Pinsonneault's (2005) Coping Model of User Adaptations have been used in different contexts: students of a large French university by Ellie-Dit-Cosaque and Straub (2011), a medical clinic attached to one of Iran's oil and gas industry companies by Kashefi (2014), a hospital's clinic in Singapore by Wu et al. (2014) and a health centre at a large public university in the USA by Fadel and Brown (2010) and Fadel (2012).

Lazarus and Folkman (1984:141) defined coping as "the cognitive and behavioural efforts exerted to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person." Internal demands refer to personal desires or obligations such as person's need for achievement or challenge, while external demands are imposed by external environment such as job requirements or social pressures. Lazarus and Folkman (1984) posit that individual's coping responses and adaptations to any disruptive event (i.e. the adoption of an IT Information System) is based on a two-stage cognitive appraisal process; a primary and a secondary appraisal. Coping theory does not specify the main attributes of the disruptive events that impact the primary appraisal process (Bhattacherjee et al., 2018).

The model posits that when a new Information System is introduced in an organisation, a primary appraisal process by which users perceive the new system as either an opportunity or a threat takes place. There are several factors identified in the acceptance/resistance literature that affect the primary appraisal process such as personal innovativeness (Agarwal and Prasad, 1998; Lewis et al., 2003), features of technology (Griffith, 1999), the perceived fit between technology and task (Dishaw and Strong, 1999; Zigurs et al., 1999), past experiences, performance expectancy and individual's anxiety about a specific situation (Bandura, 1977b; Rosen et al., 1987). In addition, there are other factors that could influence this process like top management support for a technology, what peers think of the technology and the culture of the organisation (Lewis et al., 2003).

The primary appraisal process is followed by the secondary appraisal process that determines the level of control individuals have over the situation; work, self and technology (Beaudry and Pinsonneault, 2005). The outcome of the primary and the secondary appraisal determine the coping efforts of individuals. The coping efforts are categorised as either problem-focused or emotion-focused (Lazarus and Folkman, 1984). Beaudry and Pinsonneault (2005) argue that problem-focused coping efforts aim at dealing with the situation and changing the environment (e.g., learning new skills, adapting work processes, enhancing the fit with the task and developing new standards of behaviour). Emotion-focused coping efforts change the individual's perception of the situation (e.g. escaping the situation, selective attention or avoidance and passive acceptance). These coping efforts could lead to four principal adaption strategies and relevant emotions; benefits maximising (challenge emotions), benefits satisficing (achievement emotions), disturbance handling (deterrence emotions) and self-preservation (loss emotions) (Beaudry and Pinsonneault, 2005; 2010). A study conducted by Stein et al. (2015) to examine the role of emotions in how specific IT usage patterns emerge used Beaudry and Pinsonneault's (2005, 2010) model. The key findings of Stein et al.'s (2015) study argue that users respond to uniform emotions with clear adaptation behaviours, but they deal with ambivalent emotions by combining different adaptation behaviours. These ambivalent emotions and vacillating behaviours can have a positive impact on user engagement with the technology (Stein et al., 2015).

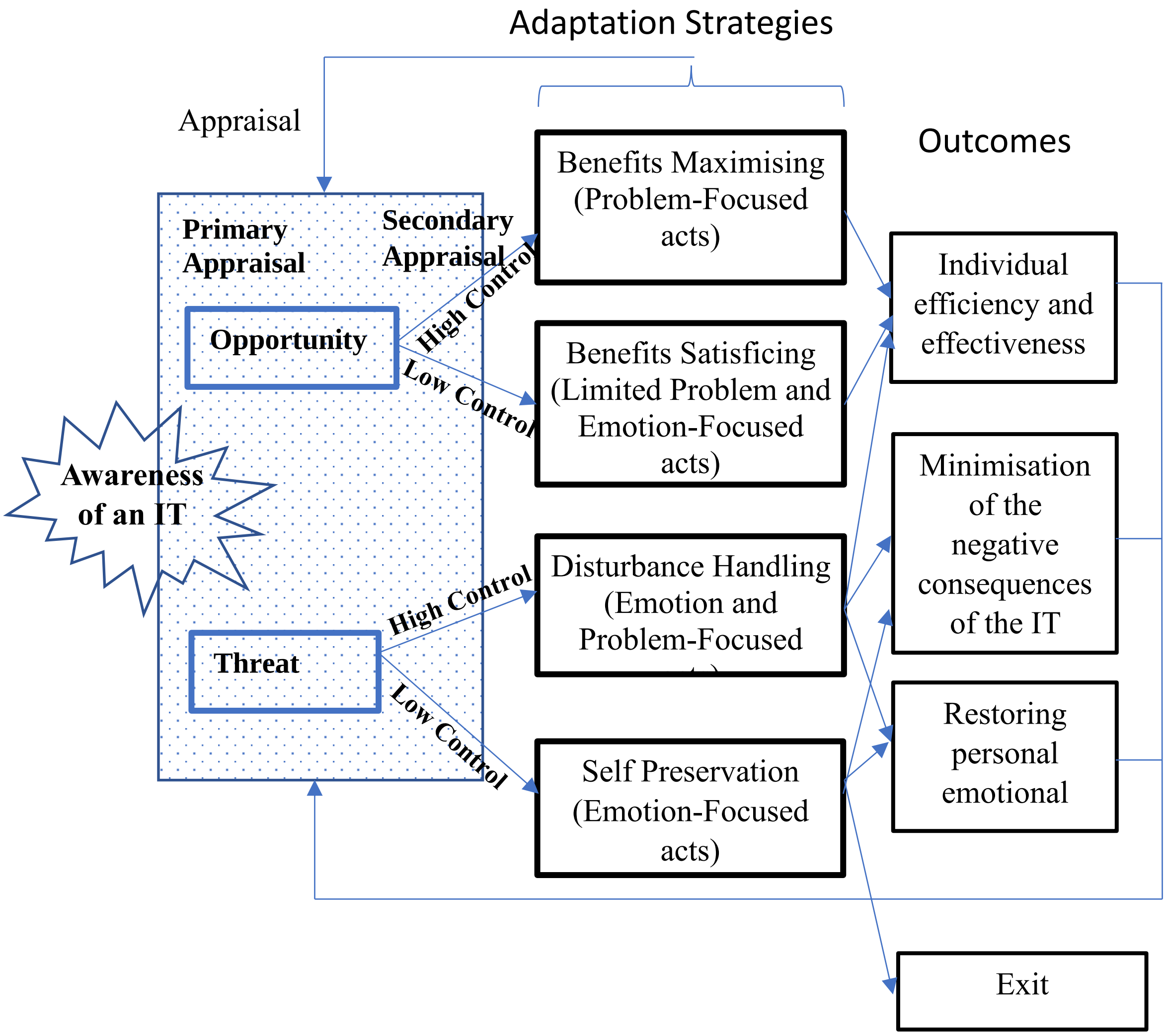

Figure 4.1 Coping Model of User Adaptation (Beaudry and Pinsonneault, 2005:499)

Bhattacherjee et al. (2018) build on Beaudry and Pinsonneault's (2005) coping model to demonstrate four similar classes of users' responses; two acceptance responses (engaged response and compliant response) and two resistance responses (reluctant response and deviant response). Beaudry and Pinsonneault (2010), Stein et al. (2015) and Bhattacherjee et al.'s (2018) models claim the coexistence of both acceptance and resistance behaviours (opportunity and threat) towards a given system (in mandatory setting) by the same user. For instance, the user may perceive some system's features as efficiency boosters and regard others as having adverse effects on quality of work generated. Similarly, Van Offenbeek et al. (2013) and Rizzuto et al. (2014:480) posit that both acceptance and resistance are "two conceptually distinct (and not necessarily opposing) constructs."

Beaudry and Pinsonneault (2005) and Bhattacherjee et al. (2018) claim the adaptation process is iterative and is highly influenced by the continuous changes in the user/environment relationship. Hence, appraisal (both primary and secondary) influences the users' adaptation efforts, which in turn lead to the reappraisal of the situation (Beaudry and Pinsonneault, 2005; Bhattacherjee et al., 2018). Besides, Fadel and Brown (2010) explored the factors that influence how users appraise an IS in the post-adoption stage. Their study's key findings indicate that performance expectancies (the extent to which users believe that using the IS will enable them to attain gains in job performance (Venkatesh et al., 2003)) and effort expectancies (the degree of ease perceived by users during system use (Venkatesh et al., 2003)) strongly influence primary technology appraisal while the presence of facilitating factors (external factors like IT support and ongoing training and internal factors to the user like self-efficacy) relate to secondary IS appraisal.

Consequently, additional training and support can potentially be associated with positive individual's appraisal at any stage of usage of the technology and can lead to improved functional efficiency and effectiveness (Beaudry and Pinsonneault, 2005; Fadel and Brown, 2010; Rivard and Lapointe, 2012). Ellie-Dit-Cosaque and Straub (2011), Fadel (2012) and Stein et al. (2015) have used and verified Beaudry and Pinsonneault's (2005) Coping Model of User Adaptation. Therefore, Beaudry and Pinsonneault's (2005) model will be used in identifying the various officers' adaptive efforts to the utilisation of the Kelvin devices in the post-adoption stage. As the aim of the pilot study is to identify the key barriers to the efficient utilisation of the mobile devices in a UK Constabulary, the analysis of officers' emotions is beyond the scope of the pilot study.

In the next section, the methodology adopted in collecting the pilot study's data is presented. Three data collection methods were used; focus groups' sessions, Q-cards methodology and online survey. Key themes identified in the pilot study data are delineated. A comprehensive analysis of the data using Beaudry and Pinsonneault's (2005) Coping Model of User Adaptation is conducted.

4.3 Data Collection Methods

The pilot study's data has been collected via three methods; focus groups sessions, Q-cards ranking and online survey. Collecting data using different methods facilitates a better understanding of the problem researched (Bonoma, 1985; Venkatesh et al., 2013; Almalki, 2016) and boosts the 'robustness of results' through triangulation (Yin, 1984; Bonoma, 1985; Benbasat et al., 1987; Breitmayer et al., 1993; Adami, 2005; Allen et al., 2014; Almalki, 2016).

4.3.1 Focus Groups Sessions' Design and Data Analysis

4.3.1.1 Focus Groups' Aim and Participants

A medium-sized Constabulary in the UK rolled out advanced mobile devices (Kelvin devices) to all police officers, Police Community Support Officers (PCSOs), the Special Constabulary and a small number of police staff roles in June 2014. The mobile devices' anticipated benefits are improved visibility, bridging the productivity gap created by having fewer officers and removing duplication of processes therefore making efficiency savings and quicker information propagation. Nine focus groups sessions were held (August 2016) with a total of 57 officers (7 Criminal Investigation Department (CID) officers, 14 front-line Police Constables (PCs) serving at North, 18 PCs serving at West, 15 PCs serving at South, 2 PCSOs and 1 PC in HQ) to investigate the positive/negative post-adoptive impact of the mobile Kelvin devices utilisation. In addition, potential possible avenues of maximising the benefits of these devices to both officers and the Constabulary were discussed. Participants were selected by the Constabulary based on our specific requests for representation from various roles, ranks, Areas of service and IT skills.

4.3.1.2 Focus Groups' Data Analysis Methodology

All sessions were audio recorded using a Dropbox audio recorder application (it saves audio files straight to a password protected Dropbox folder). To help foster trust between the researcher and the officers, the pitch of the audio files was modified using the Audacity program (to ensure complete anonymity to the semi-transcribed audio clips). A total of 10 hours of audio recordings were loaded on another program (Atlas.ti) for semi-transcription and analysis.

Each audio file was split into short audio clips (on average, each clip was 2 minutes long) and transcribed. This method is used to keep the raw data easily accessible and stored in a structured way that facilitates more analysis if needed. A total of 350 clips were used to compile this document. Gebauer and Tang (2008) differentiate between functional and non-functional requirements when using the task-technology fit (Goodhue and Thompson, 1995) to study mobile Information Systems. The authors argue that functionality relates to a process the system has to perform or to important information that the Information System needs to contain. On the other hand, non-functionality relates to the behavioural properities of the system (Gebauer and Tang, 2008). Non-functional features include the factors that impact on the operation of the devices such as processor speed, size of keyboard and connectivity (Gebauer and Tang, 2008). Hence, thematic analysis was used to group the transcriped audio clips into three top-level themes; benefits, barriers and enhancements to mobile utilisaiton. Each top-level theme was further divided into functional and non-functional sub-themes as suggested by Gebauer and Tang (2008).

4.3.2 Q-Cards Ranking Methodology

4.3.2.1 Purpose

It was noticed after the first three focus group sessions (1 with detective officers from CID, 2 sessions with PCs at North) that there were a finite set of problems, benefits and possible enhancements to the mobile Kelvin devices reported by all participants in all three sessions.

There was a need for a mechanism that helps officers evaluate the importance of the raised issues in an objective manner. There were some contradictory viewpoints disclosed in the North sessions that needed clarification. For instance, some officers reported facing some difficulty in synchronizing their devices with the police databases while in another session, other officers reported it as a minor problem (officers attending both sessions were serving at

North, hence, both groups of officers work under the same network connectivity conditions). Therefore, using the Q-cards ranking methodology helped officers focus on the key barriers to post-adoption utilisation of the devices as well as the fundamental enhancements to the devices' functionality in an objective manner.

This method proved to be a helpful tool in the remaining sessions held in South, West and with PCSOs. Furthermore, some sessions were a mix of PCs and their Police Sergeants (PSs). It was clear in the sessions attended by PSs that some officers did not feel comfortable sharing their views despite informing the researcher before the start of the session that they were happy to share their opinions (positive and/or negative) of the Kelvin devices (usually before the arrival of the Sergeant to the session). Moreover, the researcher noticed that the choices that PCs made using the Q-Cards method were in many cases contradicting with the Sergeants' views. This method helped PCs convey their ideas without having to say them verbally in the sessions.

4.3.2.2 Q-Cards Ranking Methodology Design

Three sets of cards (orange, green and yellow) were printed with statements in the officers' own words and language. All cards covered the whole range of general opinions about the Kelvin devices reported by police officers at North and CID officers (during the first three focus group sessions). The orange cards focussed on the main benefits of using the Kelvin devices while the green cards presented the key barriers to using the devices in everyday jobs. Finally, the yellow cards focussed on the enhancements that could reduce the barriers to technology post-adoption in the Constabulary.

Officers (at West, South and PCSOs) were asked to rank the cards using a diamond shape provided to them in the sessions as shown in figure 4.2 below. They worked in groups of two/three to encourage the exchange of opinions and possible compromises during the process of ranking the cards. There were nearly 9 cards in each deck of cards. Officers had to exclude some cards to be able to fit the remaining cards in the diamond shape. Finally, a weight is assigned to each level and the final score of the statements is calculated. For instance, if the card labelled Battery Life was ranked 4 times in the top level, 2 times in the middle level and 3 times in the bottom level then its score was calculated as follows: 4*30 + 2*20 + 3*10 = 190.

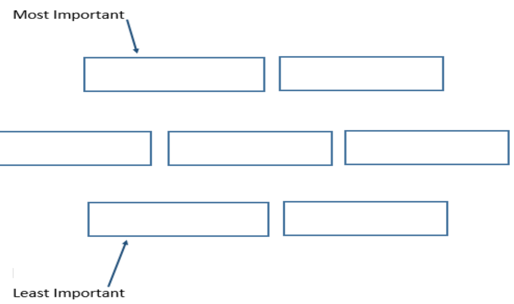

Figure 4.2 The Q-cards diamond shape sample

Figure 4.3 An example of the final arrangement of the cards

4.3.3 Online Survey

An online survey was developed using the Bristol Online Survey tool to validate the focus sessions results, collect further information about the different themes and allow a greater number of officers to participate in the study. The Bristol Online Survey tool was used as it is fully compliant with the UK data protection laws and does not have a limitation on the number of participants allowed. A total of 132 (14% response rate) officers/detectives/staff took part in the survey (90 Police Constables, 20 Sergeants, 6 Inspectors, 6 PCSOs, 2 Managers, 2 Staff, 2 SO2 and 1 Superintendent). Total number of officers who participated in the survey who are based at North are 45, South 36, West 33 and HQ 14. A copy of the online survey is presented in Appendix 1.

4.4 Results

4.4.1 Focus Groups' Key Themes

As mentioned in section 4.3.1.2, Gebauer and Tang (2008) differentiated between functional and non-functional requirements when using the task-technology fit (Goodhue and Thompson, 1995) to study mobile Information Systems. Thematic analysis is used to group the barriers, benefits and enhancements of using the Kelvin devices at the Constabulary into functional and non-functional themes as presented below.

4.4.1.1 Barriers: Functional Features

4.4.1.1.1 Red Sigma Intelligence Application Limitation

When the Constabulary decided to roll out the Kelvin devices, officers were told that they will be able to read and update intelligence information using the new Red Sigma application (the new intelligence database to replace the outdated intelligence system ‘Sleuth’) which could boost officers’ efficiency and lead to officers spending more time out of the stations. Unfortunately, the Red Sigma project took longer than anticipated and was not ready to be installed on the Kelvin devices at the time of the devices’ roll out. Officers prefer to do intelligence checks themselves as they reported getting inaccurate information sometimes from the control room staff as clarified by a Police Constable in one of the focus groups’ sessions:

> *“An Officer had an incident of a missing girl. When officer asked control room if there was any links between the girl and a certain man, the control room said no, there is no link between them. The officer went back to the station and checked the intelligence information of the man and found some serious offences on the man's log against the missing girl.”*
>
> (Police Constable, North)

4.4.1.1.2 Breaks in Statements

Officers argue that the witness statements they record using the Kelvin devices do not look professional when printed compared to the hand-written ones because of the breaks inserted by the device. When officers get called to do other jobs possibly in the middle of writing a statement, the Kelvin device requires them to input the reason for inserting a break in the statement and saves the statement for further amendments. This could happen many times in a busy shift which causes statements to have multiple breaks that look not as neat as the old ones recorded using pen/paper.

4.4.1.1.3 Time out and Wipe out of Information

Some officers reported losing important information after inserting a break in a statement because they were called to do another job. They have input the reason for the break and the device has greyed indicating saving the information. When they tried to resume typing the rest of the statement, the device has timed out and they were asked to re-enter their password to find that they have lost the information which was nearly an hour and a half worth of a statement. Other officers attending the focus group sessions reported that the stories of losing important information by other colleagues has put them off using the device and that they usually record statements using their paper pocket notebooks and then transfer them to their devices to avoid losing any information.

4.4.1.1.4 Predictive Text Feature

All officers and detectives requested having the ability to turn on/ off the predictive text feature. It causes a lot of frustration to officers especially as it freezes the wrong text when officers press the space button. This feature adds extra unnecessary stress especially when officers are writing a statement and trying to maintain eye contact with members of the Public and this feature keeps changing important information such as vehicle registrations and postcodes to wrong information. All officers proof read what they have typed several times to make sure they have the correct information on their devices instantly. A detective officer expressed his dissatisfaction with the quality of witness statements written using the Kelvin devices:

> *"In PPU, statements could be 12 to 15 pages long. The predictive text option slows things down so much and the format of the statement when printed looks awful. Hand writing the statement saves time and produces better statements. Getting Bluetooth keyboards could make things better/*

you can always go back and add things in the statement. Statements written using the new devices are very short and pretty rubbish."

(CID officer, Headquarters)

4.4.1.1.5 Performing PNC Checks

Officers argue that using the Kelvin devices to do PNC checks do not retrieve all the possible available information about persons or vehicles. Many officers reported preferring to go to the stations to do these checks to get accurate information (when the information is not urgently needed). If it is urgent, they ask the Control room using their radio devices to do PNC checks for them. This feature is highly dependent on the availability of good connectivity which is not always feasible.

4.4.1.1.6 Free Text Entry (Pocket Notebook)

This feature is widely used by officers. The main problem is the inability to search the text entries or logs quickly (after 30 days, they are wiped out of the device and officers use Pronto Manager on their desktops in the stations to access these logs). CID detectives use the free text entry in the Pronto application extensively in their work. It is difficult to find important information in logs as the search function on the devices is not functional. A search function is crucial to facilitate the access of important information swiftly as clarified by a detective officer:

"After synchronizing the text entries, it becomes difficult to find information quickly because the search function is not working."

(CID officer, Headquarters)

All officers reported the need to be able to copy information from the logs to other forms (for instance, names to Mental Health Forms) or applications (postcodes to Google Maps). At present, as soon as another application is opened, the user is locked out of the current entry and cannot add more information. Consequently, the officer must keep asking the member of the public they are dealing with to repeat their names and other details to fill in the required forms.

Officers also reported creating several text entries for one incident during the same shift because they are unable to amend information to the original log. Logs related to the same incident should be linked to each other to facilitate the search process in all the available logs for that incident and to be able to print off all the logs easily. A Police Constable highlights the importance of this feature by the giving an example:

> *"I went to different burglaries the other day. The burglar was the same person. You have 20 different entries for caught, instead you should be able to put them all in one."*
>
> (Police Constable 1, West)

Many officers reported that paper pocket notebooks are perceived as a quicker and reliable way in situations where you need to deal with a relatively large amount of information. An example was given by one of the officers:

> *"A bus has hit a car (there were two of us) and there was a fatal accident at the same time somewhere else. All the people in the bus became witnesses and I had to use my pocket notebook to get the witnesses' information as quickly as possible. It is much quicker on paper."*

(Police Constable 2, North)

"You get sucked in to the phones a whole lot more but using your pocket notebook you can do a little bit and still keep more aware. You engage more with the devices and they are too slow."

(Police Constable 3, North)

4.4.1.1.7 Inputting Three Sets of Passwords

Having to input three sets of passwords every time the Kelvin devices times out during a shift is causing much frustration to officers and detectives. They requested having the fingerprint option installed on their Kelvins to quickly access information. They believed this would make a massive difference to them.

4.4.1.1.8 Photographs quality

CID detectives argue that Crime Scene Investigators' work is undermined by the quality of photos taken by front line officers in serious cases. CID officers suggest that officers should be given clear guidelines on where and when to use their cameras so that potential evidence is not ruined, and the Constabulary lose presentation by that evidence in courts. An example of a recent case was given by a CID officer of two front line officers who were called to a crime scene in a house. The two officers were trying to take photos and not knowing that they should not be in the crime scene at all. CID detectives believed that guidance should be given to front line officers on correct faces' measurements and footprints so that photos could be used as potential evidence in courts.

"In some serious cases, officers should not take photographs or footprints

photos as this undermines some of the cases, degrading investigations. Domestic Violence photograph of injuries, often cannot be used as evidences. Officers were not told you can take photographs in these situations but not in those situations."

(CID officer 1, Headquarters)

"The house has got a crime scene and two officers inside the crime scene. Guidance needed for officers on when and where to take photographs with their Kelvin."

(CID officer 2, Headquarters)

4.4.1.2 Barriers: Non-functional features

4.4.1.2.1 Poor Signal/Connectivity and Mobility

Many officers and detectives reported problems with the devices' mobility. They try turning mobility on and off several times and sometimes switch the whole device off and on again to get mobility to work. Some officers switch the Wi-Fi option off in the police stations to be able to synchronize data quickly.

Signal problems, especially in rural areas, negatively impact on efficiently using many of the devices' features such as synchronizing data, using Google Maps, doing PNC checks, accessing or updating logs and so forth. This causes some frustration when officers contact the control room to access a log and the control room replies that they should do that using their devices!

Many officers and detectives reported using their personal phones to get directions from Google Maps or to get real-time tweets/posts on their corporate Twitter/Facebook accounts in major events.

"You don't get emails and then after 3 hours you get loads of emails. Losing the mobility connectivity is an issue."

(CID officer, Headquarters)

"You can give us the most expensive kit but if you don't have the infrastructure for the signal...there is no point!"

(Police Constable, West)

"Sometimes when we are double crewed, one person would have a signal and the other would have no signal. It is ridiculous that you can't get a signal in the police station."

(Police Constable 1, North)

"Having to keep turning mobility on and off. We have to do that to get logs. Sometimes we need to turn phones off and on again. You can't access even your emails. It is frustrating when you are outside and you need to read a log and tell comms that you are unable to read the logs and they expect you to be able to access the logs using your device."

(Police Constable 2, North)

4.4.1.2.2 Fear of Losing the Radio Device

Many officers feared that the Kelvin devices would replace their radio devices. They heard about management plans to integrate the radio and the Kelvin in one device. Many officers prefer doing PNC checks using their radio devices to ensure their colleagues know where they are or what they are dealing with. In many cases, other officers listening to the radio could get valuable information about people/criminals who police are looking for and want to arrest. They could pass important information to other officers about a repeat offender. They believed their radio devices are their lifelines as clarified by many Police Constables:

> *"Sometimes like I could go to a job and not know the person at all but my mate will shout and tell us such and such and he has done this in the past. As we all listen to the radio all the time, sometimes I would say, I tried to stop that person the other time, I will let him [officer] know about that, do you need any help mate! If we lose the radio device, it will be massive for our safety if that went because I would not be able to know where my mates are or what they are going to or what they are dealing with and they might need a bit of help!"*
>
> (Police Constable 1, West)

> *"You lose your push to talk. If you all are on one talk group, sometimes you need to give off more subtle signals indicating you need some help or stressing your voice in case of emergency. We all listening to each other all the time. Little things like that you can't have if it was only you and the control room. We need to have that talk through."*
>
> (Police Constable 2, West)

> *"I struggle to see how these could help us in any way! I struggle to understand how these can help us better than the communication system when someone is talking over the radio and how instant that is and a human*

thing and you know the subtle in a voice of the lad. Human interaction over radio is quite important."

(Police Constable 3, West)

"Part of the police work is listening to the radio to do proactive jobs. If an officer mentions that he/she is looking for someone who is expected to take a certain route in his car, other officers listening to the radio in that area will be looking for when that person passes to stop him/her!"

(PCSO, Headquarters)

4.4.1.2.3 Officer Safety

All officers reported feeling unsafe when they are single crewed to use the Kelvin devices. Using their devices frequently often lead to losing focus on what is going on around them. Because of the austerity and the government budget cuts, officers are single crewed most of the time. An example is given by a Police Constable:

"Stopping with your vehicle when you are single crewed and my nearest backup is 30 minutes away with possibly 3 up. They might have a knife and if you stop them they will not hide what they have, they will use it. The trouble is that you don't know when that one time is going to be."

(Police Constable 1, North)

Another Police Constable adds that:

"Each and every one should know where you are and that has not happened. Control room should know where you are! Even if it is a mundane job, you don't know what will happen! I shout where I am! If we

PNC someone and no one knows about it because I am using my phone - this is dangerous. Having technology in your hand and standing and dealing with someone who can turn nasty. That's a danger!" (Police Constable 2, North)

4.4.1.2.4 IT Support

CID detectives and police constables are aware that they can ask for IT support if they need help during the IT support's working hours. Since, this support is not available during night shifts, many officers reported asking 'IT savvy' young officers for help (which might not be convenient sometimes).

4.4.1.2.5 Public Perception

Public perception of the Kelvin devices is negative as reported by many officers. Officers need to apologise to members of the public every time they use the device in their presence. A complaint was placed by a member of the public against an officer and in that complaint a comment was made that one of the officers was using his phone all the time (the officer was doing PNC checks on the vehicle and the person). Officers believe that a series of articles and more publicity about the new technology used by officers in the press or media could potentially reverse this negative perception.

"[Public] can see me tapping away on the screen at the same time as they are speaking but they got no visual kind of contact to the end product or the result as it is coming out. When I use my notebook, they can see I am writing diligently and I am writing loads than what is being recorded on

that [Kelvin] until they come to see it at the end of the day. There is a little bit of distress within that."

(Police Constable 1, North)

"A member of the public got really high irate as to what I am doing with it [Kelvin device]. Who are you sending that to? I want to know who are you emailing that document to? Who is gonna see that? but with a notebook, it is just a notebook. The notebook would not have that problem! I put it [Kelvin device] away and filled it in later on."

(PCSO, Headquarters)

"Public perception of phones that officers not bothered about what is going on. They think we might be in Facebook. Officers would be checking logs."

(Police Constable 2, North)

"Officers keep looking in their phones when they should keep their eyes on things going on around them which gives a negative perception to the public. They are unaware of the surroundings and what's going on! Public feel vulnerable!"

(CID officer 1, Headquarters)

"Face to face is more important. If I am interviewing somebody, it is really important to keep watching for body language, signs, you can't do that

while watching your phone. It's rude, impolite, being a detective is all about having the best evidence you possibly can. You have to engage with people. Technology is getting in the way!"

(CID officer 1, Headquarters)

4.4.1.2.6 The Impact of Age on Officers' IT skills

Some officers who identified themselves as being old or belong to a different generation, find typing and using the Kelvin devices unnecessary. They have been doing their jobs for many years using pen and paper. They feel more confident writing statements on paper than slowly typing statements on their Kelvins. Some of them believed that it is rude to use the devices when dealing with members of the public! They are unable to comprehend the help offered by IT Support due to their basic knowledge of technology.

"When you write, you have a direct thing haven't you. When I type I forget to look at ...if I write a word I will have three different things at the bottom I forget to look at that. It is not a tool for making things better for us, I think it is a tool for us to be examined in what we do. It is a tool for other people to have a look in what we do. It is a tool for management [people who compile statistics] or whatever to look at what is going on."

(Police Constable 1, West)

"Depends on how old you are personally and depends on how much computer skills you've got. Invariably each shift, we turn around at least three times...where is the young person I don't know what I am doing. It

is back to the basics...other people would look at you and say how do you not know how to cut and paste or where to find that.... we hadn't even got a computer room in school. They are bringing all these things and there are more and more reliant on technology...there is an awful lot of us that haven't got it!"

(Police Constable, South)

"Even if the signal is good and even if they manage to put on these apps with the DA and stuff like that on, for these [Kelvin devices] there still want too much! You can't guarantee the complicated stuff everybody wants just on these. You gonna miss something there will always be an excuse, you could have pulled over or stayed a bit longer in the car park just in case."

(Police Constable 2, West)

4.4.1.3 Benefits: Functional features

4.4.1.3.1 Writing Long/Historic Witness statements

Most officers believed that the Kelvin devices helped them write neater historic/chronological witness statements as they can slot in missing details or add new information to keep the order of the information correct. Officers claimed that bigger screens and bigger keyboards can help officers achieve this job in less time.

Officers usually need to proof read statements several times to make sure there are no spelling mistakes (because of the predictive text option). Most officers did not know that they can dictate their statements using the built-in microphone and the voice recognition software on their Kelvin devices.

4.4.1.3.2 Using the Kelvin Devices as a Phone

Officers believed that the device is as good as a phone for contacting victims. They use it in sending text messages (SMS) to update victims. Victims normally do not like to answer their phones but would reply to SMS. Some officers were not sure if victims could reply to their SMS or not!

4.4.1.3.3 Electronic Signature and Taking Photographs Using the Kelvin Devices

All officers praised the usefulness of these two features to complete jobs in less time and in a much more professional way compared to using the former tough books. Taking photographs in accident scenes and sometimes in more serious cases is believed to have a positive impact on the quality of work they submit. Officers believed that it is particularly useful as an evidence in some domestic situations as it instantly shows the severity of the situation at the scene. It also eliminated the need to cease items in damage cases as in most cases it is sufficient to take a photograph and to get the person to sign it using the electronic signature facility.

Sending too many photographs is not possible though. Some officers use the device’s camera to take the photographs and then send them as an attachment instantly to their Sergeants. Officers argued that it would be more efficient if they have a cloud storage where they could send large amounts of data (like photographs and videos) to their line managers easily and promptly.

4.4.1.3.4 Being able to read/update logs

All officers reported finding being able to read and/or update incident logs very useful. They prefer the detailed picture they get about incidents through reading the logs than the short summary they are given by control room. They like being able to update logs when and where they can. The only problem with this feature occurs when they lose the device's signal and become unable to synchronize the new updates, which can sometimes lead to loss of important information. A Police Constable states that:

> *"Sometimes you give an update over the radio, whilst the majority of the comms operators are very good and they type word for word, sometimes they miss something or summarise what we say and then we might get a failure on the log to say it is not compliant because we haven't dealt with every single aspect of the job. So, internally, it is like you have not done this whereas actually the update we have given was full but it was just not been done correctly so the fact that we can update them without having to come back and again is quite good."*
>
> (Police Constable, South)

Another Police Constable adds that:

> *"The devices are good for reading logs. Because if you got a job, domestic or whatever, you can get more details from the log than the information the control room usually tell you. Officers like being able to update the log. But sometimes you are unable to synchronize the new updates and you might lose it."*
>
> (Police Constable, North)

Besides, being able to click on the postcode available in logs which would automatically launch Google Maps and show the route to that postcode is believed to save much time and is viewed as impacting positively on the efficiency of officers.

4.4.1.3.5 The Translation Application

The translation application is helpful in translating the basic questions which in most cases is enough to communicate with people who do not speak English. This application was not covered on the training day. Only officers who are confident in using the technology are using it as they explored it on their own. At West, officers had guidance information circulated by their Sergeants explaining how to use the application. Officers can possibly use the application in requesting a professional translator through the language line at an added charge.

> *"The translation app is helpful in translating the basic questions which is helpful. If you don't have a signal you can't download a language. That is the issue with every single app. Especially in rural areas where there is no signal, all apps that need a signal will not work. They are good when they work!"*
>
> (Police Constable, North)

4.4.1.3.6 The First Aid Application

This application provides useful information to officers. Officers who used it reported finding it helpful. Some officers were not aware of the existence of this application on their devices as it was not included in their training.

4.4.1.3.7 Pronto MRG Search

Officers at North and South of the county were not aware of the existence of this feature on their devices. At West, officers used this feature to search the Police National Legal Database (PNLD) and the Police Visual Handbook (PVH). Officers reported finding this feature useful.

4.4.1.3.8 Mapping Systems

Google Maps application is perceived by all officers as a useful application. In rural areas where the signal is not good enough, they usually use their personal phones (if their personal phones uses a different network) to get directions. All three Areas requested getting the mapping system used by the Control room on the new laptops/tablets as it is more detailed than Google Maps.

4.4.1.4 Enhancements: Functional features

4.4.1.4.1 Usage of a Technical Guide or Manual

All officers argued that a basic guide to using the different Kelvin devices' features is needed to remind officers of important information that they might have forgotten if they do not use these features frequently enough.

4.4.1.4.2 More Forms/Interviews

All officers claimed that more forms need to be added to the devices such as the sudden death form (which could be emailed to the Coroner's officers and the Coroner, instantly saving much of police officers' time). Also, the addition of the property systems forms, form 80 (Cannabis warning form) and the ability to record interviews on the Kelvin devices and get interviewees to sign it electronically can add to the benefits of using the Kelvin devices.

4.4.1.4.3 Instant Messaging Application

Sergeants requested an instant messaging application to help them create group chats for their teams to exchange information without wasting radio time. They believed these groups will be of massive help to officers in their shifts. Officers disagreed as they believed it is very difficult to check their messages when they are in rural areas with poor signal and busy shifts.

4.4.1.4.4 Contacts Application

The Contacts application is not used by officers because it is not configured to show all police officers' phone numbers. Officers can use this application if phone numbers are added to the mobile's phone book and linked to officers' collar numbers.

> *"Sometimes you go to a job and you need to speak to your supervisor over the phone. Sometimes it is complicated if you try to do it over the radio because only one person can speak at a time. I have done that a couple of times when I had to phone Sergeant because it was a bit convoluted. We can have a better conversation on the phone without blocking the air. I had to ring 101 because I don't have the Sergeant's phone number!"*
>
> (Police Constable, South)

4.4.1.5 Enhancements: Non-Functional features

4.4.1.5.1 Bluetooth Keyboard

All CID detectives and police officers believed that Bluetooth keyboards can facilitate writing witness statements and using the Kelvin devices efficiently. Some detectives commented on the quality of statements submitted by front line officers missing important information and they believed that if officers were provided with bigger keyboards they would have been able to write more comprehensive and detailed statements. CID officers argued that using bigger keyboards can encourage more officers to stop using their paper pocket notebooks in writing statements and use their devices instead.

> *"Officers need the tools to do their jobs properly. Bluetooth keyboards are needed. Everybody wants to be efficient! "*
>
> *(*CID officer 1, Headquarters)

> *"Keep a pocket notebook. Writing 15 exhibit references is a nightmare. It takes half an hour to write one! It is quicker to write down by hand. The devices are good for uniform."*
>
> (CID officer 2, Headquarters)

4.4.1.5.2 Laptop/tablet

Having an additional laptop/tablet available in police vans for officers to use with all the systems linked together is believed to produce massive assurance to the public. Officers argued that they will be able to carry out their jobs without having to go to the stations frequently.

4.4.1.5.3 Van Chargers and Battery Life

Many officers reported using Google Maps frequently during their shifts to get directions. In rural areas where the signal is not always available, Google Maps would consume much of the battery of the device because of constantly looking for signal to give directions. As soon as the devices' battery reaches 30%, it goes down so rapidly.

Some officers requested fixed chargers to be placed in police stations so that they can recharge their devices easily without having to worry about having a charger (like the system used to charge their radio devices). Other officers rejected this idea as they feared their Kelvin devices could possibly be picked up by mistake by other officers.

Many officers suggested buying fixed cradles in vans that officers can use to charge their Kelvin devices and at the same time would facilitate using the devices as a navigator (through using Google Maps). This can help officers use the devices more frequently and efficiently. Currently, officers struggle to view the maps on their devices while driving when single crewed.

PCSO officers reported turning the Bluetooth option off and enabling the power save option to ensure the battery lasts till the end of the shift. The idea of having fixed cradles in vans is believed to be useful by PCSO officers.

> *"Battery saving option drains the device without doing much on it probably as a result of the device trying to find a network to connect to. From 30% it goes down so rapidly. There was no charger available in the van. Why don't we have a lighter socket so officers can charge their devices easily in the van especially that all of them have got the USB connection, the plug and the lead."*
>
> (Police Constable, North)

4.4.1.5.4 USB Cable for Synchronization

Synchronization of police valuable information to the Police Head Quarter's databases is perceived as a time-consuming problem to many officers and a process that is heavily dependent on the strength of the signal and mobility.

Some officers suggested having a USB cable that connects the Kelvin devices to the desktop computers in stations could be an efficient way of synchronizing data and at the same time saving much of the bandwidth of the Wi-Fi network.

> *"Sometimes the devices don't synchronize. Sergeants can't download the statements because the device is unable to synchronize. Some officers do the synchronization when they can synchronize which could be every few days. Stations sometimes don't have signals. It is frustrating trying to do a package and you can't synchronize!"* (Police Constable, North)

PCSO officers suggested that it would be helpful if instead of getting a "successful synchronization message" after completing the synchronization process to the HQ databases to get a list of the documents successfully synchronized.

4.4.1.5.5 Multi-Sim Devices

All Officers (across all three Areas) believed that having multi Sim devices that can connect to different networks can have a massive effect on overcoming most of the signal problems in the rural areas in the county as clarified by a Police Constable in the following quote:

> *"It would be good to have a multi sim phones where officers can look for the strongest signal of other networks in the area and connect to it similar to the emergency services phones."*
>
> (Police Constable, North)

4.4.1.5.6 Buying more mini printers

Currently, there are a small number of mini printers available only in the tickets vans. Officers reported being unable to print search forms, cannabis warnings and other penalties to members of the public. Besides, some officers claimed having problems synchronizing their Kelvin devices with the printers. In many cases, they had to drive back to the stations to print the ticket and take it back to the person's house which wastes much time especially in rural areas where they must drive long distances to get to the station.

4.4.1.5.7 Rain cover

The Kelvin devices lose their sensitivity and do not work properly in the rain. One of the officers reported that her device broke in the heavy floods in 2016. A rain cover is necessary to keep the devices working efficiently for longer.

4.4.2 Results of the Q-Cards Ranking Methodology

The results indicated that officers perceived the Kelvin devices' poor connectivity and signal as the main barrier to completing their daily tasks during their work shifts. They believed that having multi-sim devices (to cover major available networks) will eliminate this problem. Besides, having fixed mobile chargers in police vans can reduce the need to go back to the stations to get the devices charged.

Officers find having to input three sets of passwords to access the devices' applications stressful. They reported finding Google Maps a useful application and they use it frequently. They believe that integrating the control room's mapping system to their devices can enhance the quality of the mapping information available for them to use.

Moreover, the results highlighted the benefit of using the Kelvin devices in reading logs and updating them instantly. Taking evidential photographs using the Kelvin devices was perceived as an added benefit by many officers.

As shown in the tables below, the highest two scores for each Area are highlighted in a different colour and the significant final scores are in bold.

Red Cards	**West**	**South**	**PCSO**	**Total**
Writing Statements is neater using my Kelvin device	130	140	20	290
I always use the device as a phone to update victims	110	120	30	260
Using the First Aid application is helpful	40	20	20	80
I use the OpenSignal application to check the strength of the signal.	30	30	20	80
The Translate application is useful	100	110	20	230
Google Maps is useful.	170	210	50	**430**
Reading logs and being able to update them is important	230	240	60	**530**
The electronic signature saves time and is professional	100	70	10	180
Taking photographs using my Kelvin device is great	210	180	50	**440**

Table 4.1 Benefits of Using Kelvin Devices Across Areas

Yellow Cards	**West**	**South**	**PCSO**	**Total**

Bluetooth Keyboard	80	70	20	170
Mapping System used by Control Room	150	110	50	**310**
Fixed Point Mobile Chargers to charge the devices quickly in the station	140	120	0	260
Mini Printers	70	60	20	150
More forms to be added to the Kelvin	160	130	20	**310**
Laptop/tablet	130	130	40	**300**
USB Chargers to Synchronize the Kelvin with desktop quickly	30	60	20	110
Rain Cover for the Kelvin device	50	40	30	120
Van Chargers	130	200	60	**390**
Multi-Sim Device to cover more networks	180	200	20	**400**

Table 4.2 Enhancements to Kelvin Devices Across Areas

Green Cards	West	South	PCSO	Total
Battery Life	220	210	50	**480**
When Pronto times out, information is wiped out	100	80	30	210
Searching Free Text Entries	60	90	10	160
I have to input three sets of passwords frequently	120	170	30	**320**
Breaks in Statements do not look good when printed	60	90	30	180
Synchronization takes much time.	130	50	20	200
PNC information is not up to date on the Kelvin	70	70	20	160
The Predictive text option is frustrating	130	120	30	**280**
Signal / Mobility	230	240	60	**530**

Table 4.3 Barriers to Using Kelvin Devices Across Areas

4.4.3 Survey Results

4.4.3.1 General Attitudes Towards the Kelvin Devices

Nearly 70% of the participants found charging their phones in the middle or towards the end of the shift a challenge. 82% found the predictive text feature frustrating. 64% believed that it is important to have a policy of use for the Kelvin devices. 88% of participants preferred using the desktop over using their Kelvin devices. 58% found the Kelvin devices easy to use compared to 40% who thought otherwise. 71% of participants disagreed or strongly disagreed that the Kelvin devices enhance their job satisfaction. Half of participants believed the devices create extra work for them. 70% found their Kelvin devices frustrating. 70% of the participants disagreed that the Kelvin device make their work interesting. 60% disliked typing using the devices' small keyboard.

39% of participants believed the Kelvin devices help them be more effective in helping victims. 66% believed that adding an instant messaging application (like WhatsApp) will be helpful in communicating with their teams.

4.4.3.2 Useful Applications on the Kelvin Devices

PNC checks, Emails, Stop Search, Storm, Google Maps, Camera, Pronto, Statements, PNLD, First Aid, Keep me safe, ASBRA, Motoring and Law, Ticket issue, Traffic offence report, Twitter, Vehicle/Person search and the torch.

4.4.3.3 Applications that Need Improvement

Multiple passwords, connectivity, Sudden Death Form, Use of Force, Command and control functionality, Pocket Note Book, Mental Health App, Crime input and the MH app.

Statement taking - requires addition of regularly used statement templates e.g. MOWP, Shoplifting, VPS, TOMV. Also, could do with Traffic and General Contemporaneous IV under caution template.

4.4.3.4 Kelvin's Pocket Notebook

74% did not find typing using the Kelvin devices' keyboard to record information in the Kelvin's pocket notebook application an easy job. In figure 4.4 below, the daily usage of the pocket notebook application is presented.

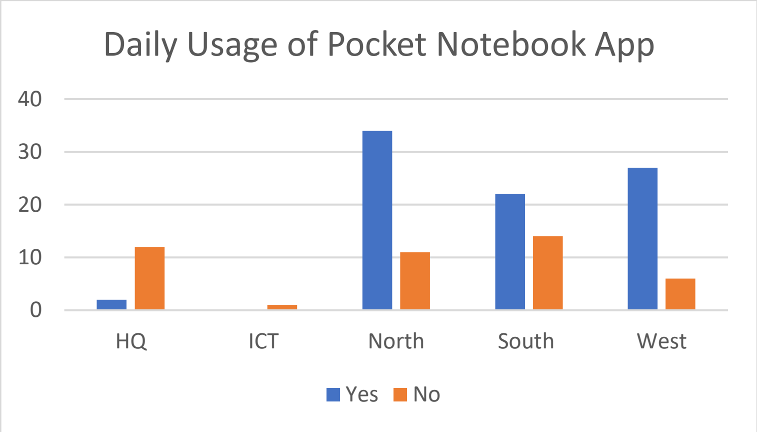

Figure 4.4 Daily Usage of Pocket Notebook Application

4.4.3.5 Productivity and Communication using the Kelvin Devices

Response officers are the main users of the Kelvin devices. There were no differences in the number of response officers across the three Areas who find the devices helping them become more productive. Younger response officers (20 – 35 years old) reported finding their Kelvin devices more productive than older response officers across the three Areas.

In addition, 49% of the participants believed that the Constabulary puts more value on officers making decisions based on data and analysis than on officers using their personal experience. 58% were not satisfied with the quality of information that they access using the Kelvin devices. Only 23% of officers believed that in the Constabulary, officers who use technology in creative or innovative ways are more likely to be rewarded than those who do not.

Officers who disagreed (48%) that the Constabulary adequately prepared them to use the Kelvin devices are mostly in the age range of 41-50 years old.

72% disagreed that the device improves the relationship with other officers/detectives. 74% believed the device does not improve communication with their line supervisor.

4.4.3.6 Attitudes Towards Technology

76% of participants liked to experiment with new technologies. 67% of participants (most of them are young officers) believed that in comparison to their fellow officers, they consider themselves "technology-savvy". Those who disagreed are mostly officers who are in the age range of 46-50 years old.

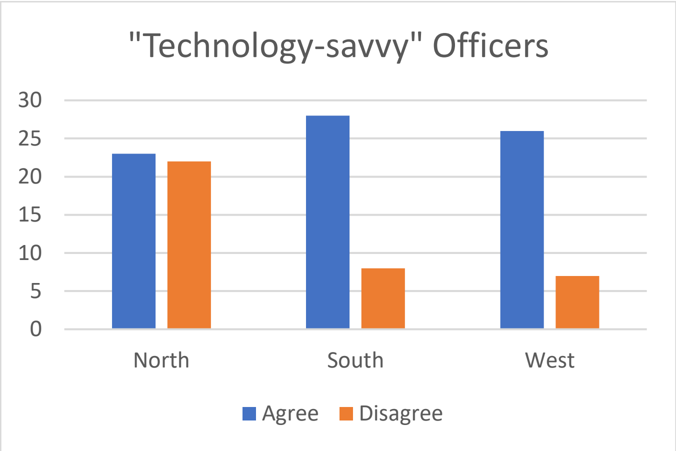

Figure 4.5 "Technology-Savvy" Officers in Areas

74% of participants believed that young officers/detectives are more receptive to using technologies than older officers/detectives. Only 34% of participants agreed that generally technology functions well in the Constabulary.

4.4.3.7 The Use of IT by Supervision and Management

Half the participants believed that Information Technology improves supervision and management within the Constabulary. 49% disagreed that their supervisors expect them to use the Kelvin device to identify and respond to crime problems.

53% believed that Information Technology generates statistics that are valuable in assessing the Constabulary's performance compared to 40% who disagreed. 54% disagreed that

Information Technology generates statistics that are valuable in assessing officer performance in comparison to 36% who agreed and 11% found it not applicable to their roles.

35% of participants agreed that supervisors use Information Technology to identify under-performing offices, 45% disagreed and 20% reported that it did not apply to their roles. 52% disagreed that their supervisors use Information Technology to track and monitor officers' daily activities compared to 31% who agreed.

4.4.3.8 The Impact of Using Information Technology on the Public

67% agreed that up-to-date technology improves the image of the Constabulary in the eyes of the public. 66% of the participants believed that it is important to the public that the officer is knowledgeable about the latest Information Technologies.

Most of the officers (65%) did not find the device helping them to improve the way they interact and communicate with the public.

4.4.3.9 Technology Adoption and Implementation in the Constabulary

64% believed that the Constabulary tends to adopt technologies that are often not useful. 55% agreed that the successful implementation of a new technology in the Constabulary depends on supervisors and senior management requiring its use. 61% were not satisfied with how new technologies are implemented in the Constabulary. 58% disagreed that after implementing a new technology, the Constabulary provides sufficient help and support to employees who are experiencing problems with it (officers' ages ranged between 40 – 51). 77% of participants disagreed that after implementing a new technology, the Constabulary seeks regular feedback from employees on how it is working. 84% of participants disagreed that before implementing a new technology, senior managers work hard to get input from employees.

50% disagreed that the Constabulary adopts technologies that are designed to meet important needs. 64% believed that supervisors and senior officers in the Constabulary work hard to generate the widespread acceptance of technology.

4.4.3.10 E-Learning System

60% of participants were not satisfied with the E-learning system. 70% believed it does not help them improve their job performance. 50% agreed that the E-learning system helps the Constabulary achieve its goals. 63% did not prefer to use a handout to learn new material and then take the test on the computer. 54% agreed that adding interactive info-graphics to the e-learning material will help them learn faster. 67% disagreed that it would be helpful if they can complete the e-learning course using their Kelvin devices.

4.5 Analysis

Understanding and analysing the pilot study results are best accomplished through using Beaudry and Pinsonnault's (2005) Coping Model of User Adaptations to technology. By studying the different users' adaptations to the adoption/post-adoption processes of a technology in an organisation, a myriad of users' responses such as "how users restore emotional stability, modify their tasks, reinvent and adapt to technology, or even resist it" could convey useful information to help management introduce appropriate change interventions to enhance the utilisation of the technology (Beaudry and Pinsonneault, 2005:494). Therefore, the results collected from the focus groups' sessions, the Q-Cards methodology and the online survey are mapped to the four categories or strategies proposed by Beaudry and Pinsonnault's

(2005) user adaptations model: benefits maximising, benefits satisfying, disturbance handling and self-preservation.

Benefits maximising: occurring in a situation when the consequences of using the technology are perceived as an opportunity and the users believe they have high control over it (Beaudry and Pinsonneault, 2005). In such instance, the adaptation efforts will mainly be problem-focused. For instance, the pilot study data highlighted the case of young officers who perceived themselves as “IT savvy” and considered adopting the Kelvin devices as an opportunity that can potentially enhance their performance and can ultimately lead to an increased desire to explore the full extent of functionalities. Indeed, many young officers reported exploring several applications that were not covered in the Kelvin devices’ training like the Translation application, the First Aid application, the MRG application and the OpenSignal application.

The online survey results further confirmed these findings as it revealed that 74% of participants agreed that younger officers are more receptive to technology and 67% of officers who defined themselves as “IT savvy” were in deed younger than the rest of participants.

Another example of problem-focused adaptation efforts was evident in the case of young officers who reported using alternative techniques to overcome the connectivity and signal problems at police stations. They realised that since all officers in the police station are using the station’s Wi-Fi to perform tasks, they should opt to switch off their Kelvin devices’ Wi-Fi and use the devices’ signal instead, hence avoiding the delays experienced while trying to synchronize important information to police databases. Other officers reported attaching photographs to emails and sending them to their Sergeants instantly to overcome the limited allowance of the number of photos to be sent via the Pronto application. PCSO officers extended the devices' battery life by enabling the power saving option and switching off the Blue-tooth feature.

All officers reported perceiving Google Maps application as an opportunity that enhanced their efficiency. Getting directions using this application drains the Kelvin devices' battery quickly. This has led many officers to use their personal phones' Google Maps application to get directions when their Kelvin devices indicated low battery. Similarly, some detectives used their personal mobile phones to update their corporate Twitter and Facebook accounts in big events when they had no signal/connectivity in their Kelvin devices. Therefore, officers tried to maximise the technology benefits by using their personal mobile phones and adopting problem-focused adaptations.

Moreover, officers acknowledged finding the signal-independent features as both useful and efficiency boosters. This was evident in the data collected from the pilot study results as it revealed that officers heavily used their Kelvin devices' camera in taking photographs in accident scenes and sometimes in more serious cases as it was perceived to have a positive impact on the quality of work they submitted. Officers believed that it is particularly useful as an evidence in some domestic situations as it instantly showed the severity of the situation at the scene. Furthermore, taking photographs using the devices' camera eliminated the need to cease items in damage cases as in most cases it is sufficient to take a photograph and to get the person to sign it using the electronic signature facility. All officers praised the usefulness of these two features (photographs and e-signature) to complete jobs as they were perceived as consistently reliable and performance enhancers compared to using the former tough books.

Additionally, some Sergeants' adaptation efforts were problem-focused as they circulated guidance information (in emails and newsletters) describing how to use some useful applications that were not covered in the Kelvin training like the Translation application. This has led to maximising the benefits of the devices among officers. Sergeants' attitude promoted the problem-focused coping perceptions and helped officers perceive the mobile device as a helpful and useful tool in their Areas.

Benefits satisficing: In this situation, users perceive the new technology as an opportunity, but they feel they have limited control over it. Adaptation efforts are likely to be minimal (Beaudry and Pinsonneault, 2005). Problem-focused efforts will be limited as users feel they cannot do much to reap more benefits and emotion-focused efforts will be limited because users do not feel the need to reduce tensions (as it is not perceived as a threat) (Beaudry and Pinsonneault, 2005). Hence, few benefits are realised from the utilisation of the technology.

Officers highlighted the impact of poor signal and connectivity on using some applications and features; reducing the anticipated benefits of the devices. They emphasised the usefulness of being able to read and update logs using their Kelvin devices as it eliminated the problems encountered when control room staff performed this task on their behalf. This feature is signal-dependent; hence officers can only check/update logs between jobs when they can drive to the nearest place with a stronger signal. This feature (when the devices' signal is strong) enhanced the quality of the recorded logs and reduced time spent in updating logs in police stations. Hence, in this case, fewer benefits are realised because of the low control over the connectivity of the devices.

Many officers reported preferring writing witness statements using their Kelvin devices but finding the predictive text feature frustrating and challenging. As they were unable to switch this feature off, they had to proof-read statements several times to check for text mistakes. This led many officers to avoid using the devices in writing long witness statements to save time and to enhance their efficiency. The same action was taken by many officers to compensate for their limited typing skills.

Moreover, even though young officers reported typing all their witness statements using their Kelvin devices, in some situations they reverted to using their paper notebooks to boost their efficiency. For instance, a young officer reported being called to an accident in which a bus has hit a car and there was another fatal incident at the same time. As all the passengers on the bus are witnesses, she had to write more than 25 witness statements at the scene. The officer used her paper notebook as typing on the device would be too slow to finish the job. Hence, officers' IT skills and poor connectivity of the Kelvin devices reduced their control on the devices and diminished the anticipated benefits of the technology.

Disturbance handling: occurs when users perceive the technology as a threat during the primary appraisal process, but they believe they have some control over the situation (Beaudry and Pinsonneault, 2005). Adaptation efforts in this situation are likely to be "oriented toward one's self (e.g. seeking training), the technology (e.g. reducing the negative aspects of the new system), and the task (e.g. adjusting work procedures so that they better fit with the technology" (Beaudry and Pinsonneault, 2005:502). This could lead to an increase in the users' efficiency and effectiveness (Beaudry and Pinsonneault, 2005).

For instance, officers who were affected by their peers' stories of witness statements being wiped out of their devices accidently, perceived this feature as a threat. They reported writing long statements in their paper pocket notebook and then recording this information on their desktops' Pronto application (in police stations). They recorded short statements only using the Kelvin devices. Officers' adaptations, in this case, are focused on benefit-finding; using the

Kelvin devices to record short statements instantly and using an adapted strategy in case of longer statements.

Some older officers who claimed having limited IT skills, reported perceiving the Kelvin devices as a threat when they were first rolled out at the Constabulary. They highlighted the important role played by young officers in helping them learn new IT skills to get better control over the use of the different useful features offered by the devices.

Self-preservation occurs when the expected consequences of the new IT are perceived as a threat and users feel that they have limited control over the situation (Beaudry and Pinsonneault, 2005). In this instance, their adaptations efforts will be emotion-focused and aiming at changing their perceptions of the IT through resistance and avoidance (Beaudry and Pinsonneault, 2005).

Many officers reported doing PNC person checks using their radio devices (even if they have good signal in their Kelvin devices) as they fear for their safety. Using radio devices to perform PNC checks ensure that their colleagues and the control room staff are aware of the job they are doing and of their current location especially when they are single-crewed. In many cases, other officers listening to the radio could get valuable information about people/criminals who police are looking for and want to arrest. Hence, doing PNC person checks using the radio devices could pass important information to other officers about a repeat offender.

The inability of officers to search through the recorded exhibits (in the Kelvin devices' pocket notebook application) because of not having a functional search feature led some of them to revert to using their paper pocket notebook as they trust the traditional methods of recording information more. Similarly, older officers who find typing using the devices' small keyboard time-consuming resisted using the Kelvin devices altogether. They reported reverting to writing statements on paper as they are more efficient using the method they are most accustomed to.

Therefore, officers' adaptation efforts in this situation were emotion-focused and clearly manifested through utilisation avoidance.

4.6 Discussion

4.6.1 The Role of Context in Understanding Mobile IS User Adaptations

Using the Coping Model of User adaptations (Beaudry and Pinsonnault, 2005) to analyse the pilot study results facilitated painting a general picture of the different officers' adaptation and coping behaviours at the Constabulary. However, an important aspect that played a major role in officers' adaptation behaviours was lacking; the use context. The context of use has a profound influence on officers' appraisal of the Kelvin devices' features. For instance, the PNC feature was perceived by officers as both a threat and an opportunity. Officers reported (in the online survey) finding this feature useful but reported (in the focus groups' sessions) avoiding using it as they feared for their safety (unless they are double crewed). This could be attributed to the context in which this feature is being used in. For instance, traffic officers can do vehicle PNC checks while in their police vans (a safe context) while person PNC checks require complete officer attention to the suspect, hence, radio devices are massively used in this context. Another example of perceiving a feature as both an opportunity and a threat is evident when using Google Maps application. Officers reported being unable to get directions from the application when they are single-crewed (especially that police vans do not have fixed cradles to place phones on while driving) but finding it massively useful in giving them directions otherwise.

Moreover, officers perceived being able to write short witness statements as an opportunity however they perceived using the Kelvin devices to record long statements as a threat (as it might get accidently wiped out if they get called to do another job in the middle of the statement). Nevertheless, many officers praised being able to write long historic witness statements using the Kelvin devices in witnesses' houses as the devices enable them to slot in information easily as and when the witnesses recall information. This is feasible because they do not get called for other jobs by the control room while in witness houses. Hence, extending the Coping model of User Adaptations to include the use context is significant to better understand users' adaptations in mobile use contexts.

Furthermore, Pica et al. (2004), Pica and Sørensen (2004) and Pica (2006) examined the relationship between the context of work activities and mobile information usage among two roles within the UK police force; the Scene of Crime Officers (SCO) and Community Security Officers (CSO). The authors argue that the real environment has the potential to increase or limit officers' interaction with the virtual (their mobile devices). Sørensen and Pica (2005) note the importance of appropriating the technology functionalities to the work context. Besides, adding the context perspective to the user, task and mobile technology highlights the importance of studying resistance to change using a multilevel perspective as proposed by Rizzuto et al. (2014). In addition, it sheds light on the significance of adding the 'use context' to Beaudry and Pinsonnault's (2005) Coping Model of User Adaptations to technology. Use context is a key determinant of the magnitude of utilisation of the mobile technology features. This study extends Jiang et al.'s (2000) study that aimed to investigate the link between resistance reasons and system types (Transaction Processing Systems and Decision Support Systems) by highlighting the significance of incorporating work/use context in technology training programmes to promote the efficient utilisation of mobile Information Systems in organisations.

4.6.2 Officers' Acceptance and Resistance Reasons

The pilot study results attempt to show how acceptance and resistance can manifest themselves in practice. The findings suggest that many officers are still using pen/paper to perform some tasks even though the use of the Kelvin devices is mandatory at the Constabulary. These results confirm with Carlson and Zmud's (1999), Thatcher et al.'s (2011) and Saeed and Abdinnour's (2013) claim that the post-adoption utilisation of the technology process is largely voluntary even if technology utilisation is made mandatory in organisations because users can choose to use a sub-set of the functionalities of the Information System to meet task requirements rather than explore the full range of features.

Key reasons for the acceptance of some of the Kelvin devices' features at the Constabulary are the reliability and the usefulness of these features. Hence, officers perceive taking photographs, the e-signature feature, Google Maps application and reading/updating logs as efficiency boosters and all officers reported using them extensively in performing daily tasks. Nonetheless, the primary reasons for resistance at the Constabulary are different and varied. For instance, organisational invalidity at the Constabulary occurred when officers were told (before the roll out the Kelvin devices) that they will be able to add intelligence information into Red Segma (the intelligence application) to reduce time spent in the frequent visits to police station. Unfortunately, the Red Segma project took longer than anticipated and the application was not ready for utilisation at the time of the Kelvin devices' roll out. Organisational invalidity was manifested in the results of the online survey; 64% believed the Constabulary adopts technologies that are not useful and 61% are not satisfied with how new technologies are implemented in the Constabulary. The disconfirmation of officers' expectations has adversely impacted on their satisfaction with the Kelvin devices (Bhattacherjee, 2001; Staples et al., 2002; Saeed and Abdinnour, 2013) and ultimately on their continuance of use of the devices

(Bhattacherjee, 2001; Bhattacherjee et al., 2008). This incongruence between police forces' technological frames and those of police officers aligns with Lum et al.'s (2016) study undertaken in two police agencies in the USA and with Chan's (2001) case study of an Australian police force. Technological frames are people's 'particular assumptions, expectations and knowledge of the technology, which then serve to shape subsequent actions toward it' (Orlikowski and Gash, 1994:175).

A Police Constable has expressed their frustration stating that:

> *"I just love what I do. You got to enjoy this job to do it. What the Constabulary has put in place over the past two years has made response officers' life so so difficult and so much more stressful. The job for me in ten years has doubled in stress, even the last year."* (Police Constable 1, North)

Another Police Constable seconded their colleague's views and added that:

> *"I do quite like it [Technology]. I am frustrated with it in some respects but I don't want to give it up especially in tickets. On the whole it works, it has a lot of positive for it."*
>
> (Police Constable 2, North)

Moreover, the impact of age (officers of longer service) on senior police constables' decision to resist using their Kelvin devices is manifested in the pilot study results. Despite having extensive experience in policing, they lack a first-hand experience in technology as they would have completed high school or college before computers were commonplace. Hence, they report finding typing, using the Kelvin devices' small keyboard, time consuming with no efficiency gain. They prefer using their paper pocket notebook as they can perform tasks much faster using traditional methods like pen/paper. On the other hand, younger officers have been exposed to using personal computers at a relatively early age and can type using both hands quickly and accurately. These views chime clearly with Morris and Venkatesh (2000) and with Poon et al. (2004). Senior police constables' passive resistance could be attributed to 'lack of felt need' where users are not convinced of the benefits of the system (Hirschheim and Newman, 1988; Cockcroft and Beattie, 2009) or a perceived threat of loss of power as argued by Markus (1983) and Lapointe and Rivard (2005). Ultimately, they became reluctant to change the status quo (Innate Conservation) (Hirschheim and Newman, 1988).

The initial Kelvin devices' training conducted by the Constabulary, was limited to one-day and focused on the main features offered by the Kelvin devices with no hands-on practice of the features, thus, senior police constables' substandard technical skills were not improved. Workers in Morris and Venkatesh's (2000) study received two-day training session on the system, during which they had hands-on use with the system as well as IT support. The training was repeated after two weeks to all participants to ensure delivering the highest quality of training to all employees (Morris and Venkatesh, 2000). High quality training and IT support can potentially contribute to older employees' reported enhancement in technical skills (Morris and Venkatesh, 2000) and possibly to a boost in their perceptions of behavioural control which significantly influence intentions of IT utilisation (Venkatesh, 2000; Ajzen, 2002; Venkatesh et al., 2003; Morris et al., 2005; Elie-Dit-Cosaque et al., 2011). Similar recommendation was noted by Ioimo and Aronson (2004) who studied the impact of using mobile computing in a medium sized police force in Arizona.

Furthermore, the lack of IT support, especially during night shifts, had a negative impact on the successful adoption of the Kelvin devices. This is evident as 58% (most of them are in the age range of 40 and 50) disagreed that the Constabulary provide sufficient help and support to officers who are experiencing problems and 48% disagreed the Constabulary adequately prepared them to use the devices. Bhattacherjee and Hikmet (2007) argue that training sessions designed to fill this knowledge gap can improve the ease of use and promote the utilisation of the IT system. In this case, the rectification is deemed congruent as the corrective responses are in congruence with the cause of resistance (Rivard and Lapointe, 2012). IT support (in the form of technical service) is proved to have direct influence on perceived ease of use (Thatcher et al., 2011) which has a strong influence on users' IT utilisation intentions during technology training interventions (Venkatesh et al., 2002).

Therefore, the reasons for users' acceptance and resistance to change are different and can coexist in the same organisation (Beaudry and Pinnsoeault, 2010; Stein et al., 2015; Bhattacherjee et al., 2018). Moreover, the same IT user can appraise some systems' features as opportunity and others as threat (Beaudry and Pinnsoeault, 2010; Stein et al., 2015; Bhattacherjee et al., 2018). For instance, 82% (of survey participants) perceived the predictive text option as frustrating, difficult to manage and reduced the quality of witness statements recorded. They also argued that having to input three sets of passwords several times during a shift is causing much frustration among officers and detectives. Nevertheless, they praised their ability to update and view logs using their Kelvin devices while in police vans. They reported being able to launch Google Maps application by pressing on the post code link in the incident logs particularly useful and efficiency booster. They also perceived taking photographs in accident scenes and sometimes in more serious cases as impacting positively on the quality of work they submit.

Officers' inability to read/add intelligence information using their Kelvin devices negatively impacted on their satisfaction with the devices. The lack of IT support at night shifts and the impracticability to contact IT support while dealing with members of the public coupled with many officers' basic technical skills, led to reduced perceptions of the usefulness of the Kelvin devices' features. The pilot study's online survey results indicated that 71% (of participants) believed that the Kelvin devices did not enhance their job satisfaction. 58% were not satisfied with the quality of information they access. CID detectives and senior management reported similar concerns about the reduced quality of witness statements recorded using the Kelvin devices. Officers believed that the reduction of the quality of the recorded statements was due to their inability to focus on typing using the small keyboard, dealing with the frustrating predictive text option and keeping eye contact with the witnesses. Findings from Colvin and Goh's (2005) study conducted in a police force on the US West Coast revealed that information quality was a key factor that can drive mobile technology acceptance among patrol officers. Hence, all these factors influenced officers' post-adoption utilisation and satisfaction with the Kelvin devices. Both satisfaction and perceived usefulness are determined by the degree to which users' expectations of the system are confirmed (Bhattacherjee, 2001; Saeed and Abdinnour, 2013).

Moreover, officers' diminished trust in the Kelvin devices is evident as many officers reported using their paper pocket notebook frequently during their shift. Individuals develop a trust relationship with the technology used only if their expectations are confirmed and reliability of the technology is realised (Lippert, 2007). Trust in technology directly influence perceived usefulness, technology utilisation and perceived ease of use (Lippert, 2007; Thatcher et al., 2011). Lippert (2007) and Mcknight et al. (2011) claim that the role of trust in technology is a key determinant in sustaining post-adoption utilisation in organisations. Technology trust affects individuals' intentions to explore the full range of functionalities of the adopted IS and consequently limit the post-adoption utilisation preventing organisations from achieving the benefits anticipated from investing in the technology (Jasperson et al., 2005; Lippert, 2007; Mcknight et al., 2011, Thatcher et al., 2011). Both trust in technology and IT support trust have indirect influence on users' intention to explore the technology features and functionalities (Thatcher et al., 2011).

4.7 Conclusion

This research has several implications for police IS research and practice. The pilot study answers Lum et al.'s (2016) call for collecting more contextual and qualitative knowledge about the actual causes of technology adoption/resistance in police forces. It also highlights the significance of the role of the work context in the successful adoption of various mobile technology features. Adding work or use context to Beaudry and Pinsonnault's (2005) Coping Model of User Adaptations to technology extends the knowledge about situations where users' primary appraisal of the mobile technology feature is both a threat and an opportunity facilitating a more fine-grained understanding of further possible users' adaptations behaviours. In the context of mobile technology utilisation, we should avoid a dichotomous view about users' primary appraisal of the different technology features because the context of use is a key driver of user adaptations and appraisal in the mobile IS context of use.

Using the Coping theory to explain the causal processes driving different users' adaptations, in mandated settings (i.e. police forces), emphasised the importance of adopting varying management interventions to target different users' adaptations. Inappropriate management interventions to resistance behaviours eventually provoke resistance escalation (Rivard and

Lapointe, 2012). At the Constabulary, 70% of the online survey participants reported finding the devices frustrating and not making their work interesting. This could promote Emotion-based adaptations; delaying further realised benefits of the devices. Managers should promote adaptation strategies that are likely to minimise negative emotions associated with the devices. Management interventions that are in congruence with the causes of resistance can bring significant efficiency benefits to organisations (Rivard and Lapointe, 2012).

Enhancing training is highly recommended in the resistance to change literature (Ali et al., 2016; Haddara and Moen, 2017) and is regarded as an effective method of improving users' expectations of technology (because it aims to promote problem-focused adaptations). This training should not just address the basic functionalities of the technology but should also accommodate for differences in users' IT skills, age, experiences, tasks, work contexts and culture; ensuring the existence of a good-fit between all these factors. Consequently, the existence of congruence in technological frames (Orlikowski and Gash, 1994) between the different actors using the technology can be feasible to foster a positive impact of technology use in police forces (Chan, 2001).

Current e-learning training packages that police forces are frequently drawing on to train officers are not fit for this purpose (Cockcroft et al., 2018; Schreuders et al., 2018). Therefore, training programmes should be designed to extend officers' skills beyond the basic use of the mobile devices (Ioimo and Aronson, 2004; Lum et al., 2016; Bhattacherjee et al., 2018) and promote efficient utilisation of the various features (Kashefi, 2014). This can potentially trigger better compliance with IT usage polices in organisations (Rivard and Lapointe, 2012; Lapointe and Beaudry, 2014).

Furthermore, scenario-based learning should be employed to present best-practise strategies in training programmes. Indeed, some police forces in the UK used scenario-based instruction in their communication skills training programmes and have reported massive development in their officers' communication skills and a positive effect on building strong relationship with local communities (HMICFRS PEEL: Police Legitimacy Report, 2017). Bhattacherjee and Premkumar (2004) and Bhattacherjee et al. (2018) highly recommend organisations to invest in technology training programmes to create a positive user experience as it directly impacts on the technology's perceived usefulness (the most crucial belief driving IT usage) and attitudes of employees. Lucas (2010) and Bhattacherjee et al. (2018) recommend recruiting champions or super-users in delivering technology training to influence the less enthusiastic users.

Finally, user resistance is of profound importance for the success of technology implementation in organisations as it can alert management to significant systems' modifications, slow the process of change down or even replace the current IS with another that better fits the organisations' needs and goals (Markus, 1983; Doppler, 2004; Rivard and Lapointe, 2012; Bagayogo et al., 2013; Stein et al., 2015; Ali et al., 2016; Haddara and Moen, 2017; Bhattacherjee et al., 2018). Understanding key resistance reasons in organisations can shed light on salient management interventions that are in congruence with the resistance reasons to boost acceptance of Information Systems.

4.8 Summary

In this chapter, a description of the different methods adopted in conducting the pilot study are presented. The main themes identified (barriers, benefits and enhancements) in the focus groups sessions were grouped as either functional or non-functional. The results of the Q-cards methodology enabled the identification of the fundamental barriers, benefits and enhancements eliminating subjectivity and promoting objective thinking among officers. The results of the online survey confirmed some previous findings and painted a clear picture of the mobile technology post-adoption situation in the constabulary

Finally, data analysis was accomplished by mapping all the findings to Beaudry and Pinsonnault's (2005) Coping model of User Adaptations to technology. This was followed by a discussion of the findings of the pilot study. Moreover, implications for future research at the Constabulary were presented to facilitate the understanding of officers' coping behaviours and responses to the adoption of the Kelvin devices. Hence, the first objective of this research study outlined in chapter one is accomplished; to identify the key reasons for officers' resistance to using the full range of functionalities offered by their Kelvin devices in performing daily tasks.

Chapter Five - Technology Training Sessions' Design and Data Collection

5.1 Introduction

A comprehensive analysis of the key themes and findings of the pilot study have been presented in the previous chapter painting a clearer picture of officers' actual patterns of usage of the Kelvin devices and primary causes for technology resistance at the Constabulary.

In this chapter, a detailed discussion of the various reasons for choosing a set of Kelvin devices' features to be presented in the training sessions is highlighted. Besides, the design posited for the training sessions conducted in the Constabulary is presented. Finally, the chapter concludes by the feedback data collected via an online survey and its analysis.

5.2 Role of Superintendent

When the researcher first contacted the Constabulary to arrange for conducting focus groups' sessions for the pilot study, she was assigned a Superintendent who was about to change roles. Hence, the hand-over to the new Superintendent delayed the start of the data collection process. The new Superintendent was not involved in the decision to adopt the Kelvin devices and their new role involved designing and implementing a technological vision for the Constabulary till 2025. The Superintendent's flexibility and openness to new ideas facilitated the prompt approval of the design and implementation of the training sessions. This Superintendent holds two academic degrees and showed appreciation to academic research. Seven meetings were held with them as they were keen to learn more about the results collected from the pilot study and to use this information in improving general attitudes towards the Kelvin devices. They were in favour of presenting the features proposed by the researcher to police officers and was happy to arrange the sessions themselves. The Superintendent prepared a PowerPoint presentation for the training sessions which had information about the new generation of Kelvin devices' features and capabilities (reassuring their officers that the new devices will be up to their expectations). Furthermore, the PowerPoint presentation had some real-life scenarios for officers to practise in the sessions. This Superintendent's support was essential for the successful delivery of the training sessions at the three Areas; North, West and South.

5.3 Pilot study resolved barriers

Some of the barriers to the Kelvin devices' adoption at the Constabulary were resolved after sharing the results collected from the focus groups' sessions, the Q-Cards ranking methodology and the online survey with the Superintendent in charge. For instance, the Constabulary enabled officers to switch on/off the predictive text feature which was reported by 82% of the online survey participants as a frustrating option. Furthermore, the Constabulary allowed officers to control the time out interval of the Kelvin devices to reduce the time spent in re-inputting three sets of passwords and to eliminate the unnecessary breaks in witness statements (in the pilot study, many officers argued that statements' breaks look unprofessional when printed compared to the hand-written ones).

In addition, more money was invested in buying a limited number of new laptops to accommodate for taking long/historic statements, hence, relieving some of the dissatisfaction caused by using the Kelvin devices' small keyboards. The new laptops have the finger print facility enabled to facilitate easy access to the applications. Also, the Constabulary ensured that the new generation of the Kelvin devices would include the finger-print facility to overcome the frustration caused by the current devices' three sets of passwords requirement for operation. Therefore, some barriers that were identified by the pilot study results were resolved.

5.4 Unresolved Barriers

The results collected from both the focus groups sessions and the online survey revealed the disappointment of most officers because their Kelvin devices did not meet their expectations and certainly did not increase the time they spend on the beat; away from police station, as promised by senior management at the Constabulary. This disappointment led officers to use a sub-set of the features; the ones they perceived as reliable, useful and efficiency boosting. For instance, officers praised the ability to read and update logs using their Kelvin devices and reported finding it a useful feature. Moreover, writing witness statements had been generally perceived by officers as a useful feature which can be improved if the Constabulary invests in bigger Bluetooth keyboard that could be connected to the Kelvin devices. Unfortunately, due to austerity measures, the Constabulary was unable to invest in new Bluetooth keyboards. It is worth mentioning that the level of detail and the quality of witness statements were negatively affected after the roll out of the Kelvin devices and had been flagged as a major concern as noted by the Superintendent in charge.

In the focus groups sessions, many officers reported using their paper pocket notebook again even though the Constabulary (at the time of the focus groups' sessions) stopped issuing them. Officers highlighted two main issues with the Kelvin devices' pocket notebook application. The first issue was the inability to search through entries as the search option was disabled and the second was finding the process of recording incidents using pen/paper much faster than using the small Kelvin devices' keyboard.

5.5 Proposed Kelvin Devices' Features for Training

In order to overcome the problem of using a small keyboard in writing statements, emails, updating logs and adding pocket notebook entries, the researcher proposed training officers on using the dictation option (a built-in feature already available on the Kelvin devices) but not presented to officers during the Kelvin devices' initial training. This feature was tested by both the researcher and the Superintendent, and was found to be accurate, efficient and easy to use. Using the dictation option is particularly useful to older officers who find speed typing or typing with both hands both difficult and limiting to their ability to perform jobs efficiently.

Dictating witness statements can enable officers to keep more eye-contact with witnesses and members of the public which is not feasible when they need to look in their Kelvin devices' screens while typing on the keyboard. The Kelvin devices' stylus feature was also tested but was found not as efficient as the dictation feature.

Another feature proposed for training by the researcher was using naming conventions to record entries in the pocket notebook application to facilitate and speed up the process of searching through the recorded entries. Using naming conventions at the start of the text entry (that is comprised of incident location and incident type) can eliminate wasted time spent in going through each entry to locate the ones they are looking for.

Furthermore, a super-user police officer (who was involved in delivering the initial Kelvin devices training at the Constabulary) suggested training officers on using the feature of automatically copying personal and vehicle information across several forms in the Pronto application[4]. For instance, if an officer needs to do a PNC check on an offender, the officer can

[4] The Pronto application has all the forms and applications needed by police officers to perform their daily tasks. It can be used whether the officer is connected to a network or offline. It significantly reduces time spent on travel to stations and inaccurate administration.

input the offender's personal information to their Kelvin device then use the saved information in populating the PNC check form with this information automatically. Besides, officers can use the saved information to fill in other forms like the Stop Search form or even use it to fill in the personal details section in witness statements. This feature can be used to fill in Vehicle details and in issuing traffic tickets. Hence, eliminating errors that can occur in the process of filling in multiple forms with the same personal and vehicle information can potentially enhance the quality of information recorded in police databases and can save much time spent in recording the same information in multiple forms. It portrays a professional police officer to the public who uses technology smartly and does not ask them to repeat the same information several times to fill in forms. This feature was not delivered to officers in the Kelvin devices' initial training to avoid confusing the less IT-able officers in the sessions.

To promote the use of the Kelvin pocket notebook application and to limit the use of the paper pocket notebook, another feature was proposed by the IT department; using the 'S-Note' feature. S Note is a note taking application which allows officers to efficiently create, edit and manage notes. This includes easy file management with the ability to create categories and copy, move or delete files from within the application. It also supports interactive multimedia functions and allows officers to draw and write using the stylus.

This application allows officers to add quick notes on their Kelvin devices without the need to input any passwords mimicking their paper notebook. Using the stylus (in this application) is different from using the stylus to input text as the quick notes are saved as pictures rather then converted to text, hence it is very efficient and effective.

5.6 The Features Chosen for the Training Sessions

Based on the results obtained from the pilot study's online survey, 71% of participants disagreed or strongly disagreed that the Kelvin devices enhanced their job satisfaction. More than half the participants believed the devices created extra work for them and 70% disagreed that the devices made their work interesting. Hence, the choice of features for the training sessions focused on the features that can potentially reverse these negative attitudes towards the Kelvin devices among front-line officers (the main users of the devices) at the Constabulary. This was achieved by choosing features that would enhance the fit between the feature and the task in different contexts. Ultimately, promoting the efficient use of many useful applications such as updating logs and writing statements. Other factors that were taken into consideration are the features' ease of use, usefulness and reliability.

Three key features were shortlisted by the researcher and approved by the Superintendent for the training sessions:

1. The dictation feature (Speech to Text) is generic and has the potential to facilitate the process of writing statements, sending SMS, emails, updating logs and writing text entries in the pocket notebook application. The primary limitation to using the Speech To Text feature (dictation) is the inaccuracy of recognizing speech in excessively noisy contexts and in the case of peculiar accents. On the other hand, the dictation feature can eliminate the difficulty of typing on the devices' keyboard in extreme weather conditions (freezing and wet weather which are very common in the County).
2. 'Copying person and vehicle' information across different forms can enhance the quality of the information recorded in police databases. This feature allows officers to save time by eliminating the need to ask members of the public to repeat their personal

information to fill in different forms. The Superintendent highly supported getting officers trained to use this feature.

3. As mentioned before, after the roll out of the Kelvin devices, the Constabulary stopped issuing new paper pocket notebooks to officers to ensure they use the Kelvin devices' pocket notebook application. The Constabulary had to reverse this decision and resume issuing paper pocket notebooks again to stop officers buying their own paper pocket notebooks (as this could undermine cases in courts). The S Note feature does not require high levels of IT-skills and could encourage many officers to use it frequently especially as it does not require the input of the three sets of passwords that are needed to access the Kelvin devices' pocket notebook application. In addition, officers can sketch on the S Note in the same way they do using their paper pocket notebook.

5.7 Technology Appropriation Training Sessions' Design

5.7.1 Criteria of Training Sessions' Participants and Trainers

The researcher requested that the number of officer trainees per session would be limited to a maximum of six police officers. Officers should be of similar age and rank. A discussion with the Superintendent about whether to have a mixed gender training sessions or separate sessions for male and female officers was concluded by the Superintendent's preference for having a session that mimics the training sessions already run by the Constabulary. The researcher clarified that during the pilot study's focus groups' sessions, female officers frequently raised the issue of being less IT confident (unable to use the devices' features on a regular basis because of their diminished IT skills) than their younger male colleagues and that running special training sessions for female officers can boost their technology self-efficacy. The

Superintendent disagreed with the researcher and noted that this might be down to the researcher's background as she was not brought up in the UK and hence, she is more sensitive and aware of this issue. Therefore, the decision was to have mixed gender training sessions.

The Constabulary recruited the participating officers and appointed three super-users responsible for delivering the training in the three Areas (North, West and South). It was agreed with the Constabulary that the researcher will attend the training sessions but only as an observer. The trainers chosen for delivering the Kelvin devices training contributed to the initial Kelvin devices' training when the devices were first rolled out in the police force. Besides, the Constabulary regularly rely on them in delivering technology training on various IT applications to police officers. Hence, the training sessions are conducted in a way similar to how the Constabulary usually runs its own technology training sessions.

5.7.2 Arrangements Undertaken Before the Training Session

Before the training session, a meeting with the trainer is conducted in which he/she is consented to participate in the research study. The training session's plan is discussed in detail highlighting the primary goals to be achieved at the end of each part of the training session. Trainers are asked to encourage officers to work in teams and to support each other especially at the end of the second part of the session (as will be clarified in the next section). The researcher emphasised the importance of addressing police officers (participating in the study) by their first names and setting a friendly mood to the session.

Furthermore, information about the trainer's use of the various features of the Kelvin devices over the past four years (since the adoption of the Kelvin devices at the Constabulary) is collected. Moreover, the features chosen to be presented in the session are discussed.

5.7.3 The Training Session

The session opens by a brief acknowledgment of the limitations of the current generation of Kelvin devices. The trainer emphasises that this training session aims to introduce officers to useful features which can eliminate some barriers to using the various Kelvin devices' features in daily tasks. They assure participating officers that the skills and features presented in the session are transferable to the next generation (Samsung Galaxy Note 9) of Kelvin devices that are expected to be rolled out by the Constabulary (hopefully) in six months to replace the current devices (Samsung Galaxy Note 4s). Finally, the trainer shares the plan for the session with the trainees emphasising the invaluable officers' input, experiences and knowledge in improving the technology training at the Constabulary.

The training session is divided into three parts as shown in figure 5.1:

1. *Feature Demonstration:* the trainer presents how to use the Kelvin devices' feature (one feature at a time) by performing a practical presentation demonstrating how to use this feature using his/her Kelvin device. The trainer also highlights the benefits of using this feature in performing officers' daily jobs. The feature demonstration is conducted in a lecture mode or instruction-based style similar to the Kelvin devices' initial training.
2. *Officers' Practice Time (familiarity and making sense of the feature):* Officers are asked to access the feature using their Kelvin devices to explore how it works. The trainer (or IT staff member) ensures that all trainees can use the feature without difficulty and deals with any technical problems related to differences in officers' IT skills. For instance, the trainer can offer help and support to officers who are struggling to toggle the keyboard button to the microphone button in different applications like

SMS, updating logs and statements. Any IT knowledge gaps should be rectified at this stage. Officers are encouraged to help each other and work in groups after ensuring they are confident in using the feature on their own.

3. *Linking feature to context/task:* Officers are encouraged to use the 'Frame of Patterns' technique developed by Zigurs and Khazanchi (2008) to pair what they have just learnt to real life situations and to different work contexts. A pattern consists of three parts: a specific context, a problem and a solution. Officers use their experience and knowledge extensively to promote better and efficient usage of the features. They should be arranged in a circle to facilitate a deeper level of understanding and develop personal skills such as active listening, team collaboration and constructive feedback or criticism. They are also given real-life scenarios with real data to practice the new features using their Kelvin devices. These real-life scenarios involve using all the features presented in the session. This should facilitate applying all the skills learnt in the training session to familiar daily tasks, thus, consolidating the learning process.

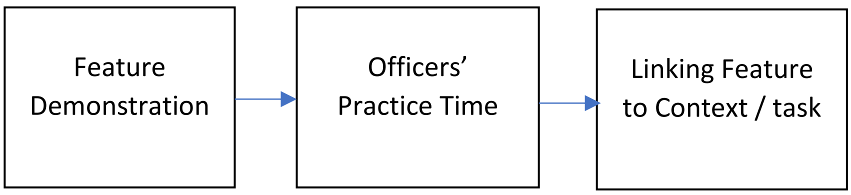

Figure 5.1 Training Session Layout

The training sessions focus mainly on two key Kelvin devices' features: Speech To Text and 'Copying Person and Vehicle Information' to other forms as they require more time to present and to discuss than the third feature (S Note). If time does not permit, the third feature can be presented by circulating guidance information to all participant officers describing how to use the S Note feature.

5.7.4 At the End of the Training Session

The researcher acknowledges the trainees' and the trainer's invaluable knowledge, contributions and experiences. Participants are asked to use the dictation (Speech to Text) feature to feedback to the researcher. This is achieved by using the dictation feature to send SMS and/or emails to the researcher describing their positive and/or negative experiences because of using the features in performing their daily jobs. The key reason for the choice of SMS as a feedback method is to encourage officers to feedback promptly to the researcher about the effectiveness of using the features in actual work contexts without burdening them with more jobs.

Besides, they are encouraged to share what they have learnt in the session with their colleagues who did not attend the training sessions. They are informed that in three weeks they will receive an online survey to collect their invaluable detailed feedback and experiences regarding the training session's design and the actual utilisation of the Kelvins' features to finalise the study results.

5.8 Training Sessions' Observation Data

5.8.1 North Training Session

5.8.1.1 Trainer

The trainer was sent an email by the Superintendent briefing him about the Kelvin devices' features that will be presented in the training session. This was followed by another meeting that was attended by the researcher to further clarify the job to the trainer. In this meeting, the researcher (who was sitting facing the trainer and the Superintendent) noticed that the trainer who was also a super user (of the Kelvin devices) and a serving police officer was not happy to do the job, but he did not refuse it. The Superintendent did not notice the trainer's face reactions (as they were sitting next to the officer).

The researcher asked the trainer in the interview (conducted before the training session on the training day) about the reason for not being enthusiastic about delivering the training to his colleagues. He stated that officers prefer using their paper pocket notebook and they did not find the Kelvin devices' features as good as they were promised when the Constabulary made the decision to roll out these devices. He clearly did not want to associate himself with a device that is disliked by many officers. The trainer's view is clarified in the following quote:

> *"A lot of false promises were made when they [Kelvin devices] were brought out. We couldn't add intelligence using the device which caused massive delays and disappointment. People don't use it, they are put off using it and they use the bare minimum."*
>
> (Trainer Officer, North)

The trainer was familiar with all the features to be presented in the session. He stated clearly that he disagreed that the dictation feature was useful, and he personally preferred typing using the Kelvin devices' keyboard.

5.8.1.2 Researcher Role

The training session was held in the police station's briefing room. The researcher sat facing both the trainees and the trainer, at one end of the briefing room (next to the IT staff member). The researcher was observing only for most of the training session. The only contribution was at the end of the session when she had to highlight that the Speech To Text feature can be used in any context that the keyboard can be used at.

5.8.1.3 Participants

Five front-line police officers attended the session. Two female officers and three male officers. All officers' ages ranged between 25 – 35 years old. One officer did not bring their Kelvin device to the session claiming it needs charging! An IT staff member attended the session to assist with the technical problems that may occur during the training and to provide support to the less IT-able officers.

5.8.1.4 Training Session's Mood and Physical Setting

The training was held in a spacious briefing room with a smart board. The chairs were arranged in rows. All participants hardly greeted each other when they entered the briefing room. The two female officers sat at one end of the room (close but not next to each other). An officer with many years of experience sat next to a young officer who had less than one-month experience as a police officer in the middle of the room. The fifth officer, who was both young and IT confident, sat at the other end of the room and worked on his own. The trainer sat on a chair in the middle of the room and all participants seemed to know him well. The trainer was talking in a friendly/formal manner to all officers before the start of the session. The general mood of the session was formal or neutral, where officers only talk if they are asked questions.

5.8.1.5 Training Session's Observations

The trainer started the session by acknowledging the limitations of the Kelvin devices. He told trainees that he was appointed to do this job by Superintendent [name] and that he was asked to use the PowerPoint presentation (prepared by the Superintendent) in the session. He started to read the first slide which presented the new features and improvements in the new devices (that will be delivered to officers in the very near future) to replace the current Kelvin devices. Trainees did not express any reaction to the PowerPoint's slide content. He moved on to present the first feature; Speech To Text. After showing officers how to access the microphone button, he told them that he was not a fan of dictating and he preferred typing using the Kelvin devices' keyboard. This was followed by a comment from the young IT confident officer stating that they did not see this feature working when taking witness statements as victims usually use some inappropriate language when giving a statement to police officers. One officer agreed with the young IT confident officer but added that in a nice, quiet environment this feature would work well. Another officer took part in the discussion and noted that in a straight forward statement, this feature can save much time.

The trainer asked all officers to practise using the Speech To Text feature in dictating a statement themselves using their devices. All officers were busy using the new feature except for the officer with many years of experience who paired with the young officer (because this officer did not bring their Kelvin device to the session). These two officers were unable to get the feature to work as they did not have a signal in the Kelvin device they shared. The senior officer started to make negative comments about the signal and the Kelvin devices generally.

The IT staff attending the session was unable to sort out the signal problem especially that other officers attending the training session did not report the same problem. This senior officer added “to be honest, it probably is easier for the likes of yourself [addressing the young officer sitting next to him] to text with both hands quickly. It is a generation thing. I was working with [officer name] one day and [they were] typing with both hands without looking [everyone laughs].” The young officer sitting next to this senior officer suggested [the old officer] should use the Speech To Text feature to overcome this problem but the senior officer replied that they prefer typing with one finger! (indicating that they will not use the dictation feature).

At this point, the trainer looked unconfident and asked the IT staff member whether this feature was active or disabled!! To which the IT staff member replied that it works well and all issues with this feature were resolved. The trainer quickly stated that he did not use the feature himself because he was not sure about its accuracy in picking different accents. No further discussions about possible different contexts where this feature can be utilised took place and the trainer moved on to presenting the second feature.

The second feature was adding ‘Person and Vehicle Information’ as objects in the Pronto application. The trainer noted that this feature was the one he uses frequently while on duty. He showed officers how to input people’s personal information using this feature and asked officers to copy him using their Kelvin devices. The young IT confident police officer confirmed the trainer’s positive views about this feature and stated that they use it frequently. This officer added that they explored this feature on their own and found it useful.

The female officers asked the trainer for help as they struggled at first to access the feature. The trainer was enthusiastic to share with them his own positive experiences and was giving them examples of the different contexts that he had used this feature efficiently in. The two female officers paired together and exchanged comments about the feature and how clever it was. Meanwhile, the senior officer (as they did not have their phone) was asking the IT staff member about the reason that their Kelvin device times out quickly (a problem not related to the training session plan). The IT staff member clarified that this problem can be rectified by adjusting the Kelvin device's settings. The senior officer quickly answered that they tried changing the settings but there was no difference. Then added that they were unsure if the device allowed them to change the settings! The IT staff member showed the officer how to adjust the settings using the IT staff's Kelvin device and asked the officer to send him the device if they were still unable to fix the time out problem on their own.

This was followed by a discussion using the 'frame of patterns' method to list the different contexts and tasks that can be performed using this feature. Finally, they were asked to practise inputting data (using the features and skills just learnt) using real-life scenarios (prepared by the Superintendent) to consolidate their learning of the features presented in the session. It was clear that officers spent few minutes thinking about how to input the data using the skills they just acquired.

The third feature was presented briefly, and a guidance information sent to officers by email (as they were called by their Sergeant to start their shift).

5.8.1.6 After the Training Session

The trainer shared with the researcher his viewpoints about the training delivered to officers. He praised the idea of offering officers some refresher training sessions on the various Kelvin devices' features. He claimed that this session was the first Kelvin training officers receive after the initial training conducted when the devices were rolled out four years back. He added that, within the four years of having the Kelvin device, he changed roles several times. Within each role, he used a subset of the features and a refresher training would certainly help officers (like him) refresh their memories of many useful features that they can make use of.

> "*People get set in the ways they use the Kelvin and a refresher could help in showing them how to use things especially things like that where people are shown difficult things. "*
>
> (Trainer officer, North)

> "*You don't get the time to really sit and think about what you are doing. I think you need to get well with doing the jobs. Sometimes a little refresher like that is really good."*
>
> (Trainer officer, North)

The researcher asked the trainer about the role of Sergeants in promoting the use of the Kelvin devices at the Constabulary. He claimed that Sergeants used to do quality checks on the Kelvin devices' pocket notebook application utilisation when the devices were first rolled out. They stopped doing these checks to cope with the growing workloads. He added that it is the responsibility of each police officer to use the Kelvin device in completing jobs.

A week after conducting the North training session, the researcher received feedback via SMS from some of the participating officers:

> *"I have just used the voice recording to complete a text entry on my Kelvin. It worked ok but picked up 4-5 things wrong that I had to amend."*
>
> (Police Constable 1, North)

It is worth mentioning that in this session, officers were not given examples of different contexts that they can use the dictation option in. Hence, this officer explored the feature and decided to use it in recording information in the pocket notebook application. It was briefly suggested in the session that the dictation can mainly be used to take witness statements.

Another feedback from the young IT confident officer:

> *"I have not used the voice feature on this device. I find it easier to just type my statements on to the device especially as the phone tends to learn the style of writing. But I used the vehicle information feature in issuing traffic tickets. It saved much time and was certainly efficient."*
>
> (Police Constable 2, North)

A feedback from the trainer officer:

> *"I regularly use the objects [person/vehicle information] within pronto which allows me to copy the information into the forms section so I'm happy with the way that works. As for the voice to text function. I have been tutoring a new student for the last few weeks so haven't been in a position to fully use it aside from when back in the van or office. I'm happy that it would be useful to use out on response."*
>
> (Trainer Officer, North)

5.8.2 West Training Session

5.8.2.1 Trainer

The researcher was informed of the date and location of the West training session one week in advance. No details about the trainer were provided. On the day of the session, the researcher arrived at West police station an hour before the start of the session to hold an interview with the trainer (who is also a super-user of the Kelvin devices) and to discuss the plan for the training. The trainer informed the researcher that he received an email from the Superintendent a day before the session and the researcher was shown this email. The email listed the Kelvin devices' features to be discussed in the session, asked the trainer to read the PowerPoint presentation (prepared by the Superintendent) and informed him that a PhD student from University of Cumbria will attend the session. The trainer did not use any of the Kelvin devices' features that he was about to present and was not aware that these features existed on his device. Because of the short notice, he was not able to find a colleague who has used these features to assist him in this job. Hence, the researcher presented the features to the trainer and offered to assist him in presenting the features to police officers. The trainer was an exceptionally friendly officer, radiating positive vibes and confident of our (himself and the researcher) ability to do the job. As it was the first time the researcher meets with the trainer who is also a serving police officer, the researcher was suspicious of the trainer's confidence and was worried about the quality of the training that will be delivered to West police officers.

5.8.2.2 Researcher Role

The researcher assisted the trainer in presenting the Kelvin devices' features to police officers. She used the knowledge collected from the North training session in demonstrating and presenting the Kelvin devices' features. Hence, the contribution of the researcher was limited to the first part of the session only; demonstrating the features. She also dealt with the IT technical problems in the session. After that, the researcher moved to a chair distant from the trainees to collect observations of the group's interactions (during the third part of the session).

5.8.2.3 Participants

Three front-line police constables (PC), one Sergeant and one Detective Sergeant attended the session (three female officers and two male officers). The ages of the five police officers ranged between 25 and 35 years old. The IT staff member was unable to attend this session due to other work commitments.

5.8.2.4 Training Session's Mood and Physical Setting

The training session was conducted in a medium-sized room (not a briefing room). The room had two desks at one end and a round table at the other end. The presence of a round table in the room facilitated team discussions as all officers sat facing each other. All officers greeted each other in a friendly way and chatted with the trainer. The trainer offered to get hot drinks to his colleagues. The three female officers sat next to each other and frequently paired together (they worked as a group in exploring the features) but they were also actively discussing the Kelvin devices' features with the rest of the group. The other two male officers (the police Sergeant and the Detective Sergeant) and the trainer officer worked on their own. They only paired if they wanted to show other officers the results of exploring a feature. They participated in the group chats but not as much as the female officers; they preferred to listen to the discussions. A friendly positive mood dominated the session all through. Officers were enthusiastic about learning the new Kelvin devices' features and seemed to enjoy the learning process.

5.8.2.5 Training Session's Observations

The trainer explained (in a very positive and friendly way) to his colleagues that he was assigned the job of training them on new features that he has not used before but assured them that the researcher is knowledgeable enough to train the attending officers. The researcher introduced the first Kelvin feature to trainees; Speech To Text. She encouraged them to practise accessing the feature using their devices. She also offered technical assistance to all attending officers to help them access the feature on their phones. The Detective Sergeant did not have the Speech to Text feature activated on their device and they were happy to pair with a younger police Sergeant who was sitting next to them on the round table. Officers' positive reaction to the accuracy of the dictation feature was remarkable. They all agreed that they will feed this feature back to their colleagues and bosses. They were surprised they had this feature on their devices for a long time, but they were not aware of its existence. The trainer officer expressed this view in the following quote:

> *"You [addressing the researcher] blew our minds!! The whole West area doesn't know about this feature. It is very user-friendly, we'll feed it back"*
>
> (Trainer officer, West)

Another officer added:

> *"I am amazed that we've had that and we didn't know about it. It would have saved massive time."*
>
> (Police Constable, West)

Officers were showing each other the quality of the text they dictated on their devices. The most experienced officer extended the use of the feature (during the session) to update logs and shared what they did with their colleagues. This officer seemed to have good IT skills in addition to vast experience in policing. They were also able to offer support to other female colleagues. Their input was highly acknowledged by all participating officers. This was followed by a constructive discussion about the contexts in which they can utilise this feature in. They used the 'frame of patterns' technique in this discussion. All officers believed that using the Speech To Text feature can enhance the witness statements' level of detail and quality which were affected by the Kelvin devices' small keyboard and officers' typing skills. One officer praised the feature as shown in the following quote:

> *"So that will make a BIG difference to us especially taking statements from victims. It will save a lot of time."*
>
> (Police Constable, West)

As the Detective Sergeant did not have the Speech To Text feature activated on their Kelvin device, their colleagues happily shared their devices with this DS to explore the feature. The Detective Sergeant noted finding this feature particularly useful as they do not prefer typing on the Kelvin devices' small keyboard.

The researcher presented the second feature; 'Copying Person and Vehicle Information' to officers. Officers actively and enthusiastically practised using the feature using their devices. This was followed by another discussion (using the 'frame of pattern' technique) identifying different contexts and tasks that officers can make the best use of this feature to save time and be more efficient. All officers participated in this discussion, sharing examples of jobs they performed and using their policing experiences extensively.

The experienced officer perceived this feature as less useful especially that their current role did not involve dealing with regular persons who they would use their personal information frequently to fill in other forms. These comments were quickly echoed in the session. An officer expressed their view by saying:

> *"That is not massively fantastic to use! Statements drop off eventually, so we won't be able to use them to copy over"*
>
> (Police Constable, West)

The Detective Sergeant commented that their role, sometimes, involved revisiting victims and taking multiple statements and this feature can save them the time spent in asking victims about personal information required for the first part of the witness statement form.

The third feature (S Note) was presented briefly, and a guidance information sent to officers on the next day by email. At the end of the session, all officers practised using the features using real-life scenarios prepared by the Superintendent. They spend a few minutes in reading and inputting the scenario's data to their devices. All officers praised being able to practise using Kelvin features in the training session. This view was noted by one of the officers as shown in the following quote:

> *"It's always better to see in use! Fantastic training session!"*
>
> (Police Constable, West).

5.8.2.6 After the Training Session

The participating officers' feedback about the session was positive and it was clear they were all happy to have attended this session. The researcher had many queries about the key factors that contributed to the successful delivery of the features. For instance, are the officers who attended the session exceptionally friendly and possess positive attitudes about the Kelvin devices? Do senior officers at West promote a culture of learning which can explain officers' enthusiasm to learn the new features? Besides, officers mentioned in the training session that they receive a weekly police training and agreed that these features should be presented to their colleagues in these sessions. It was unclear whether these training opportunities are also conducted in North and South or not.

Therefore, the researcher sent an email with all her queries to the trainer at West. He confirmed that a weekly training is conducted in all Areas (not only at West). The training goes on throughout the year and covers a multitude of topics. They are conducted on a five-week rota. Hence, every five weeks, officers had new topics covered. It is usually a two-hours training and it sometimes covers more than one topic.

He added that the officers who attended the training session were the available officers at the time of the training session (fulfilling the age criteria) and were not chosen to fit any predefined criteria (i.e. IT skills).

> *"As a general rule officers are happy to learn when the thing they are learning is of a benefit to their role. I think this then changes when we are asked to learn something which in the officer's eyes is not relevant to their role, does not help their role or worse of all is a hindrance to the role they carry out"*
>
> (Trainer officer, West)

> *"I have already started spreading the good word about the dictation option on Kelvin's and have demonstrated to anyone and everyone I have*

come across. I suspect it will take several months to get bedded in but am hopeful people will eventually use this as the norm as oppose to the exception"

(Trainer officer, West)

The researcher received an email dictated by the Detective Sergeant at West to inform her that they contacted IT support at the Constabulary and got the dictation feature enabled on their Kelvin device. The Detective Sergeant added:

"It was really lovely to learn something of significant value. the first thing I did when I returned to my office was to cascade the learning down to all the members of my team and to show them how to use it, this was on the understanding that they would show others. I had to visit our IT people to have the microphone enabled on my own device and once it was I performed quite a lot of audio input messages"

(Detective Sergeant, West)

Another SMS feedback was dictated by two officers:

"Just wanted to give you an update regarding the dictation function on our Kelvin devices. I have found this very useful and very easy to use. You can easily add punctuation to texts and it makes taking a statement a lot quicker.

The only downfall I have found is that I think you need to be connected to the Internet for it to work (unless it's just my Kelvin playing up!). I have *passed this information on to other officers and none of them were aware of the dictation function and they have stated they believe it will significantly improve their statement."*

(Police Constable 1, West)

"Considering we have had the devices for what 4 years?? Your short input I learned quite a bit and it is all very helpful. The speech to text is really good." (Police Constable 2, West)

After one week of the training session, the Detective Sergeant circulated the following email to all the participating officers and to the researcher:

"I've been using the punctuation in the input..

I use "full stop" to show a period, I can't get with the American language.

I prefer colour over color, unless of course I'm using some HTML programming.. I used "New line" to put a break in, and in fact I've used, "new line, new line" to put a paragraph in.

I'll keep using it as it truly is excellent. My personal mobile is a Samsung S9, and I use it on that now as well."

(Detective Sergeant, West)

Three weeks after the training session, the West trainer informed the researcher that he delivered a short training on the use of the dictation feature to all West officers.

5.8.3 South Training Session

5.8.3.1 Trainer

The researcher met the trainer an hour before the session. He was a super-user and a serving police officer. The trainer delivered the First Aid application training (a Kelvin device application) to police officers at South. He was sent an email two days before the training session by his Sergeant asking him to do some Kelvin training. He was not briefed about the features to be presented in the session and was not given the PowerPoint presentation that he should use. The IT staff member who attended North session was present to provide technical assistance to the trainer and trainees if required.

The researcher informed the trainer about the first feature to be presented; the Speech to Text feature and immediately the trainer reacted negatively to using this feature claiming that it was not practical and will not work! The researcher explained that other officers can find this feature useful and shared with him her experience at West training session. The IT staff member confirmed the researcher's viewpoint about the dictation feature and showed the trainer how the second feature works. The trainer clearly did not know that both features existed on his Kelvin device.

The researcher explained the structure of the training session and asked the trainer to encourage officers to support each other and work together in teams. As the trainer did not have a copy of the PowerPoint presentation, the researcher forwarded him a copy to be presented in the session. There were some technical problems in getting the computer connected to the smart board to work. These problems delayed the start of the session nearly fifteen minutes.

The trainer stood far from the participating officers during the session (isolating himself from the audience) and did not join in their discussions.

5.8.3.2 Researcher Role

The session was held in a briefing room like the North session's briefing room. The researcher sat at one corner of the room, facing both trainees and trainer. She was observing officers' interactions during the first part of the training session. The researcher noticed that there were many side talks that distracted officers from keeping good attention to the features presented and certainly from practising using them. Consequently, she had to switch to active observation and try to direct officers' attention back to the training session. She kept offering help and support to officers who were having side talks and tried to ensure that all officers practised using the different features. Besides, at the end of the session, she had to highlight the different contexts that officers can utilise and benefit from using the Speech to Text feature.

5.8.3.3 Participants

Twelve police officers attended the training session (initially sixteen officers came to attend the training but after nearly half of the session, four officers were called by the control room to do urgent jobs). It was not possible to ask some officers to leave the training session (many of them were enthusiastic about learning the new features). Five female officers and seven male officers attended the training session. All officers are front-line serving police constables. The ages of the female officers ranged between 28 and 35. Seven male officers' ages ranged between 24 and 35.

5.8.3.4 Training Session's Mood and Physical Setting

In this session, female officers sat together on the left side of the room. They worked as a group and paired together frequently. The IT staff member moved to sit next to them as they needed more technical support and help than the rest of the officers. Before the start of the session and while fixing the white board's technical problem, young male officers chatted together and exchanged good humour. They started asking the trainer about the Kelvin devices' features that he will present. His reaction clearly showed he was not happy to do this job.

> *"I've been given this on Monday, I didn't have any input what so ever and it just has to do with Kelvin device [everyone laughs]"*
>
> (Trainer officer, South)

During the training session, older male officers (sitting close to the young male officers) paired with them only if they needed technical help with the device. Generally, there were many side talks during the training session. It was difficult to control the session and the trainer delegated most of the training to the IT staff member. The negative comments about the Kelvin devices (as will be highlighted in the next section) that preceded the start of the session reduced the enthusiasm of participating officers about the new features.

5.8.3.5 Training Session's Observations

The trainer asked both the researcher and the IT staff member to introduce themselves. This was followed by the trainer asking the participating officers about their opinions of the Kelvin devices and encouraging them to tell him about their viewpoints. This was a clear deviation from the training session's plan and contributed to setting a negative mood to the session (especially that the training involved presenting features of a device which officers expressed negative attitudes towards). Ultimately, officers spent nearly twelve minutes listing all the problems and the barriers to using their devices. Some officers commented on their preference of using their paper pocket notebooks and started to tell other officers about their negative experiences with their Kelvin devices. The IT staff member interrupted these discussions and presented the third feature; using the S Note (this feature mimics officers' paper notebook). This quickly got the officers busy, trying to access and use the new feature and most of them were happy experimenting with their devices. The IT staff member was facilitating the use of this feature and offering help to many officers. A constructive discussion using the 'Frame of Patterns' technique about the different contexts that this feature can be utilised in enabled officers to appreciate the benefits of using this feature.

When it was felt that participating officers were ready for the next feature to be presented, the trainer started to read the first slide of the PowerPoint presentation which informed officers about the new generation of Kelvin devices and the anticipated advanced features. Many officers asked the IT staff member about the new features incorporated in the new devices in an ironic way expressing their doubts that the new generation of Kelvin devices will be better or will be rolled out in the near future as the PowerPoint slide claimed.

Then, the trainer moved on to the Speech To Text feature and presented it to officers. Many officers were happy to explore the feature using their Kelvin devices. The researcher noticed that one young officer did not want to practise the dictation feature using their Kelvin device. The researcher tried to find out the reason for resisting to use the feature. The officer answered that they prefer typing using the device's keyboard and is not going to use this feature.

Other officers were busy talking to their colleagues. The researcher felt the need to convert the attention of those officers (who were busy with their side talks) to the session again. She asked them to share their viewpoints about the dictation feature and offered to help those officers. The IT staff member was busy helping the group of five female officers as they were keen to use the feature in the session and kept asking him questions enquiring about how to use the dictation feature efficiently. There were other officers (especially the older officers) in the session that needed help. One young IT confident officer volunteered to help those officers. At this point, the session was very noisy and difficult to control.

The IT staff member interrupted the noise and presented the third feature (copying person and vehicle information to different forms) to participating officers. Officers practised using this feature on their devices. This was followed by a discussion of the different contexts that this feature can be best utilised in (using the ‘Frame of Patterns’ technique). Many officers were enthusiastically contributing to the discussion. The trainer joined the discussion and clearly stated he did not prefer to use this feature as he believed it is not practical. Then officers were asked to practise the features using real-life scenarios. At the end of the training session, the researcher acknowledged the attending officers’ knowledge and input during the session and asked them to feedback to her their positive and/or negative experiences with the different features presented in the session.

5.8.3.6 After the training session

The researcher was worried that some officers might have missed important information about the different features presented in the session, especially that the session was a bit noisy and there were many distracting side talks. She decided to send some guidance information highlighting how to add punctuation marks to the dictated text, the possible different contexts that the Speech To Text feature can be efficiently utilised and similar information about the second feature (copying person and vehicle information to different forms) to all participating officers.

Two days after the South training session, SMS feedback from some officers was received.

> *“I tried using the voice facility whilst taking a statement. It said it couldn't connect to Google. I have tried again to use it this morning to construct this message from within the police station and got the same message.”*
>
> (Police Constable 1, South)

"I am using the person/ vehicle feature regularly now. It's very useful."

(Police Constable 2, South)

5.8.4 Online Survey

5.8.4.1 Methodology

An online survey was developed using the Bristol Online Survey tool to collect feedback about the training sessions. The Bristol Online Survey tool was used as it is fully compliant with the UK data protection laws and does not have a restriction on the number of participants. A total of 18 (out of 24 officers who attended the training sessions; 75%) officers (16 Police Constables, 1 Detective Sergeant and 1 Sergeant) participated in the survey. Total number of officers who participated in the survey who are based at North are 4, 8 at South and 6 at West. A copy of the online survey is presented in Appendix 2. Participants demographics data are shown in table 1.

Area	Gender	Age
North	M	31
North	M	29
North	M	33
North	F	35
North	F	25
West	F	26
West	F	30
West	F	31

West	M	31
West	M	35
West	M	33
South	F	28
South	F	22
South	F	23
South	M	26
South	M	29
South	M	24
South	M	25

Table 5.1 Participants' Responses Demographics

5.8.4.2 Survey Results

100% of the participating officers either agreed or strongly agreed that being able to practise the technology features in the training session helped them appreciate the ease of use of the features presented. All officers agreed or strongly agreed that being able to practise the feature in the training session helped them appreciate the usefulness of the feature. 88.9% agreed or strongly agreed that practising the feature in the session boosted their trust in the feature. 83.3 % of officers claim that when they use a reliable feature they share their experience with their colleagues. 100% of officers believed that using real-life scenarios in the training session consolidated their learning of the features presented. 100% of officers agreed/strongly agreed that presenting useful and reliable technology features encourage officers to use them. 88.9% of the officers believed that the discussions about the different contexts that a feature can be used in extended their knowledge about the feature. 94.4 % believed that discussions about the different contexts that a feature can be utilised in helped them appreciate the usefulness of the feature. 90% found the features presented in the training sessions useful. 61.1 % of officers found information circulated in emails and newsletters about technology features useful.

Officers' features arrangement in the order of usefulness are as follows:

Area	**Gender**	**Features**
North	Male	Person/Vehicle Information, S Note, Speech to Text
North	Female	Person/Vehicle Information, Speech to Text, S Note
North	Female	Person/Vehicle Information, S Note, Speech to Text
North	Male	Person/Vehicle Information, S Note, Speech to Text

Area	**Gender**	**Features**
West	Female	Speech to Text, S Note, Person/Vehicle Information
West	Male	Speech to Text, S Note, Person/Vehicle Information
West	Female	Speech to Text, Person/Vehicle Information, S Note
West	Female	Speech to Text, Person/Vehicle Information, S Note
West	Male	Speech to Text, Person/Vehicle Information, S Note
West	Male	Speech to Text, S Note, Person/Vehicle Information

Area	**Gender**	**Features**
South	Male	Person/Vehicle Information, S Note, Speech to Text
South	Male	Speech to Text, Person/Vehicle Information, S Note
South	Female	Person/Vehicle Information, S Note, Speech to Text

South	Male	Person/Vehicle Information, S Note, Speech to Text
South	Male	S Note, Person/Vehicle Information, Speech to Text
South	Male	S Note, Person/Vehicle Information, Speech to Text
South	Male	Person/Vehicle Information, Speech to Text, S Note
South	Female	Person/Vehicle Information, Speech to Text, S Note

Participating officers' suggestions on how to improve technology training in the Constabulary:

Area	Gender	Comment
South	Male	Scrap the idea of ' Super-users' and give everyone the same level of training, as 'Super-users' rarely have time to pass that information on or are not always around when its needed.
South	Male	I feel hands on training, with smaller training groups are more beneficial. online learning packages are not much good for people who can't fully grasp IT. You can't seek clarification to better understand a difficulty/question you have and if you're not IT literate you can struggle with the online course itself. Smaller groups allow for clarification questions to be asked/answered without fear of individuals feeling pressured due to their lack of knowledge
South	Female	More practical, less PowerPoint

West	Female	More training needed for all officers to make them aware of the useful features as many officers are still unaware.
North	Male	Make more stuff useful for us as operational officers.
West	Male	The training needs to be relevant to the real world. I understand that [name] Constabulary who we are partnered with through [application name] don't routinely give IT training. However, unless you are interested in tech (like myself) you miss valuable shortcuts and inputs that can improve your productivity.
West	Female	Better training and information
West	Female	More regular training. Training close to the time new technology is going live so that it's not forgotten.
West	Male	Rolled out to all staff to make them aware, potentially in Wednesday training sessions
South	Male	more training for officers
West	Male	Demonstrations of features and small quick training sessions which are more personal
North	Female	The kelvins should be designed with a better power life, and more training on the useful features which would be used everyday would be beneficial
South	Male	More of it when relevant
South	Male	Include more real-life scenarios in the training session which will help consolidate my learning of the features presented
South	Female	More kelvin work in training

North	Male	More training with those responsible for issuing the technology so that any feedback or decisions made can be given directly

Officers' comments about using the Speech To Text feature three weeks after the training session:

Area	Gender	Comment
North	Male (Young IT confident Officer)	I don't and won't use dictation
North	Female	Updating kelvin in free text
North	Female	When making notes in the PNB
North	Male (Trainer)	Have not used it

Area	Gender	Comment
West	Male (Detective Sergeant)	The speed in which i am able to have my spoken word created into texts, and the accuracy in which it does this.
West	Female	Writing statements and pocket note book entries
West	Female	Being able to speak without having head down typing.
West	Male	Useful when completing long documents but will depend on how it integrates with different dialects.
West	Male (Trainer)	Statements

Area	Gender	Comment

South	Male	Easy access to information checking
South	Male	I have previously enquired about this feature in the past with a view of assisting in recording any lengthy written documentation i.e. statements. I find it difficult and a great hindrance recording such documents on a mobile phone device. So much so that following taking part in the portable keyboard exercise some time ago, I have purchased my own use keyboard for use with my kelvin. Since the training I used the speech dictation feature to document a first account in my kelvin from an assault victim and it greatly sped the process up
South	Female	It still has not successfully worked on my device.
South	Male	Not at all does not understand my accent
South	Male	Not very good
South	Male	Never really use it but possibly first accounts
South	Male (Trainer)	Allowed for an entry to be made quickly on features. This saved typing out and I was able to concentrate on other things visually at the same time.
South	Female	I don't

Officers' comments on the training sessions:

Area	**Gender**	**Comment**

North	Male (IT confident Officer)	Unfortunately, I knew everything the training offered so it didn't give me any additional information. I did however like giving feedback on things we could change.
North	Female	Helpful session
North	Male (Trainer)	Good exchange of views on how others use the technology. Good to share positives and negatives on the system.

Area	**Gender**	**Comment**
West	Female	Useful and informative
West	Male	Thoroughly enjoyable and I have continued to use the skills I was given on the training session. Not just at work but at home also. Loved the input thank you very much.
West	Female	Very useful and the trainer was very knowledgeable
West	Male	Found out a very useful aspect of kelvin device in the dictation feature.

Area	**Gender**	**Comment**

South	Male	I was a little confused about what we were getting out of it or what the training was meant to focus on.
South	Female	Small regular inputs like this are more helpful
South	Male	Difficult to carry out as different people deal with technology differently and may be at different stages when dealing with it.

5.9 Summary

In this chapter, officers' training needs are identified and the set of Kelvin devices' features to be presented in the training sessions are delineated along with explanations for these choices. The design and layout of the sessions are discussed in detail. Furthermore, the researcher's observations of the learning process are presented. All observations undertaken in the three Areas (North, West and South) were classified into: trainer, researcher role, participants, training session's mood and physical settings and training sessions' observations.

Besides, the feedback collected via emails or SMS straight after the training sessions are presented. In addition, the feedback collected via an online survey three week after conducting the three sessions is analysed to facilitate understanding the key determinants of a successful training session that boost officers' learning and reduce technology resistance to the Kelvin devices at the Constabulary.

Chapter Six - Discussion

6.1 Introduction

Technology training has received scant attention in research studies despite being one important precursor to individual-level technology infusion in organisations (Jasperson et al., 2005; Ali et al., 2016; Haddara and Moen, 2017; Bhattacherjee et al., 2018). Therefore, the analysis of the data collected in chapter five is presented in this chapter. This analysis aims to extend our current state of knowledge about how to conduct effective technology training sessions that not only mitigate learners' resistance to technology features but also enable organisations to realise the anticipated benefits of the adopted technology.

Additionally, this study reports on gender differences that can impact on the learning process during technology training sessions. Gender differences in IT perceptions are more noticeable among older workers as claimed by Morris et al. (2005). Levy (1988) argues that studies of gender differences can be misleading without reference to age. Age has been shown to adversely impact employees' perceived behavioural control (PBC) over technology use through an increase in computer anxiety (Chua et al., 1999; Mikkelsen et al., 2002; Elie-Dit-Cosaque et al., 2011). PBC has a significant influence on intentions of IT utilisation (Venkatesh, 2000; Ajzen, 2002; Venkatesh et al., 2003; Morris et al., 2005; Elie-Dit-Cosaque et al., 2011). Research studies have noted that subjective norms and PBC strongly influence older workers both at the adoption stage and at the post-adoption stage, although the effect of subjective norms diminishes over time (Morris and Venkatesh, 2000). Hence, in this study, officers' age is a control variable, thus, all officers' ages ranged between 25-35 years.

This study posits and evaluates a Fit Appropriation Model for Training (FAMT) to create a learning environment that bridges the gaps in officers' technical knowledge and skills, enables them to use their work experiences to link the technology features to tasks and to relevant contexts, in addition to, consolidating the learning process through using real-life scenarios for practice. A comprehensive discussion and analysis of the conceptual design of FAMT is presented in this chapter. In addition, the key factors that influence the learning process during technology training are highlighted.

6.2 The Impact of Top Management Support on Officers' Post-adoption Technology Utilisation and Job Satisfaction

Institutional factors in the form of top management support have positive impact on employees' beliefs about the usefulness and ease of use of technology in organisations (Lee et al., 1995; McNish, 2002; Lewis et al., 2003; Wang et al., 2015). This is manifested through top management commitment and support to overcome obstacles in learning through training and IT support (Lewis et al., 2003; Jasperson et al., 2005; Wang et al., 2015). Based on the results of the pilot study, 64% of officers believed that the Constabulary tends to adopt technologies that are often not useful and 61% were not satisfied with how new technologies are implemented at the Constabulary. Moreover, only 23% of officers believed that in the Constabulary, officers who use technology in creative or innovative ways are more likely to be rewarded than those who do not. 58% disagreed that after implementing a new technology, the Constabulary provides sufficient help and support to employees who are experiencing problems with it. 84% disagreed that before implementing a new technology, senior managers work hard to get input from officers. Hence, the lack of management commitment to provide much needed technical support to officers (Hirschheim and Newman, 1988; Kashefi, 2014), the inability to incorporate officers in the implementation and decision process (Elie-Dit-Cosaque et al., 2011;

Haddara and Moen, 2017; Bhattacherjee et al., 2018), the diminished use of rewards and incentives (Bhattacherjee, 1998; Lapointe and Beaudry, 2014) have contributed to officers' inability to appreciate and perceive both the ease of use and usefulness of the Kelvin devices' full range of features.

Besides, 71% believed that the Kelvin devices did not enhance their job satisfaction. This disappointment has led officers to use a small sub-set of the Kelvin devices' core features; the ones they perceive as reliable, useful and an efficiency booster (i.e. taking photographs, e-signature, checking logs, google maps). Core features are the ones that if removed or altered, an overall change to the nature of the technology occurs (Griffith, 1999). Thus, the Kelvin devices' functionalities did not meet officers' expectations which adversely affected officers' satisfaction with the Kelvin devices (Staples et al., 2002) and ultimately impacted on their job satisfaction (Lee et al., 1995). Moreover, at the time of the field study, the Constabulary had resumed using pocket paper notebooks again to stop officers buying their own notebooks as this could undermine cases in courts. All these factors can explain why officers at both North and West did not perceive the features of the new generation of Kelvin devices (presented to them in the first slide of the Superintendent's PowerPoint presentation) as an opportunity that can enhance their performance and ultimately, did not react positively to the information presented to them. Additionally, officers at South, expressed their doubts that the new generation will be rolled out in an ironic way. These negative beliefs and attitudes were formed over four years of hands on experience with the Kelvin devices. Strong empirical evidence supports the direct impact of past behaviour on future intentions and behaviours (Eagly and Chaiken, 1993; Ouellette and Wood, 1998). Hence, officers' negative beliefs and attitudes towards the current generation of the Kelvin devices can potentially guarantee future resistance to the new devices. Therefore, management interventions are crucial to disrupt the formation of deep, non-reflective mental scripts as they can help officers use many features in an innovative way, learn new features or discover new uses of existing features (Jasperson et al., 2005).

The benefits of using effective training techniques as a useful management intervention tool can promote the formation of positive beliefs and attitudes among users which can ultimately influence both the perceived ease of use and perceived usefulness of the technology adopted (the two main predictors of technology adoption) (Agarwal and Prasad, 1999; Amoako-Gyampah and Salam, 2004). These training interventions can enable users to gain hands-on experience of the system (Bhattacherjee, 2001; Jasperson et al., 2005; Saeed and Abdinnour, 2013; Haddara and Moen, 2017); hence, allowing them to explore both the technical and the functional perspectives of the technology (Amoako-Gyampah and Salam, 2004). It is worth noting that the initial Kelvin devices' training delivered to officers at the time of the roll out of the devices did not encompass any hands-on experience and the various Kelvin devices' features were presented in a lecture style.

Furthermore, for interventions, in general, to influence individuals' cognitive processing and trigger the sensemaking process, three types of stimuli are highlighted by Louis and Sutton (1991). Firstly, the situation must be unfamiliar or novel. Secondly, the individual must sense a discrepancy between reality and expectation. Thirdly, there has to be a deliberate initiative to induce individuals to regard their behaviour. Thus, the technology sensemaking process can be influenced by managing both the technology features and the user background (i.e. user experience and training) (Griffith, 1999). Therefore, FAMT incorporates Behaviour Modelling Training techniques in presenting new Kelvin devices' features (features not presented to officers in their initial Kelvin devices training) to accommodate for the first two types of stimuli highlighted by Louis and Sutton (1991). As for the third type of stimuli in Louis and Sutton's (1991) model, officers used their prior policing experiences and technology knowledge to link the features to different contexts and consolidated their learning by applying the new features and skills acquired to real-life scenarios. To influence officers' cognitive processing and to trigger better technology sensemaking, the design of a technology training model (FAMT) is presented in the next section.

6.3 Fit Appropriation Model for Training (FAMT) Design

6.3.1 Using the Fit and Appropriation Model Concepts in FAMT's Design

The Fit Appropriation Model (FAM) developed by Dennis et al. (2001) enhanced users' performance and led to more satisfied participants. The authors used the Task Technology Fit Theory (Goodhue, 1995; Goodhue and Thompson, 1995; Zigurs et al., 1999) and the appropriation concepts based on the Adaptive Structuration Theory (DeSanctis and Poole, 1994; Wheeler and Valacich, 1996) to enhance the utilisation of newly adopted Group Support Systems (GSS) in organisations and boost users' performance. Dennis et al. (2001) argue that by achieving two fits (IT-Task and IT-user) through using the Task Technology Fit (IT-Task) and appropriation support (IT-user), organisations can enhance GSS outcomes effectiveness (i.e. decision quality) and improve work processes. Despite the importance of achieving a good fit between the task and the technology features, it is the use of these features that affect performance, not the fit itself (Todd and Benbasat, 2000; Dennis et al., 2001). Hence, the importance of providing appropriation support to facilitate the faithful appropriation of technology features and promote incorporating these appropriations to users' habitual routines and norms (Dennis et al., 2001).

Fuller and Dennis (2009) extended FAM by introducing time to the model and argued that over time, teams with poor-fit between tasks and technology appropriate their use of technology in different ways to improve their performance. The pilot study results contrast with Fuller and Dennis's claim (2009) as officers at the Constabulary, over time, reverted to their old methods of performing tasks rather than appropriate their use of the Kelvin devices' features. In Fuller and Dennis's study (2009), users performed social appropriations to overcome the poor-fit between the task and the technology. Prior technical skills did not impact on the appropriation process as GSS are generally easy to use and are designed to facilitate social interactions between group members to improve the quality of decisions in organisations. However, at the Constabulary, good IT skills are essential for performing tasks efficiently using the Kelvin devices' features. Unfortunately, at the Constabulary, IT support is limited to day shifts only. Besides, it is unpractical to call IT support when officers encounter technical problems during day shifts while dealing with serious incidents or members of the public. Hence, officers were unable to bridge the technical skills gap through the appropriation process. Therefore, the appropriation support provided to users must be in congruence with their needs, skills and context of technology use. Only then, users can faithfully appropriate the technology and overcome its' limitations. This is consistent with Fuller and Dennis's (2009:5) claim that prior knowledge and experiences of team members can constrain the appropriation process as individuals attempt to appropriate "structures that are salient to them based on their level of knowledge and familiarity with the structures from prior use" (Fuller and Dennis, 2009:5).

Therefore, to engender positive attitudes and faithful appropriations of the Kelvin devices and to mitigate officers' resistance to using the full range of features, a conceptual model for technology features training (FAMT) was designed by modifying the Fit Appropriation Model posited by Dennis et al. (2001) as shown in figure 6.1.

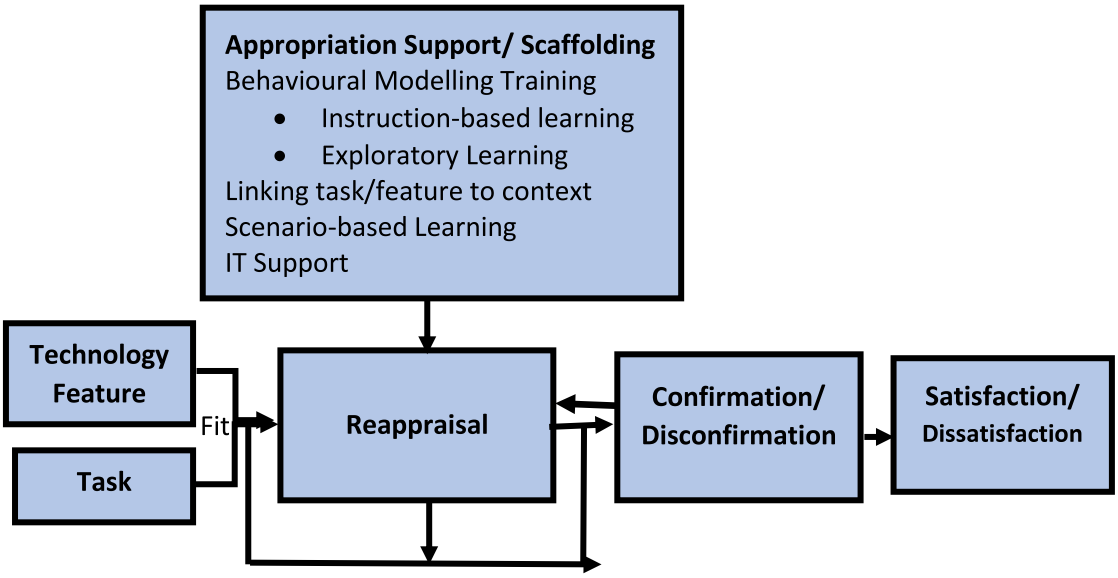

Figure 6.1 Fit Appropriation Model for Training (FAMT)

6.3.2 Fit Appropriation Model for Training (FAMT) Design

The fit and appropriation process depends on how users/learners appropriate technology's features and the social structures that affect the use of the technology (Orlikowski, 1992, 2000; DeSanctis and Poole, 1994; Tyre and Orlikowski, 1994; Wheeler and Valacich, 1996; Majchrzak et al., 2000; Barki et al., 2007). A good fit without the needed appropriation support is less likely to improve performance (Dennis et al., 2001). To ensure a good fit between the feature of the mobile technology and the task, the feature must fit with different work contexts. This entails extensive testing of the features before the training session and highlighting its strengths and limitations in different work contexts. For instance, some features are signal-dependent, others can be used offline. Realistic strengths/limitations must be clarified and shared with the learners during the training session to avoid any disconfirmation of expectations and resistance after the training. Confirmation or disconfirmation of users' expectations is a key factor that impacts individuals' satisfaction in the post-adoption stage of using an IS

(Bhattacherjee, 2001; Staples et al., 2002; Thong et al., 2006; Saeed and Abdinnour, 2013; Wang et al., 2015).

Besides, appropriation support or scaffolding are means of enforcing the faithfulness of the appropriation process (Gupta and Bostrom, 2009; Gupta et al., 2010) as they ensure a fit between the feature and the user. Faithfulness of the appropriation process leads the users/learners to use the system in the same way as the designers' initial defined processes (Wheeler and Valacich, 1996). FAMT incorporates several appropriation support methods like behaviour modelling training techniques (instruction-based learning and exploratory learning), IT support and collaborative learning methods (namely, problem-based learning and scenario-based learning) to achieve the meaningful learning process outlined by Mayer (1981), thus, intensifying the learners' ability to apply knowledge to new situations or contexts (Davis and Bostrom, 1993).

Furthermore, appropriation support has a direct impact on users' satisfaction as it can eliminate the frustration developed when trying to apply an 'unfamiliar technology process' as argued be Dennis et al. (2001:185). Using these appropriation support methods in technology training can foster positive reappraisal of the adopted technology in addition to learners' expectations confirmation which ultimately leads to higher levels of satisfaction (Bhattacherjee, 2001; Staples et al., 2002; Beaudry and Pinsonneault, 2005; Thong et al., 2006; Bhattacherjee et al., 2008, 2018; Rivard and Lapointe, 2012; Saeed and Abdinnour, 2013; Wang et al., 2015) and elevation of perceived usefulness of the technology features (Bhattacherjee, 2001; Wang et al., 2015). Empirical evidence has shown that post-acceptance satisfaction is accurate and robust as it is based on users' first-hand experience with the IS (Bhattacherjee, 2001; Thong et al., 2006; Bhattacherjee et al., 2008; Wang et al., 2015). Users' IS satisfaction has strong impact on their job satisfaction as empirically proved by Lee et al. (1995). When learners are satisfied with the technology features, they will alter their post-adoptive behaviours accordingly leading to better performance, enhanced utilisation and more exploration of various system's features (Jasperson et al., 2005; Saeed and Abdinnour, 2013). Hence, users' IS satisfaction is a more accurate dependent variable than technology use, especially in mandatory settings where users have no choice other than to use the organisation's Information System regardless of their self-efficacy, personal preferences and intentions of technology use (Koh et al., 2010).

Therefore, FAMT adopts FAM concepts, Behaviour Modelling Training techniques (Bandura, 1977a; Yi and Davis, 2001), IT support and collaborative learning methods that are based on the principles of Adult Learning Theory of Andragogy (Barrows, 1996; Knowles, 1980, 1984, 1990; Wood, 2004; Werth, 2011;) to create a learning environment that bridges the gaps in technical knowledge and skills, enables learners to use their work experiences to link the technology features to tasks and to relevant contexts, in addition to, consolidating the learning process through using real-life scenarios for practice. Thus, the second objective of this research study is accomplished; to design technology training sessions that mitigate officers' resistance to efficient utilisation of the Kelvin devices' features.

6.4 Technology Training Design

The development of technology training programmes involves three phases: pre-training phase, formal training (includes training methods and the learning process) and post training (Compeau et al., 1995; Gupta et al., 2010) as mentioned in section 2.3.2 and illustrated by figure 2.4. The authors argue that the effectiveness of the training depends on the training methods and the learning process; the second phase. The key findings of this study demonstrate that even though the same technology features were presented using the same training techniques in the three sessions (North, West and South), the learning outcomes varied significantly across the three Areas. The key factors that influenced the learning process across the three sessions will be discussed in detail in the next sections.

6.4.1 The Pre-Training Phase

The pre-training stage or initiation phase deals with the epistemological perspectives of the training programme and identifying learners' training needs (Compeau et al., 1995).

6.4.1.1 Identifying Epistemological Perspectives for the Training Sessions

Epistemological perspectives focus on different knowledge states and learning outcomes (Gupta and Bostrom, 2009; Gupta et al., 2010). The epistemological perspectives adopted for this study's technology training programme are: cognitivism learning and collaboration learning as shown in figure 6.2 below. Cognitivism learning is conducted through the adoption of behaviour modelling training techniques while collaboration learning is achieved through group discussions that incorporate the frame of patterns technique (Zigurs and Khazanchi, 2008), problem-based and scenario-based learning methods.

The cognitivist perspective focuses on the cognitive processes used in learning where learning involves "processing instruction input to develop, test and refine mental models in long-term memory until they are effective and reliable enough in problem-solving situations" (Leidner and Jarvenpaa, 1995:269). Collaboration learning assumes that teams collaborate to construct new ideas based on prior experiences and knowledge (Yarusso, 1992). Thus, each reality is different as it is based on learners' experiences and biases (Yarusso, 1992). Therefore, the cognitivism perspectives fit with the learning outcome of enhancing officers' cognitive mental models during learning the new features while team collaboration consolidates the learning process by linking the feature to specific work contexts, thus, incorporating officers' policing experiences in their roles and their IT skills.

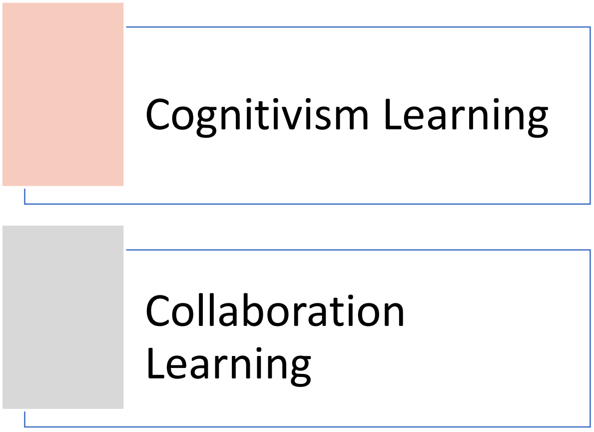

Figure 6.2 Epistemological Perspectives of FAMT

6.4.1.2 Identifying Officers' Training Needs

Based on the pilot study results, the key barrier to the Kelvin devices' adoption at the Constabulary is officers' dissatisfaction with some of the devices' core features. This dissatisfaction led to a disconfirmation of their expectations which impacted on the devices' perceived usefulness aspects. This is consistent with Bhattacherjee (2001), Bhattacherjee and Premkumar (2004), Jasperson et al. (2005), Saeed and Abdinnour (2013) and Wang et al. (2015) findings. In this study, officers reported finding some of the core features of the Kelvin devices useful such as taking photographs, e-signatures and reading/updating logs. Two main core features were resisted; writing witness statements and using the pocket notebook application. Both features are highly dependent on the use of tangential (optional technology features not the main defining features of the technology (Griffith, 1999)) features like using the keyboard (74% of officers in the pilot study's online survey did not find typing using the Kelvin devices' keyboard to record information an easy job) and having to input three sets of passwords to record an exhibit in the pocket notebook application. Hence, the choice of presenting new alternative tangential features like the Speech to Text and S Note features to officers in the training sessions. Dictating witness statements using the Speech to Text feature can speed up this task, in addition to allowing officers to use the Kelvin devices while being visually aware of their surroundings; hence, enhancing officers' safety. Similarly, using the S Note feature can eliminate the frustration caused by inputting three sets of passwords and boost officers' efficiency.

Another tangential feature; the Person/Vehicle Information feature was added to the training programme to enhance the quality of data recorded and synchronised to police databases (58% of officers in the pilot study's online survey are not satisfied with the quality of information that they access using the Kelvin devices) and boost officers' efficiency by eliminating the need to ask members of the public to repeat their personal information several times to fill in different forms. Information quality is a key variable in Delone and McLean's (2003) Information System success model (the success model's aim is to predict and achieve Information Systems' successful adoption in organisations). Many research studies validated the success model and reported significant relationships between 'Information Quality' with 'User Satisfaction' and 'Individual Impact' (DeLone and McLean, 2003). Information Quality was measured in terms of accuracy, timeliness, completeness, relevance, and consistency (DeLone and McLean, 2003). Individual Impact was measured in terms of decision-making performance, job effectiveness, and quality of work (DeLone and McLean, 2003). DeLone and McLean (2003:21) have "strongly encouraged [researchers] to include information quality measures as a critical dimension of their success measurement construct." Moreover, Bagayogo et al. (2014) posit that one form of achieving IT enhanced use is by introducing unused set of technology features to users, thus, the three features fit well with the enhanced use construct.

Furthermore, as mobile use context is a substantial characteristic of mobile Information Systems (Siau et al., 2001; Pica et al., 2004; Pica and Sørensen, 2004), the training sessions' design accommodated for linking the Kelvin devices' features to the context of use to enable officers better perceive the actual strengths and limitations of the different features in various work contexts. Consequently, technology satisfaction can be boosted as a result of the confirmation between officers' expectations and technology features.

Moreover, another training need that was identified in the pilot study; bridging the technical gaps in officers' IT skills. Many officers reported their inability to deal with technical problems during their shifts which have caused them to revert to their old methods of doing their daily tasks; using pen/paper. Hence, providing IT support to officers at the training session can enhance their technical skills and boost their self-efficacy. The technology training goals are presented in figure 6.3.

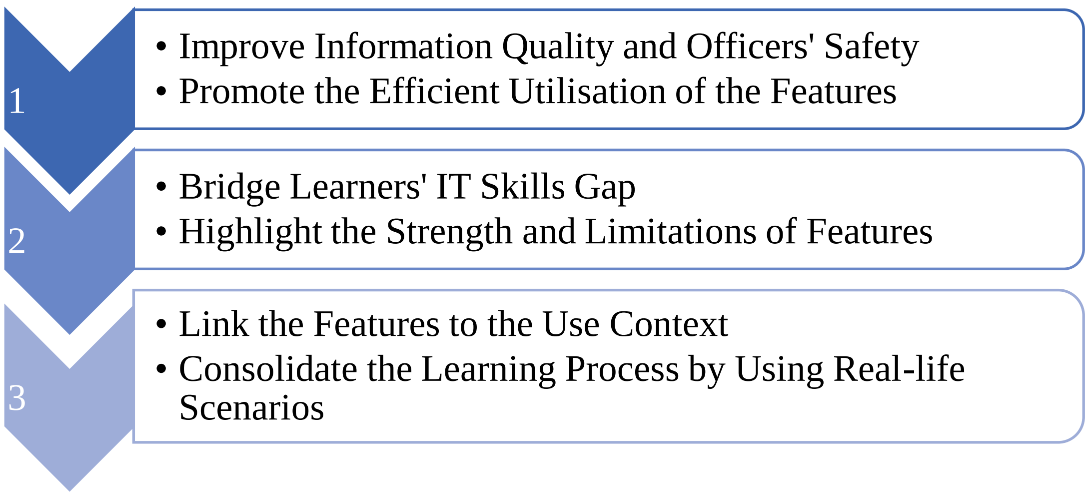

Figure 6.3 Technology Training Goals

6.4.2 Training Methods and Learning Process Phase

6.4.2.1 Training Methods

The training methods encompass a set of materials and activities designed to deliver specific knowledge to end-users based on users' needs and training goals (Compeau et al., 1995). The training sessions' design adapted the Task Technology Fit (TTF) profile for mobile Information Systems to support managerial tasks developed by Gebauer et al. (2006) and Gebauer et al. (2010) to fit the learning goals of the technolog training at the Constabulary as shown in figure 6.4. A key characteristic of the technology utilisation in the post-adoption stage is the differences in learners' technical skills and familiarity with the different features. For instance, IT confident officers' self-exploration of the devices' features can extend their knowledge about these features while the less IT confident officers can be unaware of the existance of the features. Hence, the design of any technology training session has to be generic to accommodate for differences in officers' technical skills and knowledge. The model shown in figure 6.4 consists of three fits to achieve the training goals. Officers with less IT-skills have to start from Fit 1 while those who are IT confident (have used the devices' features on a regular basis) can start from Fit 2.

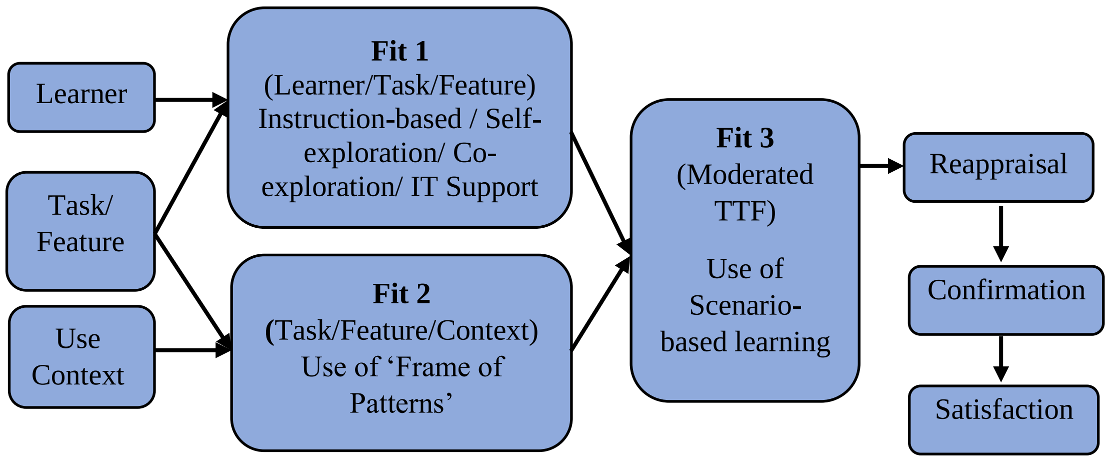

Figure 6.4 A Moderated Task Technology Fit Profile for FAMT

Fit 1: The first fit is between the learner and the task/feature (i.e. writing a statement using the Speech to Text feature). The trainer presents the feature to officers and gives general instructions on how to access the feature on the Kelvin device. Then officers are asked to practise using the feature by two types of exploratory computer learning methods; self-exploration and then co-exploration. Exploratory-based learning methods proved effective in technology learning (Carroll et al., 1985, 1987; Raban, 1988; Simon and Werner, 1996; Lim et al., 1997; Gallivan et al., 2005;). At the end of this part, any technology-related knowledge gaps are bridged (via the IT support); hence, enhancing officers' mental models (Lim et al., 1997).

Fit 2: The second fit between the task/feature and the use context. This is achieved through using the 'Frame of Patterns' method developed by Zigurs and Khazanchi (2008). A pattern consists of three parts: a specific context, a problem and a solution. Using their experience and knowledge, officers discuss the different contexts that a feature can best be utilised in. Adding officers' experience to the profile is crucial for the success of the technology adoption as argued by Gebauer et al. (2006). It facilitates achieving meaningful learning as learners integrate new knowledge with knowledge that already exists in their long-term memory; thus, supporting the proposition of the Assimilation Theory as argued by Davis and Bostrom (1993). To achieve a deeper level of understanding and develop personal skills such as active listening, team collaboration and constructive feedback or criticism, officers should be arranged in a circle as highlighted by Barrows (1996), Wood (2004) and Werth (2011).

Fit 3: In the third fit, fit 1 and fit 2 are joined to achieve the task-technology fit for feature technology training. This is achieved by providing officers with real-life scenarios to practice the new features. This method of learning is effective in improving self-directed learning skills, long-term memory, problem-solving skills and the learning process in general (Banta et al., 2001; Dochy et al., 2003; Docherty et al., 2005; Koh et al., 2008; Werth, 2011).

The three fits can lead to either positive or negative appraisal of technology features which in turn leads to confirmation/disconfirmation of learners' expectations. The extent of confirmation/disconfirmation will determine learners' satisfaction and continuance intention of utilisation.

6.4.2.2 Learning and Interaction Process

Despite using the same training methods in the three training sessions, various factors influenced the learning process and impacted on the learning outcomes. These factors will be discussed in detail in the next sections to accomplish the third objective of this study.

6.4.2.2.1 The Role of the Super-user in the Learning Process

Many research studies suggest that management can achieve better IT usage if they can identify IT confident users or super-users to boost IT utilisation in organisations (Fulk, 1993; Orlikowski et al., 1995; Karahanna et al., 1999; Lucas and Spitler, 1999; Morris and Vekatesh, 2000; Lewis et al., 2003; Beaudry and Pinsonnault, 2005; Spitler, 2005). 'Change agents' as coined by Rizzuto et al. (2014) can influence other employees' IT usage as they usually possess a positive attitude towards using technology which in turn, can impact their peers' beliefs and attitudes towards the technology adopted (Fulk, 1993; Brown et al., 2002; McNish, 2002; Lewis et al., 2003; Venkatesh et al., 2003; Gallivan et al., 2005; Jasperson et al., 2005; Clark et al., 2009; Lucas, 2010; Saeed and Abdinnour, 2013; Rizzuto et al., 2014; Bhattacherjee et al., 2018). In this study, IT confident officers played a major role in shaping their colleagues' beliefs and attitudes towards using some of the features as will be discussed later in the chapter. However, recruiting super-users to deliver technology training sessions as suggested by Fulk, (1993), Lewis et al. (2003) and Clark et al. (2009), especially in the post-adoptive stage, on the basis that their technical skills are far better than their peers proved to adversely impact the learning process at both North and South (at West, the researcher presented the features to participating officers).

Super-users at the post-adoptive stage developed their own habits of technology utilisation and identified their sets of features that they perceive as useful and efficiency boosters. It is also likely that these super-users changed roles in their organisations and for each role they used a different subset of technology features. Hence, being IT confident does not guarantee that they have used the full range of features offered by the technology. For instance, the trainer at North stated that since the roll out of the Kelvin devices four years back, he changed roles several times and has used different sets of features for each role.

> "*People get set in the ways they use the Kelvin and a refresher could help in showing them how to use things especially things like that where people are shown difficult things.* "
>
> (Trainer officer, North)

Furthermore, because the super-user is an IT confident officer, they did not perceive typing using the device's small keyboard as a problem or efficiency reducer. Consequently, they never used the Speech to Text feature and did not perceive this feature as useful. This lack of experience and enthusiasm about the feature was reflected in the way the trainer, at North, presented the feature to his colleagues. The trainer also expressed his concerns about the accuracy of the feature (despite not using the feature before) and moved on to present the second feature without allowing the officers to discuss different contexts that the feature can best be utilised in. This behaviour impacted negatively on the officers' learning process and the results collected from the online survey indicated that the majority of officers did not use this feature after the training session. For this reason, the training quality was jeopardised. The trainer at South echoed the same viewpoints relating to the Speech to Text feature before and during the training session. Another two super-users who attended the training sessions (one at North and another at South) refused to try the Speech to Text feature because they were happy to use the devices' small keyboard. For example one stated that:

> *"I have not used the voice feature on this device. I find it easier to just type my statements on to the device especially as the phone tends to learn the style of writing. I don't and won't use dictation."*
>
> (Police Constable, North)

This study seems to confirm Jasperson et al.'s (2005) claim that prior use, habit and a feature-centric view of technology are the three main aspects that determine the extent of post-adoption of Information Systems. Furthermore, these three key aspects determine the success of recruiting super-users in delivering quality training sessions to their peers in organisations in the post-adoption stage. For instance, a visually impaired officer who uses the Speech to Text feature on a regular basis to perform daily tasks might not be IT confident in using the full range of features offered by the Kelvin devices. Nevertheless, he/she is a super-user in using this particular feature and their experiential skills and knowledge can help their peers use this feature efficiently in performing tasks (Jasperson et al., 2005; Clark et al., 2009). Another example from West training session, the Detective Sergeant (DS) whose role involved writing statements on a regular basis, reported finding typing these statements using the small keyboard unpractical. As the DS's Kelvin device did not have the microphone option activated at the time of the training, the DS contacted the IT department, activated the feature, tested it extensively and circulated several emails (to colleagues and the officers who attended the training session) sharing with them valuable information about new shortcuts to add punctuation marks to the dictated text accurately. This DS is not IT confident in using the full range of features of the Kelvin devices, nevertheless became a super-user of this feature. Similarly, as the trainer at North used the Person/Vehicle Information feature extensively in their role, the trainer's enthusiasm and prior experience (about using this feature) influenced his peers to perceive this feature as both useful and 'clever'. The results of the online survey indicated that all officers who attended the North training session integrated this feature in their daily sets of features to perform tasks. Hence, prior use, habit and a feature-centric view of technology determine the extent of successful delivery of technology features in training sessions in the post-adoption stage. At this stage, users who have used a technology feature extensively in performing tasks can deliver successful training for this feature (even if they did not explore the full range of features of the technology) and are super-users of this particular feature.

The recruiting of super-users who are also serving police officers to deliver technology training sessions to their colleagues was impacted by some aspects of police culture which influenced the learning process. As mentioned in section 2.6, police officers rely on one another for support, the assumption being that they back up one another (Westley, 1970; Punch, 1983, 2009; Reuss-Ianni, 1983; Paoline et al., 2000; Terrill and Mastrofski., 2002; Paoline, 2004; Reiner, 2010; Cockcroft, 2013; Workman-Stark, 2017). This denotes 'police solidarity' or 'support and backing' in the line of duty but, more importantly, emotionally and personally.

This has been reflected in the training sessions as trainers, generally, did not offer help to their colleagues after demonstrating the features unless they are explicitly asked for assistance. As they were aware of their colleagues' negative attitudes towards the Kelvin devices, they did not want to show enthusiasm about the features and kept quiet to avoid being viewed as different from their colleagues. Also, this can be attributed to gender differences as all the trainers were male officers, hence, can partly be more task-oriented than women (Lynott and McCandless, 2000). In the context of technology usage, task orientation refers to the completion of organisational tasks that may require technology (Venkatesh and Morris, 2000). Thus, they focused only on completing the task by presenting the features as they always do in police technology training.

The trainers seemed to feel uncomfortable helping older officers (who have many years of policing experience) and older officers did not seem to be comfortable asking the young trainer for assistance either. Also, the trainers avoided interfering to control the training session when their colleagues engaged in side talks or when the focus of the session diverted from the features presented.

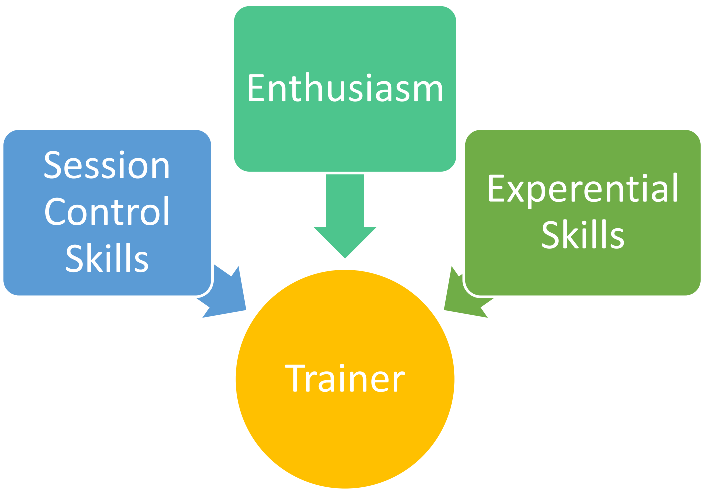

Figure 6.5 Key Attributes of a Professional Trainer

All these factors can explain the reason behind the inconsistency in the delivery of the Kelvin devices training sessions across the three Areas at the time of roll out of the devices which was reported in the pilot study's focus groups (where some features were presented in some Areas and skipped in other Areas). Recruiting super-users to deliver technology training in the post-adoption stage must be based on their experiential knowledge and skills in using these features. These views chime with Constable and Smith's (2015) and Cockcroft et al.'s (2018) findings. Cockcroft et al.'s (2018:12) study shed light on the impact of recruiting trainers 'who have specialized knowledge or whose communication skills facilitate engaging learning experiences' in police forces. It is worth noting that all super-users in this study were nominated by their supervisors with no criteria of selection. A similar recommendation was issued by HMIC (2002) criticising the criteria for selecting tutor constables who are responsible for training new recruits as part of the IPLDP (Initial Police Learning and Development Programme) and recommending national selection criteria for tutor constables. Again, an example is offered by a Police Constable who suggested to:

> *"Scrap the idea of 'Super-users' and give everyone the same level of training, as 'Super-users' rarely have time to pass that information on or are not always around when it is needed."*
>
> (Police Constable, South)

6.4.2.2.2 The Impact of Using Exploratory Learning Methods on the Learning Process

Exploration learning (self-exploration and co-exploration), by its nature, implies trial and error while instruction-based learning with its programmed format minimises the occurrence of trials and reduces the number of errors (Davis and Bostrom, 1993). This conforms with the cognitive school of learning theories where learners are believed to learn more from “experience, by doing, and that the learning that comes from the experience is fitted into the framework of [the learners’] existing knowledge” (Wood, 2004:6). Therefore, the design of the training sessions focused on using exploratory learning methods preceded by a short instruction-based introduction about the technology features.

Gender differences were clear at this stage of the training and influenced the learning process significantly. Male officers in the three sessions self-explored the technology features without requiring much technical support either from colleagues or from the trainer/IT staff member. They were task-oriented and motivated to explore the features practically which is consistent with the findings of Venkatesh and Morris (2000). Generally, even the less IT confident male officers, at South, who required little technical support at the beginning of the features’ self-exploration process (but no further help later) did not ask explicitly for help and waited for their younger colleagues to offer them the technical help they needed. This can be attributed to their focus on productivity-enhancement factors related to their technology use (like usefulness) which are more important to men (as they are more driven by technology instrumental factors) (Venkatesh et al., 2000; Venkatesh and Morris, 2000).

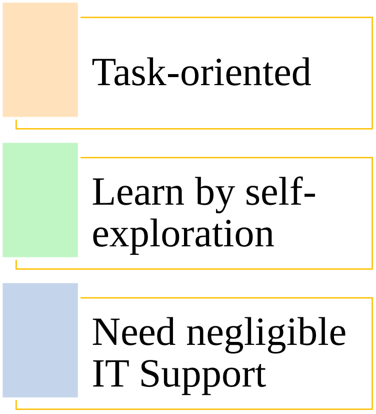

Figure 6.6 Male Officers' Learning Attributes

On the other hand, female officers seemed to have less computer self-efficacy as they required much technical support during the self-exploration process of the Kelvin devices' features even though they should have been using the devices for four years at the time of the training. They focused more on the methods used to complete tasks (process-oriented) and needed affirmation that they have followed the right steps from the IT staff member/researcher (South and West training sessions) or from the trainer (North training session). Similar findings were reported Venkatesh and Morris (2000). Moreover, at North, the two female officers attending the training session, automatically switched to co-exploration even before being asked to work in teams (the two female officers did not sit next to each other in the room and did not chat at all before the start of the training session).

At West, female officers sat next to each other around the round table. Firstly, they explored the features using their Kelvin devices on their own and sought technical support from the researcher (who was the trainer in this session). Then, even before being asked to work in teams, they shared their experiences with their female colleagues. The co-exploration process seemed natural to them and motivated them to explore different contexts that the features can efficiently be utilised in, even before being asked by the trainer to collaborate or co-explore the features.

This was clearly illustrated when a female officer used the Speech to Text feature to update logs on her Kelvin device and praised the accuracy of the feature which encouraged her female colleagues to copy her actions. On the other hand, male officers did not explore further uses of the features during this stage, instead they were focused on testing the accuracy and the functionality of the feature generally (exactly following the instructions given by the researcher). Male officers did not seem to need to co-explore the features with their colleagues. They only listened to their female colleagues' conversations.

As for South, female officers sat together at one end of the room and the IT staff member had to move and sit next to them to be able to answer all their questions during the exploration stage. Female officers were exchanging their exploration findings and supporting each other through this stage (like West female officers). Co-exploration learning enhances learners' mental models facilitating the inference potential of the learners and promoting a deeper-level of thinking (Lim et al., 1997). Therefore, it forces learners to interact with their peers and reconcile their differences in opinions until they reach a unified approach to the problem they are solving (Yi and Davis, 2001; Taylor et al., 2005).

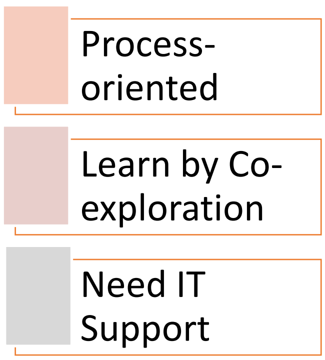

Figure 6.7 Female Officers' Learning Attributes

Therefore, in all the three training sessions, female officers seemed to prefer to work in teams and required IT support while male officers seemed to prefer to self-explore the Kelvin devices' features with negligible IT support. This can be attributed to the strong influence of subjective norm (peer's influence (Mathieson, 1991; Roberts, 1991; Taylor and Todd, 1995)) and lower levels of perceived behavioural control (Taylor and Todd, 1995; Venkatesh et al., 2000) on women claimed by Venkatesh et al. (2000) and Venkatesh and Morris (2000) in the context of technology use. Perceptions of behavioural control (PBC) relate to the extent to which individuals believe that they have control over factors that influence their behavioural performance like computer self-efficacy and facilitating conditions (i.e. training, IT support) (Ajzen, 1991, 2002; Mathieson, 1991; Taylor and Todd, 1995). PBC has significant impact on intentions of IT utilisation (Venkatesh, 2000; Ajzen, 2002; Venkatesh et al., 2003; Morris et al., 2005; Elie-Dit-Cosaque et al., 2011) and on post-adoptive IT intentions and behaviours (Bhattacherjee et al., 2008). It has been linked to self-efficacy in IT usage (Compeau and Higgins, 1995a; Taylor and Todd, 1995). In addition, IT support has been conceptually and empirically shown to impact users' PBC (Cragg and King, 1993; Harison et al., 1997). IT support corresponds to the second dimension of trust in technology identified by Mcknight et al. (2011) and Thatcher et al. (2011) and proved to have an influence on external computer self-efficacy (CSE) (which is a belief about the users' ability to use the Information System when it provides support or assistance) (Thatcher et al., 2008; Tams et al., 2018).

Furthermore, exploring different technology features during training sessions can boost learners' positive attitudes and beliefs towards these features if their performance meets users' expectations. Gallivan et al.'s (2005) study confirmed the significance of using technology exploration training in organisations and emphasised the importance of the role of co-workers in enhancing individuals' IT usage. Since the choice of the Kelvin devices' features for the training sessions was guided by officers' technical needs identified in the pilot study, the results of the online survey collected after the completion of the training showed that all officers agreed/strongly agreed that presenting useful and reliable technology features encouraged officers to use them. 90% reported finding the features presented in the training sessions useful. Hence, the importance of having a good fit between the task and the technology feature as argued by Goodhue and Thompson (1995), Beaudry and Pinnsoeault (1998), Zigurs et al. (1999), and Dennis et al. (2001). This was noted by one of the officers and the trainer at West as shown in the following quotes:

> "*As a general rule officers are happy to learn when the thing they are learning is of a benefit to their role. I think this then changes when we are asked to learn something which in the officer's eyes is not relevant to their role, does not help their role or worse of all is a hindrance to the role they carry out*"
>
> (Trainer officer, West)

> *"You [addressing the researcher] blew our minds!! The whole West area doesn't know about this feature [Speech to Text]. It is very user-friendly, we'll feed it back"*
>
> (Trainer officer, West)

> *"I am amazed that we've had that [the features] and we didn't know about it. It would have saved massive time."*
>
> (Police Constable, West)

Officers' positive attitudes towards the features' functionality can boost their internal CSE. Internal CSE depends on the functions offered by the system; users will use the system efficiently if the system's functions are aligned with the tasks (Thatcher et al., 2008). Thatcher et al. (2011:4) defined the functionality belief as "the belief that the system has the capability, functions, or features to do for one what one needs to be done" and identified it as the first dimension of trust in technology. Internal CSE exerts a significant positive effect on ease of use as users who have positive beliefs about their abilities usually have lower levels of computer anxiety and view systems as simple to use (Venkatesh and Davis, 1996; Agarwal et al., 2000; Thatcher et al., 2008). 100% of the participating officers either agreed or strongly agreed that being able to practice the technology features in the training session helped them appreciate the ease of use of the features presented. Computer anxiety is negatively related to IT adoption and utilisation (Durndell and Haag, 2002; Beaudry and Pinsonneault, 2010) and has been empirically shown to negatively influence PBC as a result of reducing perceived CSE (Thatcher and Perrewé, 2002; Ellie-Dit-Cosaque et al., 2011). Being able to explore the features during the training session was reported by all officers to have a positive effect on the features' ease of use perceptions. This is particularly important as perceived ease of use has a strong influence on users' intentions to use technology during training interventions as argued by Venkatesh et al. (2002). This is particularly important for female learners who are significantly influenced by perceptions of ease of use both during the introduction of technology and in the post-adoption stage (Venkatesh et al., 2000; Venkatesh and Morris, 2000). Individuals with lower levels of internal CSE are likely to have lower intentions to continue to use a given IS (Bhattacherjee et al., 2008).

Furthermore, CSE (both internal and external) has been shown to have a mediating role on trust in technology (Tams et al., 2018). Trust in technology directly influence perceived usefulness and perceived ease of use (Lippert, 2007; Thatcher et al., 2011). Perceived usefulness has the strongest influence on future intention to technology utilisation as argued by Davis et al. (1989), Taylor and Todd (1995) and Venkatesh et al. (2003) as it encourages positive attitudes about use particularly in mandatory settings (Brown et al., 2002). It has been shown to impact men significantly during the initial decision process that drives technology adoption, as well as, influences post-adoptive usage (Venkatesh et al., 2000; Venkatesh and Morris, 2000). This is consistent with this study's findings as male officers focused on the features' functionality and the usefulness of these features in performing daily policing tasks. Lippert (2007) and Mcknight et al. (2011) claim that the role of trust in technology is a key determinant in sustaining post-adoption utilisation in organisations. Technology trust affects individuals' intention to explore the full range of functionalities of the adopted Information System and consequently can limit the post-adoption utilisation preventing organisations from achieving the benefits anticipated from investing in the technology (Jasperson et al., 2005; Lippert, 2007; Mcknight et al., 2011; Thatcher et al., 2011). In this research, 88.9% agreed or strongly agreed that practicing the feature in the session boosted their trust in the feature. Technology trust can mitigate feelings of risk and uncertainty associated with innovative and exploratory behaviours (Mcknight et al., 2011; Thatcher et al., 2011; Tams et al., 2018). Therefore, using exploratory learning methods is fundamental to boost trust in technology through enhancing learners' perception of technology features' usefulness.

In addition, using exploratory methods in technology training impact on learners' satisfaction which is the strongest predictor of individuals' post-adoption utilisation as empirically shown by Bhattacherjee (2001), Thong et al. (2006), Bhattacherjee et al. (2008) and Wang et al. (2015). Post-adoption satisfaction is accurate and robust as it is based on users' first-hand experience (in this context, during technology training sessions) with the Information System

(Bhattacherjee, 2001; Thong et al., 2006; Wang et al., 2015). Moreover, exploratory learning can disrupt standard IS usage patterns and promote an expanded utilisation of technology features (Jasperson et al., 2005; Saeed and Abdinnour, 2013).

Therefore, exploratory learning methods (self-exploratory and co-exploratory) are significant determinants of effective technology training programs as they impact on learners' internal CSE (if a good fit between the task and the technology feature exists), perceptions of ease use, perceptions of usefulness and on their intentions to continue to use the technology features in the post-adoption stage. Providing IT support (especially for female learners) impacted positively on their perceptions of behavioural control through enhancing their CSE. This was evident in their active engagement in constructive discussions afterwards.

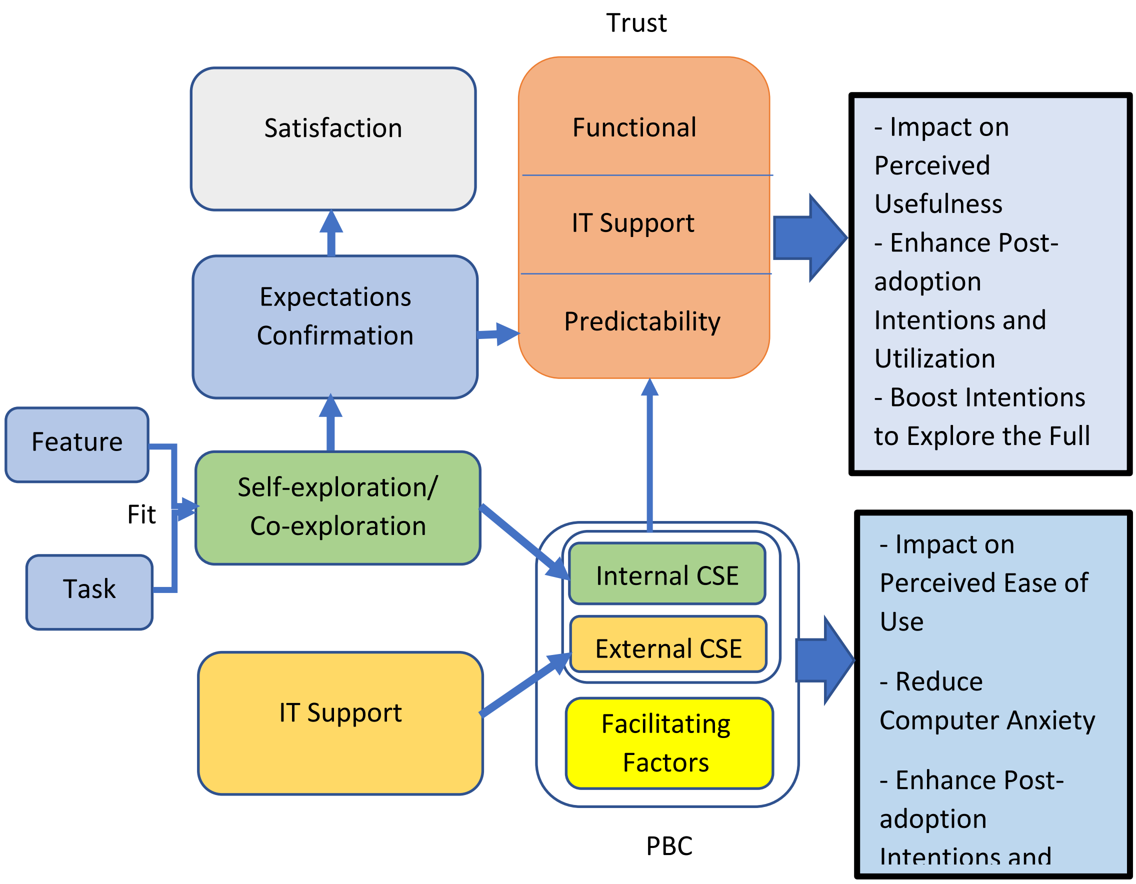

Figure 6.8 The Impact of Exploratory Learning on the Learning Process

6.4.2.2.3 The Impact of Linking Technology Features to Contexts using Collaborative Learning Methods on the Learning Process

Investigating the impact of work context on the extent of technology utilisation and its impact on the use of mobile technology in policing have been explored by scant research studies (Ioimo and Aronson, 2004, 2003; Pica et al., 2004; Pica and Sørensen, 2004; Sørensen and Pica, 2005). They reported a variation in productivity improvements among different police roles because of using the mobile technology in different contexts. Sørensen and Pica's study (2005) highlighted the importance of appropriating the mobile technology functionalities to police work contexts. The pilot study results indicated that the lack of appropriation training on how to use a technology feature in different work contexts contributed to officers' not realising enough efficiency gains from using the Kelvin devices. The initial Kelvin devices' training presented the primary functionalities to officers without considering the peculiarity of using mobile technology in different contexts. One key cause for officers' resistance to using the full range of the Kelvin devices' features is the unpracticality of using the Kelvin devices' small keyboard in different contexts to complete various tasks. Different data input methods suit different contexts. The context of use plays a fundamental role in choosing the appropriate data input method that fits with the task to be completed. Therefore, adopting a feature-centric view that focuses on the different contexts that a feature can efficiently be utilised in can reduce the barriers to technology use and enhance officers' perceptions of the usefulness of the Kelvin devices' features.

By linking the technology feature to different possible work contexts, officers can extend the use of the features and adopt a realistic expectation of the strengths and limitations of these features. The confirmation of officers' expectations can lead to technology satisfaction and consequently to continuance of use (Bhattacherjee, 2001;

Thong et al., 2006; Bhattacherjee et al., 2008; Wang et al., 2015). This confirmation corresponds to the third dimension of trust in technology identified as the predictability belief by Thatcher et al. (2011). It refers to the system's consistency and the ability to forecast system behaviour. Predictability beliefs influence learners' external CSE (Tams et al., 2018). Besides, the use of the theoretical 'Frame of Patterns' technique developed by Zigurs and Khazanchi (2008:3) enabled officers to achieve a better fit between the feature and the context as these patterns are "holistic abstractions of experience". Its' use in group discussions facilitates applying the Adult Learning Theory principles of learning and incorporating the learners' experiences (Cross, 1981; Houle, 1984; Cotton, 1995). Group interactions and discussions varied significantly across the three training sessions. Several factors influenced the depth of the discussions of the different features presented like officers' seating in the session, the information influence (which occurs when co-workers or peers share their own personal experience and evaluation of the technology (Karahanna et al., 1999)) and the number of officers participating in the session.

At North, the trainer's enthusiasm about using the Person/Vehicle Information feature coupled with the positive feedback from the IT confident young officer about this feature created a positive motivational learning environment for the rest of the officers. Both officers informed their colleagues that they use this feature frequently in completing daily jobs and were happy to list different contexts in which they can best utilise this feature. The different context-based problems that can be encountered while using this feature were highlighted and possible ways of dealing with these problems suggested. The use of the 'Frame of Patterns' technique facilitated these discussions and enabled officers to realise and appreciate the usefulness of using the feature in various contexts through the 'internalisation' process posited by Fulk (1993).

Therefore, co-workers' support impacted significantly on the learning process and on the utilisation of this feature after the completion of the training. This was noted by the trainer's comments:

> *"Good exchange of views on how others use the technology. Good to share positives and negatives on the system."*
>
> (Trainer, North)

However, the seating of officers in the room enabled some of them to opt out of the discussions (like the senior officer who did not bring their Kelvin device to the training session and clearly indicated that they prefer to use pen/paper). Since officers were sitting in a horizontal row (not facing each other) in the room, the officer who declined to engage in any discussions did not feel the need to contribute to these discussions and distracted themselves with their phones. This resembles the 'flight' behaviour described by Wood (2004). The online survey results reveal the successful adoption of the officers who participated in the discussion of this feature. Hence, the presence of super-users in the training session who have positive attitudes towards the feature presented boosted the feature utilisation as argued by Brown et al. (2002), Venkatesh et al. (2003), Gallivan et al. (2005), Jasperson et al. (2005), Clark et al. (2009), Lucas (2010), Saeed and Abdinnour (2013) and Bhattacherjee et al. (2018).

At West, officers used the 'Frame of Patterns' technique after exploring the Speech to Text and the person/vehicle features. All officers expressed positive views about the usefulness and ease of use of the Speech to Text feature as soon as they started to explore it in the session. The perceived usefulness of the feature shaped the positive attitudes towards it. Their discussions using the 'Frame of Patterns' technique to link the feature to different contexts was constructive. One example of a pattern that they identified as a limitation to using the feature was how to have control over the dictated text when recording a statement in the presence of witnesses (eliminating the witness speech from the recording). The researcher demonstrated to officers how to pause the recording when needs be. This technical feedback eliminated an unrealistic perceived limitation about the feature that can potentially reduce the feature's perceived usefulness in future use contexts. It motivated officers to come up with more patterns of use for the feature in different contexts. Hence, this confirms Taylor et al.'s (2005) and Wood's (2004) claim that feedback from the facilitator or group members reassures learners that the learning process is successful and is an important aspect in the learning process. Thus, the use of the 'Frame of Patterns' technique facilitated a mutual discovery appropriation move among officers as they collaborated in a "joint sense-making and technology exploration" (Jasperson et al., 1999:115). The survey results showed that officers at West continued to use this feature after the completion of the training.

Furthermore, officers at West, were using their policing experiences extensively to list different patterns of use for the Speech to Text feature as they perceived it as an opportunity that they have high control over; thus, they were trying to maximise the feature's benefits as posited by the first category of Beaudry and Pinsonneault's (2005) Coping Model of User Adaptations to technology. Thus, officers' adaptations efforts were mainly problem-focused aiming at dealing with the situation and changing the environment (e.g., learning new skills, adapting work processes, enhancing the fit with the task and developing new standards of behaviour). These findings are consistent with the results reported by Fadel (2012) who argue that problem-focused adaptation behaviours promote infusion of the technology in organisations. Indeed, the use of

‘Frame of Patterns’ technique boosted officers’ problem-focused adaptation behaviours which promoted the infusion of efficient utilisation of the Speech to Text feature at West. After the training session, the trainer at West informed his supervisors of the benefits of using this feature and they decided to train all officers at West on using this feature guided by the same training methodology.

As for the second feature; the Person/Vehicle Information, officers at West used the ‘Frame of Patterns’ technique to discuss the different possible contexts that they can best use this feature in. After a short discussion, the female officer with the extensive policing experience stated that she believed this feature is less useful especially that her current role did not involve dealing with regular persons who she would use their personal information frequently to fill in other forms. Her comments were quickly echoed in the session. The results of the online survey indicated that few officers at West adopted this feature after the training session. Hence, the discussions of this feature were influenced by the imitation appropriation moves among participating officers as they voluntary decided to learn from the actions of their colleague (Jasperson et al., 1999), complying to her viewpoints (Fulk, 1993; Brown et al., 2002; Lewis et al., 2003; Venkatesh et al., 2003; Gallivan et al., 2005).

> *“That is not massively fantastic to use! Statements drop off eventually, so we won’t be able to use them to copy over”*
>
> (Police Constable1, West).

The six officers who attended the training session at West were sitting around a round table which facilitated a deeper level of understanding of the different use of features in various contexts. Facing each other enabled them to actively listen, contribute to the discussion and provide constructive feedback to each other. Even the officers who were quiet at the start of the discussion (actively listening), started to contribute to the ideas and patterns suggested by other officers afterwards. Hence, the number of officers (a small group) and how the seating was arranged (in a circle) facilitated team collaboration and extended the depth of the discussions which confirms with Neufeld and Barrows's (1974) and Wood's (2004) claim.

On the other hand, the training session at South was attended by twelve officers (initially sixteen officers attended the session but four of them were called by the control room half way through the session to do urgent jobs) who were seated in horizontal rows (like the North training room). Officers used the 'Frame of Patterns' technique to discuss different contexts that the features can efficiently be utilised in. Nevertheless, it was difficult, at times, to follow the discussions as some officers were engaged in side talks and the session was generally noisy. The learning process was massively impacted because of having more officers attending the training session. A quote from a Police Constable clarifies this point:

> *"I was a little confused about what we were getting out of it or what the training was meant to focus on."*
>
> (Police Constable 1, South)

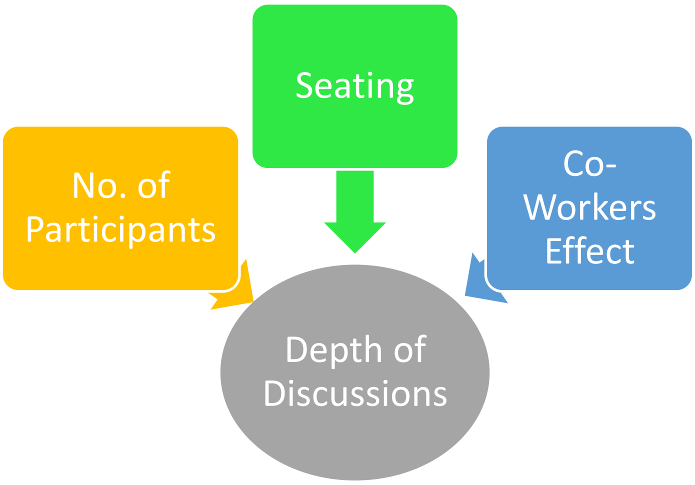

Figure 6.9 Factors Impacting on the Depth of Discussions at Technology Training

Finally, using real-life scenarios facilitated the consolidation of the learning process and prepared them to use the features efficiently in their daily tasks. This conforms with the findings reported by Bradford and Pynes (1999), Birzer (2003), Vander Kooi (2006), Cleveland and Saville (2007) and Werth (2011). The results of the online survey indicated that all officers (who participated in the online survey) believed that using real-life scenarios in the training session consolidated their learning of the features presented. 88.9% of the officers believed that the discussions about the different contexts that a feature can be used in extended their knowledge about the feature. 94.4 % believed that discussions about the different contexts that a feature can be utilised in helped them appreciate the usefulness of the feature. Therefore, using the ‘Frame of Patterns’ technique and scenario-based learning impacted positively on the learning process and was perceived by officers as an effective method that consolidated their learning. Some officers expressed their views about using real-life scenarios in technology training as shown in the following quotes:

“The training needs to be relevant to the real world. I understand that [name] Constabulary who we are partnered with through [application name] don't routinely give IT training. However, unless you are interested in tech (like myself) you miss valuable shortcuts and inputs that can improve your productivity. “

(Police Constable 2, West)

“Include more real-life scenarios in the training session which will help consolidate my learning of the features presented”

(Police Constable 2, South)

6.4.3 Post-Training Phase

The post-training stage deals with the assessment of the training goals, measuring the training impact and the knowledge gained by the learners considering the goals or needs identified in the pre-training stage (Gupta et al., 2010). Three key training goals were identified based on the results collected from the pilot study. The first goal is to train officers on using new tangential features that are both easy to use and efficiency boosters; allowing them to have alternative options that suit the variation in officers’ IT skills, roles and work contexts. The second goal is to facilitate linking the features to work contexts using officers’ experiences and knowledge to maximise the utilisation of the features, as well as, to boost officers’ perceived usefulness of the capabilities of the Kelvin devices. Finally, the third goal is to eliminate any technical knowledge gaps and enhance officers’ technical skills. An assessment of the impact of the training sessions and the knowledge gained by officers is presented in the next section.

6.4.3.1 A Comparison Between the Benefits of Using E-learning Packages versus the Fit Appropriation Model for Training (FAMT) at the Constabulary

During the pilot study's focus groups sessions, officers expressed dissatisfaction with the e-learning training packages frequently rolled out by the Constabulary to save budget money. More data was collected via the pilot study's online survey about the use of e-learning packages as an effective method of training at the Constabulary. 60% of participants were not satisfied with the e-learning system. 70% believed it did not help them improve their job performance. 50% agreed that the e-learning system helps the Constabulary achieve its goals. 63% did not prefer to use a handout to learn new material and then take the test on the computer. 54% agreed that adding interactive info-graphics to the e-learning material will help them learn faster. Many officers preferred being able to practise technology features during training sessions over using e-learning packages that provide instructions only on how to use the features. Similar results are reported by Cockcroft et al. (2018) in a study that investigated officers' views of the most effective training method in delivering cybercrime training in police forces. In this study, officers favoured face-to-face training over e-learning training packages, and they drew attention to the potential of using e-learning training packages in delivering refresher training or basic introduction training (Cockcroft et al., 2018).

Besides, some studies reported gender differences in the context of technology e-learning. For instance, Ong and Lai (2006) claim that women are strongly influenced by perceptions of computer self-efficacy and ease of use while men are influenced by perceptions of usefulness of e-learning. These results confirm with this study's findings as well as Venkatesh et al.'s (2000) and Venkatesh and Morris's (2000). Hence, the importance of designing e-learning packages that match the learning needs of both male and female learners.

A feedback received from a police officer after attending the technology training sessions at South:

> *"I feel hands on training, with smaller training groups are more beneficial. Online learning packages are not much good for people who can't fully grasp IT. You can't seek clarification to better understand a difficulty/question you have and if you're not IT literate you can struggle with the online course itself. Smaller groups allow for clarification questions to be asked/answered without fear of individuals feeling pressured due to their lack of knowledge."*
>
> (Police Constable, South)

Moreover, based on the training sessions' online survey results, 100% of the participating officers either agreed or strongly agreed that being able to practise the technology features in the training session helped them appreciate the ease of use of the features presented. All officers agreed or strongly agreed that being able to practise the feature in the training session helped them appreciate the usefulness of the feature. 88.9% agreed or strongly agreed that practising the feature in the session boosted their trust in the feature. 100% of officers believed that using real-life scenarios in the training session consolidated their learning of the features presented. 88.9% of the officers believed that the discussions about the different contexts that a feature can be used in extended their knowledge about the feature. 94.4 % believed that discussions about the different contexts that a feature can be utilised in helped them appreciate the usefulness of the feature.

Furthermore, the availability of IT support during the training sessions was crucial to ensure effective learning particularly to female officers. Bridging the technical skills gap during the exploration stages positively influenced female officers' computer self-efficacy and was reflected in their abilities to conduct constructive discussions in later stages of the training. Also, bridging the gaps in IT skills eliminated the barrier to extend the use of some features to other contexts as reported by officers after the completion of the training. Therefore, using FAMT was perceived by officers as an effective training method that facilitated a personalised technology training and extended their knowledge about useful features in their Kelvin devices.

A sample of officers' feedback about the training sessions:

"Very useful and the trainer was very knowledgeable"

(Police Constable1, West)

"Thoroughly enjoyable and I have continued to use the skills I was given on the training session. Not just at work but at home also. Loved the input thank you very much. "

(Police Constable2, West)

"Small regular inputs like this are more helpful"

(Police Constable, South)

"I have previously enquired about this feature in the past with a view of assisting in recording any lengthy written documentation i.e. statements. I find it difficult and a great hindrance recording such documents on a mobile phone device. So much so that following taking part in the portable keyboard exercise some time ago, I have purchased my own use keyboard for use with my kelvin. Since the training I used the speech dictation feature to document a first account in my kelvin from an assault victim and it greatly sped the process up"

(Police Constable, South)

"*It was really lovely to learn something of significant value. the first thing I did when I returned to my office was to cascade the learning down to all the members of my team and to show them how to use it, this was on the understanding that they would show others. I had to visit our IT people to have the microphone enabled on my own device and once it was I performed quite a lot of audio input messages"*

(Detective Sergeant, West)

"*Considering we have had the devices for what 4 years?? Your short input I learned quite a bit and it is all very helpful. The Speech to Text is really good."*

(Police Constable, West)

6.4.3.2 IT Confident Officers' Resistance to the Speech To Text Feature

The pilot study's findings revealed the resistance of senior police constables to using the Kelvin devices' features. However, resistance to the Speech To Text feature was clearly manifested among the young IT confident officers. At North, neither the trainer nor the young IT confident officer perceived the usefulness of the feature and consequently refused to use it. At South, many young officers reported not using it. Moreover, when the researcher asked a young female officer at the South training session to explore the feature, her reply was that she prefers typing using the Kelvin device's keyboard and she is not going to use this feature. This resistance can be caused by officers' irrelevant appraisal of the feature (Fadel and Brown, 2010). Irrelevant appraisal occurs when "an individual does not foresee a significant personal impact from the introduction of an IS, she may deem it largely irrelevant to her personal well-being" (Fadel and Brown, 2010:110). The IT confident officers did not perceive this feature as either an opportunity or a threat (as they naturally type fast using the small keyboard). This situation fits with the 'Non-Adaptation' quadrant in Beaudry and Pinsonneault's (1998) framework where a fit between the technology and the task is present but a mis-fit between the technology and the user exists. Hence, the effects of the fit and mis-fit are likely to cancel each other, and technology usage is expected to have no significant influence on performance (Beaudry and Pinsonneault, 1998). This passive resistance can also be attributed to 'lack of felt need' as coined by Hirschheim and Newman (1988); where users are not convinced of the benefits of the system or the feature. Hence, in similar situations, it is important that the trainer professionally acknowledges that different users can appraise different technology features differently and share success stories about other learners who appraised the feature positively. The trainer should ensure that the IT confident learners' negative appraisal of the feature is neutralised by success stories of other colleagues who positively appraised the feature.

6.4.3.3 Identifying Female Super-users in Technology Training Sessions

At the Constabulary, many officers (if not all) who are identified by management as super-users and are involved in conducting technology training sessions are males. They use the Kelvin devices to accomplish daily tasks especially in the absence of clear criteria for super-users' nomination and selection. Whilst, as already highlighted by Silvestri (2003; 2007), it is hard not to become entangled in debates about the attributes of women and men in organizations (Silvestri et al., 2013), including the police (Silvestri, 2015), it is worth noting here that the 'cult of masculinity' repeatedly applied to rationalise women's negative experiences and lack of progression in policing does not possess sufficient explanatory power for making sense of the experiences of women who, in this study, are not super-users. In interpreting the 'cult of masculinity', Rabe-Hemp (2008[a,b]) argues that its stereotypical value may be read as an almost pure form of 'hegemonic masculinity', strongly grounded in heterosexuality where particular notions of masculinity govern. With the perception that police work involves strength, action and danger, the concept of physicality becomes a defining element of the ''cult of masculinity'' and so the work of policing becomes securely defined as 'men's work', here we would argue even women's relationship with technology, hence the lack of female super-users in this study. Furthermore, with Harding (1986) once again looking at the context of female officers who are not super users, the question to ask gravitates around a much wider discussion about the way technology reflects gender divisions and inequalities. The problem is not only men's monopoly of technology, here male officers, but the way gender is embedded in technology itself, a discussion which falls outside the scope of this thesis.

The presence of female IT confident officers or super-users in technology training sessions, as trainers and/or trainees, can potentially enhance the effectiveness and the success of the training. FAMT's design facilitates the process of identifying super-users as it incorporates a collaborative discussions stage where super-users feedback and share their experiences with their colleagues. Organisations can profoundly benefit from incorporating female employees as active actors during technology training. This can be achieved by adopting special schemes such as Springboard Women Development courses for female employees to boost their self-confidence, self-efficacy and support them in achieving their personal and career goals. Given the importance of super-user's impact on their peers, management should use instruments that measure technology users' competence like the one developed by Marcolin et al. (2000) to identify female super-users.

6.4.3.4 The Impact of Using FAMT on the Technology Enhanced Use Construct

The enhanced use construct posited by Bagayogo et al. (2014) identified different patterns of technology enhanced use and highlighted the impact of the task-related variables, the IT system type and the user knowledge on the extent of utilisation of technology. Patterns associated with locus of innovation are shaped by the analysability of the task and the technology type (Bagayogo et al., 2014). Officers use their Kelvin devices to perform low analysability tasks like writing witness statements or filling forms. Functional systems (like the Kelvin devices) enable users' initiatives as they provide different tools to facilitate the accomplishment of different tasks, hence, the user is usually the locus of innovation of the enhanced use (Bagayogo et al., 2014). However, based on the pilot study results, the majority of officers were unable to enhance their utilisation of the various features of their Kelvin devices and reverted to using pen/paper. This can be attributed to the gaps in officers' IT skills, the inability to link the various technology features to work contexts and ultimately, the disconfirmation of officers' expectations of the Kelvin devices' performance.

The extent of substantive use (the second attribute of enhanced use) is influenced by the task complexity and the IT-related knowledge (Bagayogo et al., 2014). Tasks that involve many steps like entering data into a detailed form with many parameters (like the forms used by police officers) can engage users in substantive use of technology (Bagayogo et al., 2014). However, officers' IT-related knowledge reduced their ability to use the Kelvin devices' features in an enhanced way. Furthermore, it impacted on officers' adaptations (the third attribute of technology enhanced use construct) facilitating the utilisation of a small subset of the features offered by the devices (Thong et al., 2006).

Hence, using FAMT in technology training can contribute to enhancing the use of the Kelvin devices among officers. This study sheds light on other factors that can potentially impact the enhanced use construct such as gender differences, subjective norms, organisational culture, context of use and IT support. In addition, FAMT accommodates for learners' differences that play an important role in the technology post-adoption process in organisations.

6.5 Conclusion

The integration of Task-Technology Fit Theory, appropriation concepts, behavioural modelling for training methods and collaborative learning methods into FAMT have successfully contributed to positive confirmation of officers' expectations of the technology features, extended their knowledge about efficient utilisation of these features in different contexts and promoted officers' perceptions of the usefulness of the Kelvin devices' features.

Furthermore, the use of FAMT can boost learners' personal innovativeness with IT (PIIT) which is defined as "the willingness to try out any new information technology" (Lewis et al., 2003; Agarwal and Prasad, 1998:206). PIIT is an individual personality variable (Ellie-Dit-Cosaque et al., 2011). It is acknowledged by many research studies to be a key enabler to IT adoption as it engenders positive beliefs about technology (Agarwal and Prasad, 1998; Agarwal and Karahanna, 2000; Thatcher and Perrewé, 2002; Lu et al., 2005), positively impacts CSE (Agarwal et al., 2000; Thatcher and Perrewé, 2002) and influences PBC both directly and indirectly (Ellie-Dit-Cosaque et al., 2011). Hence, by bridging the technical skills gaps through features' first-hand practice and IT support during the exploratory stage and linking technology features to actual use contexts, officers were able to perceive the usefulness of the Kelvin devices' features and reported positive attitudes towards the features presented in the training sessions. Officers also reported using these features in performing policing tasks which indicates positive reappraisal of the presented technology features as a result of possible improvement in officers' perceptions of behaviour control, computer self-efficacy and reduction in computer anxiety. All these factors can positively impact on officers' PIIT and lead to officers' satisfaction with the Kelvin devices' features. Training and technical support have been empirically shown to influence PIIT (Wang et al., 2015).

In organisations like police forces where employees change roles frequently, refresher technology training sessions that focus on the set of features that fit best with these roles can impact positively on the post-adoption utilisation attitudes and beliefs towards the technology. They can also shape officers’ acceptance/resistance to future Information Systems projects by positively influencing their secondary appraisal of the technology features as claimed by Fadel and Brown (2010).

Finally, this study does not suggest that male officers have better IT skills than their female colleagues, rather it sheds light on the gender differences that influence the learning process. Managers should not underestimate these differences and should ensure that trainers provide sufficient IT support and confirmation to female learners. Moreover, ensuring that female learners are seated close enough to each other during technology training can facilitate their collaboration, boost their learning and enable them to swiftly bridge any technical skills gaps.

6.6 Summary

In this chapter, a comprehensive discussion of the design of the Fit-Appropriation Model for Training (FAMT) is presented. FAMT adopts the Fit-Appropriation Model concepts (the model is based on the Task-Technology Fit Theory, the Adaptive Structuration Theory and the Appropriation concepts), Behaviour Modelling Training techniques, IT support and collaborative learning methods to create a learning environment that bridges the gaps in technical knowledge and skills, enables learners to use their work experiences to link the technology features to tasks and to relevant contexts, in addition to, consolidating the learning process through using real-life scenarios for practice. Using FAMT to train front line officers at the Constabulary was positively appraised as an efficient method of technology training. The learning process across the three areas (North, West and South) varied extensively despite using the same training methods in the three sessions. Trainers' prior knowledge, enthusiasm and session control skills extensively impacted on the learning process. Using exploratory learning methods (self-exploratory and co-exploratory) are key to ensuring the effectiveness of technology training in organisations as it impacts on learners' internal CSE, perceptions of ease use, perceptions of usefulness and on learners' intentions to continue to use the technology features in the post-adoption stage. Furthermore, providing IT support (especially for female learners) impacts positively on learners' perceptions of behavioural control through enhancing their external CSE and IS continuance use behaviours.

Chapter Seven – Conclusion

7.1 Introduction

The purpose of this research study is to identify the key causes that contribute to officers' resistance to using the full range of functionalities in mandatory setting of mobile IS utilisation and to posit a technology training program that rectifies them. The pilot study used the Coping Model of User Adaptations to technology (CMUA) developed by Beaudry and Pinsonneault (2005) to understand officers' adaptation patterns to the use of the Kelvin devices features in performing policing tasks. The key findings of the pilot study indicate that in the context of mobile technology utilisation, the work context exerts a profound effect on efficient utilisation/ resistance to technology features. The lack of appropriate users' technical skills can restrict this efficient utilisation and result in a dissatisfaction among them. Therefore, the design of the Fit-Appropriation Model for Training (FAMT) incorporates different learning methods to achieve bridging learners' IT- skills gaps and to promote the efficient utilisation of the mobile Kelvin devices in various work contexts. The results reported by officers after the completion of the training reflect a positive change in their attitudes towards the Kelvin devices' features and the learning methods used. Officers expressed positive feedback and favoured using exploratory learning techniques over both the instruction-based learning methods and e-learning packages usually rolled out by the Constabulary.

In the first section of this concluding chapter, the key contributions of this study are presented. The second section discusses the implications of the research approach. This is followed by the limitations of the study and areas of future research.

7.2 Contributions

Despite the existence of some research studies that used the CMUA to technology as a theoretical lens to study users' adaptations and appraisals to IS utilisation, this is the first study that uses CMUA in the context of mobile IS utilisation. A key difference between stationary IS and mobile IS lies in the context of use of the different functionalities of the mobile technology (Sawyer et al., 2003; Turel, 2006; Gebauer et al., 2010). Hence, the significance of shedding light on the importance of incorporating the context of use in mobile IS research studies. Technology training has received scant attention in IS research despite its fundamental role in boosting users' acceptance and efficient utilisation of the various technology features in organisations (Jasperson et al., 2005; Ali et al., 2016; Haddara and Moen, 2017; Bhattacherjee et al., 2018). Therefore, this thesis's contributions to theory, methodology and practice are discussed in the following sections.

7.2.1 Theoretical Contributions

This study has several implications for mobile IS research. The key findings of the pilot study highlight the significance of the role of work context in the successful adoption of various mobile technology features. Incorporating work or use context to Beaudry and Pinsonnault's (2005) Coping Model of User Adaptations (CMUA) to technology, extends the knowledge about situations where users' primary appraisal of the mobile technology feature is both a threat and an opportunity facilitating a more fine-grained understanding of further possible users' adaptations behaviours. For instance, the PNC feature was perceived by officers as both a threat and an opportunity. Officers reported in the pilot study's online survey finding this feature useful but reported in the focus groups' sessions avoiding using it as they feared for their safety (unless they are double crewed). This could be attributed to the context in which this feature is being used in. For instance, traffic officers can do vehicle PNC checks while in their police vans (a safe context) while person PNC checks require complete officer attention to the suspect, hence, radio devices are massively used in this context. Therefore, in the context of mobile technology utilisation, we should avoid a dichotomous view about users' primary appraisal of the different technology features because the context of use is a key driver of user adaptations and appraisals in the mobile IS context of use.

This study makes a novel contribution to the policing IS training literature, in particular to the mobile technology training in the post-adoption stage of utilisation. In proposing a new training approach; using FAMT in technology training, the researcher is seeking to fulfil the call of Jasperson et al. (2005) to develop rich conceptualisations of post-adoptive training strategies that examine post-adoptive learning experiences and behaviours. In addition, FAMT integrates both 'acquisition' and 'participatory' learning methods to deliver effective technology training to police officers as argued by Heslop (2011) and Charman (2017). The use of the 'Frame of Patterns' and scenario-based learning in technology training acknowledged the peculiarity of the different types of incidents that officers in various police roles are exposed to. Consequently, it conforms with officers' beliefs that policing is a 'craft' and incorporates their knowledge and policing skills. Cockcroft et al. (2018) highlighted the significance of recognising the paramount role played by human interaction that takes place during the learning process in the field of cybercrime training and called for police policy makers to consider adopting more participatory learning strategies. As FAMT incorporates learners' interactions in situational contexts using 'Frame of Patterns' and scenario-based learning, it fulfils Cockcroft et al.'s criteria of effective cybercrime training.

The results of this study could facilitate advancing the field of mobile IS technology training in the following ways. First, this study highlighted the significance of incorporating the technology context of use in training sessions to extend learners' knowledge about efficient utilisations of the mobile technology features. Second, the study sheds light on the gender differences during the technology learning process and the importance of providing IT support at the time of technology training to female learners. Third, it revealed that co-exploration technology learning methods enhance the learning process of female learners while self-exploration is appropriate for male learners. Fourth, the use of the collaborative learning methods in police mobile technology training is novel and this study emphasises its' profound impact on consolidating the learning process among officers. Fifth, the study adds to the current body of literature on the accentuated impact of not only police culture on the learning process but also of recruiting male super-users to deliver technology training on their colleagues' IT utilisation beliefs and behaviours. It demonstrated and identified key attributes that super-users should possess to ensure the effective delivery of technology training programmes.

7.2.2 Methodological Contribution

This dissertation contributes to policing mobile IS research by extending the scope of the explorative interpretive qualitative research studies conducted in this discipline to envisage pragmatic Action research approaches. These qualitative studies aimed to examine the different aspects of mobile IS utilisation in police forces. However, using qualitative data collection methods solely cannot provide enough insights on the extent or magnitude of officers' adoption and utilisation of the various mobile technology's functionalities in their policing daily tasks. Hence, the significance of adopting pragmatism through combining qualitative and quantitative data collection methods to address policing IS problems. Combining qualitative and quantitative methods "provides a richer, contextual basis for interpreting and validating results" (Kaplan and Duchon, 1988:575).

Furthermore, Action research has been adopted and developed successfully as an approach to IS research (Avison et al. 1999; Davison et al., 2012; Malaurent and Avison, 2015; Baham et al., 2017; Baird et al., 2017; Yang et al., 2017). Using a multi-method approach, in this study, to collect data; observations, text messages (SMS), online surveys, focus groups, unstructured interviews and Q-card ranking have facilitated the collection of invaluable information about the key determinants of delivering successful technology training sessions. These sessions have promoted efficient utilisation of technology features, in addition to boosting learners' satisfaction and trust in the technology. Therefore, this dissertation extends policing mobile IS research methodologies to envisage Action research as a valid research methodology in this discipline.

7.2.3 Practical Contributions

This dissertation results are also of consequence for practitioners. This study answers the call of Fuller and Dennis (2009) and Bhattacherjee et al. (2018) to conduct appropriation training programmes that provide flexible learning opportunities to help users who believe they have less control over their IT use. Therefore, the results of this research emphasise the key determinants to successful delivery of flexible technology training programmes that promote problem-focused users' adaptations and enhance their control over technology use. It highlights the significant role of providing IT support during technology training. This role should not be underestimated by mangers as it impacts profoundly on female workers' technology learning. Additionally, the study sheds light on the key attributes that super-users should possess to be able to deliver effective technology training programmes in organisations. Investing in training super-users on how to manage a training session and professionally present technology features can maximise the benefits of the technology training and promote positive attitudes towards the technology features among the learners.

Furthermore, the study stresses the key role played by management to identify the causes of resistance to technology post-adoption utilisation and to incorporate suitable methods of rectifying these problems. For instance, at the Constabulary, the identification of the unfeasibility of using the Kelvin devices' small keyboard in performing many policing tasks has highlighted the importance of training officers on using other data input methods like using the Speech to Text feature. Hence, the benefits of using advanced mobile technology will not be gained as a direct result of simply introducing the devices and rolling out a one day training session but will be attained from a process of continually assessing the technical and utilisation needs of the users of these systems and conducting refresher training sessions that disrupts the limited usage patterns and promotes innovative ways of using the full range of functionalities of the technology.

Moreover, the results of this study reveal the paramount role of using problem-based learning and scenario-based learning in technology training. These methods consolidated the learning process and were highly perceived by police officers as effective methods of learning. This dissertation is the first research study to use the collaborative learning methods in technology training generally and specifically in British police forces.

7.3 Implications of the Research Approach

The key contribution of this dissertation is that it has provided valuable insights about the determinants of conducting effective technology training that incorporates learners' needs by enhancing learners' technical skills as well as linking the feature usage to the work context. Adopting a multi-method pragmatic action research approach facilitated identifying important aspects that impact on the technology learning process like gender differences through using exploratory learning methods and problem-based/scenario-based learning techniques. Using CMUA and FAMT in the study enriched the data collected about aspects of effective technology training and identified successful strategies to incorporate in future technology training programmes. The findings of the study could have wider applicability to other contexts where the utilisation of mobile technology is mandatory. As discussed in chapter three, this research can claim to offer generalisation to theory (Lee and Baskerville, 2003) as it modified the pilot study's initial guiding theoretical model (CMUA) based on the findings from the pilot study's data and offered a thick description of the results of applying the theories used in the design of FAMT which can be useful for both researchers and practitioners in the mobile IS research discipline.

Furthermore, Kirk and Miller (1986) posit that synchronic reliability is a necessary premise of generalisability while Gummesson (2000) argues that validity is a sounder criterion for generalisation. Both synchronic reliability and validity were fulfilled in this study as discussed in section 3.4.3.3.

7.4 Research Limitations

Whilst the pilot study participants sample's size is adequate to collect rich data about the key causes of resistance to the efficient use of the Kelvin devices in the Constabulary, the training sessions' sample size appears to be limited. It was unfeasible for practical reasons to arrange more training sessions due to the unprecedented reduction in police officers' numbers as a result of austerity. Nevertheless, research studies' findings, regardless of the sample size, are an invaluable source of scientific development and their generalisability powers should not be underestimated by the sample size as argued by Flyvbjerg (2002, 2006, 2013).

In addition, as the agreement between the researcher and the Constabulary stated that the Constabulary is responsible for the process of organising the training sessions and the recruitment of officers, the researcher had no control on ensuring that all participating officers have used the Kelvin devices for the same amount of time. Nevertheless, the survey responses of the only officer who was newly recruited with one-month experience in policing were omitted from the results of this study.

Another limitation is the scope of the study as the pilot study and the technology training sessions were conducted in a UK police force. Even though police forces are a good context to study technology utilisation in mandatory settings, it is highly unlikely that officers would disclose information about appropriating the use of the devices in an unfaithful way. Hence, it was not feasible to report on any unfaithful utilisation of the Kelvin devices' features that can possibly exist in other organisations. Thus, the results of this study cannot be generalised for other contexts of technology utilisation without further validation.

Besides, it was beyond the scope of this study to examine extra-organisational contextual influences (Scheepers et al., 2006) like the magnitude of officers' mobile technology usage in their personal life to identify if their competence in using the mobile devices is driven by congruency with the utilisation of the devices in their personal contexts.

7.5 Areas of Future Research

More future research needs to be undertaken for deeper understanding of the change in learners' emotions because of their reappraisal and adaptations of the Kelvin devices features after attending the technology training sessions. Kashefi's (2014) study has examined individuals' emotions as a result of introducing a new IT system in a medical clinic attached to one of Iran's oil and gas industry companies. His study examined the change in users' emotions in the adoption and the post-adoption stages. Kashefi's (2014) study used the CMUA and extended the model to include emotions as a mediator to better understand the different users' IT adaptations especially the non-IT savvy ones. His proposed model can be used to investigate the impact of using FAMT on users' emotions and subsequent users' adaptations and behaviours.

Future research can build upon this study to shed light on examining different methods of identifying female super-users in organisations. This rarely investigated area deserves more focus and research. Moreover, more studies need to investigate the impact of recruiting female super-users to deliver technology training on the learning process. Research questions should address the potential of enhancing female and/or male learners' perceptions of behavioural control as a result of recruiting female super-users to deliver technology training in organisations.

Furthermore, police officers use different types of mobile ISs to complete their daily tasks. Another area of investigation concern studying the impact of using FAMT on the learning process of other types of mobile technology. This can extend FAMT's design to accommodate for other determinants of technology training that best fit different mobile ISs.

References

Ackerman, P. L., Kyllonen, P. C. and Roberts, R. D. (1999) Learning and Individual Differences: Process, Trait, and Content Determinants. Washington, DC: American Psychological Association.

Ackroyd, S., Harper, R., Hughes, J.A., Shapiro, D. and Soothill, K. (1992) New Technology and Practical Police Work. Open University Press: Buckingham, Philadelphia.

ACPO Report (2006) Professionalising Neighbourhood policing. http://library.college.police.uk/docs/acpo/Professionalising-NeighbourhoodPolicing.pdf [Accessed 07/01/2020]

Adami M.F. (2005) The Use of Triangulation for Completeness Purposes. Nurse Researcher 12(4), pp.19–29

Agarwal, M., Rao, H.R. and Sanders, G.L. (2003) Impact of Mobile Computing Terminals in Police Work. Journal of Organizational Computing and Electronic Commerce, 13(2), pp.73-89.

Agarwal, R. and Karahanna, E. (2000) Time Flies When You're Having Fun: Cognitive Absorption and Beliefs about Information Technology Usage. MIS Quarterly, 24(4), pp. 665–694.

Agarwal, R. and Prasad, J. (1998) A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology. Information Systems Research, 9(2), pp. 204–215.

Agarwal, R. and Prasad, J. (1999) Are Individual Differences Germane to the Acceptance of Information Technologies? Decision Sciences, 30(2), pp. 361-391.

Agarwal, R., Sambamurthy, V. and Stair, R. (2000) The Evolving Relationship Between General and Specific Computer Self-Efficacy: An Empirical Assessment. Information Systems Research, 11(4), pp. 418-430.

Ahuja, M.K. and Thatcher, J.B. (2005) Moving Beyond Intentions and Toward the Theory of Trying: Effects of Work Environment and Gender on Post-adoption Information Technology Use. MIS Quarterly, 29 (3), pp. 427–459.

Ajzen, I. (1991) The Theory of Planned Behaviour. Organisational Behaviour and Human Decision Processes, 50, pp.179-211.

Ajzen, I. (2002) Perceived Behavioural Control, Self-efficacy, Locus of Control and the Theory of Planned Behaviour. Journal of Applied Social Psychology, 32(4), pp. 665-683.

Ali, M., Zhou, Li, Miller, L. and Petros, I. (2016) User Resistance in IT: A Literature Review. International Journal of Information Management, 36, pp. 35-43.

Allen, D K and Shoard, M (2005) Spreading the Load: Mobile Information and Communications Technologies and their Effect on Information Overload. Information Research, 10(2), paper 227.

Allen, D K and Wilson, T D (2004) Action, Interaction and the Role of Ambiguity in the Introduction of Mobile Information Systems in a UK police force. In E. Lawrence, B. Pernici, & J. Krogstie (eds), Proceedings of the Mobile Information Systems: IFIP TC8 Working Conference on Mobile Information Systems (Vol. I, pp. 15–37). New York: Springer.

Allen, D K, Wilson, T D, Norman, A W T and Knight, Charles (2008) Information on the Move: The Use of Mobile Information Systems by UK police forces. Information Research, 13 (4).

Allen, D. K., Karanasios, S. and Norman, A. (2014) Information Sharing and Interoperability: the Case of Major Incident Management. European Journal of Information Systems, 23(4), pp.418–432.

Almalki, S. (2016) . Journal of Education and Learning, 5(3), pp. 288-296.

Amoako-Gyampah, K. and Salam, A.F. (2004) An Extension of the Technology Acceptance Model in an ERP Implementation Environment. Information and Management, 41(6), pp. 731-745.

Angrosino, M. and Mays de Perez, K. (2000) Rethinking Observation: From Methods to Context. In: N. K. Denzin and Y. S. Lincoln (eds), Handbook of Qualitative Research (second edition). Thousand Oaks, California: Sage Publications.

Ausubel, D.P. (1968) Education Psychology: A Cognitive View. New York: Holt, Reinhart and Winston.

Avison, D., Baskerville, R and Myers, MD (2001) Controlling Action Research Projects. Information Technology and People, West Linn, 14(1), pp. 28-45.

Avison, D., Davison, R. and Malaurent, J. (2018) Information Systems Action Research: Debunking Myths and Overcoming Barriers. Information and Management, 55(2), pp. 177-187.

Avison, D., Lau, F., Myers, M. D. and Nielsen, P. A. (1999) Action Research. Communications of the ACM, 42(1), pp. 94-97.

Bagayogo, F., Beaudry, A. and Lapointe, L. (2013) Impacts of IT Acceptance and Resistance Behaviors: A Novel Framework. Thirty Fourth International Conference on Information Systems, Milan, Italy.

Bagayogo, F., Lapointe, L. and Bassellier, G. (2014) Enhanced Use of IT: A New Perspective on Post-Adoption. Journal of the Association for Information Systems, 15(7), pp.361-387.

Bagozzi, R. and Kimmel, S. (1995) A Comparison of Leading Theories for the Prediction of Goal-directed Behaviours. British Journal of Social Psychology, 34(4), pp. 437-461.

Baham, C., Hirschheim, R., Calderon, A. A. and Kisekka, V. (2017) An Agile Methodology for the Disaster Recovery of Information Systems Under Catastrophic Scenarios. Journal of Management Information Systems, 34(3), pp. 633–663.

Baird, A., Davidson, E. and Mathiassen, L. (2017) Reflective Technology Assimilation: Facilitating Electronic Health Record Assimilation in Small Physician Practices. Journal of Management Information Systems, 34(3), pp. 664-694

Balkin. S. and Houlden, P. (1983) Reducing Fear of Crime Through Occupational Presence. Criminal Justice and Behavior, 10(1), pp.13-33.

Bandura, A. (1977a) Social Learning Theory. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1977b) Self-Efficacy: Toward a Unifying Theory of Behavioural Change. Psychological Review, 84(2), pp. 191-215.

Banta, T., Black, K. and Kline, K. (2001) Assessing the Effectiveness of Problem-based Learning. Assessment Update, 13(1), pp. 3–11.

Barki, H., Titah, R. and Boffo, C. (2007) Information System Use-Related Activity: An Expanded Behavioural Conceptualisation of Individual-Level Information System Use. Information Systems Research, 18(2), pp.173-192.

Barrows, H. S. (1996) Problem-based Learning in Medicine and Beyond: A Brief Overview. New Directions for Teaching and Learning, 68, pp. 3-12.

Basch C. (1987) Focus Group Interview: An Underutilised Research Technique for Improving Theory and Practice in Health Education. Health Education Quarterly. 14(4), pp.411–448.

Baskerville, R and Myers, MD (2004) Special Issue on Action Research in Information Systems: Making IS research Relevant to Practice-Foreword. MIS Quarterly, 28(3), pp. 329-335.

Baskerville, R. and Wood-Harper, A. T. (1998) Diversity in Information Systems Action Research Methods. European Journal of Information Systems, 7(2), pp. 90-107.

Baskerville, R. L. and Wood-Harper, A. T. (1996) A Critical Perspective on Action Research as a Method for Information Systems Research. Journal of Information Technology, 11(3), pp. 235-246.

Bearison, D. J. (1982) New Directions in Studies of Social Interactions and Cognitive Growth. Social Cognitive Development in Context, Guilford, NY.

Beaudry, A and Pinsonneault, A (1998) Appropriation of Information Technology: A Requisite for Improved Individual Performance. AMCIS 1998 Proceedings. Paper 238.

Beaudry, A. and Pinsonneault, A. (2005) Understanding User Responses to Information Technology: A Coping Model of User Adaptation. MIS Quarterly, 29(3), pp. 493-524.

Beaudry, A. and Pinsonneault, A. (2010) The Other Side of Acceptance: Studying the Direct and Indirect Effects of Emotions on Information Technology Use. MIS Quarterly, 34(4), December, pp. 689-710.

Belanger, F., Collins, R. W. and Cheney, P. H. (2001) Technology Requirements and Work Group Communication for Telecommuters. Information Systems Research, 12(2), pp.155–176.

Benbasat, I., Goldstein, D. K. and Mead, M. (1987) The Case Research Strategy in Studies of Information Systems. MIS Quarterly, 11(3), pp. 369-386.

Berker, T., Hartmann, M., Punie, Y. and Ward, K. (eds) (2005) Domestication of Media and Technologies, Maidenhead, UK: Open University Press.

Bernard, H. (1994) Research Methods in Anthropology: Qualitative and Quantitative Approaches. Second Edition, Walnut Creek, CA: AltaMira Press.

Bhattacherjee, A. (1998) Managerial Influences on Interorganisational Information Technology Use: A Principle-Agent Model. Decision Sciences, 29(1), pp. 139-162.

Bhattacherjee, A. (2001) Understanding Information Systems Continuance: An Expectation-Confirmation Model. MIS Quarterly, 25(3), pp. 351-370.

Bhattacherjee, A. and Hikmet, N. (2007) Physicians' Resistance Toward Healthcare Information Technology: A Theoretical Model and Empirical Test. European Journal of Information Systems 16(6), pp.725–737.

Bhattacherjee, A. and Premkumar, G. (2004) Understanding Changes in Belief and Attitude Toward Information Technology Usage: A Theoretical Model and Longitudinal Test. MIS Quarterly, 28(2), pp. 229–254.

Bhattacherjee, A., Davis, C., Connolly, A. and Hikmet, N. (2018) User Response to Mandatory IT Use: A Coping Theory Perspective. European Journal of Information Systems, 27(4), pp. 395 – 414.

Bhattacherjee, A., Perols, J. and Sanford, C. (2008) Information Technology Continuance: A Theoretic Extension and Empirical Test. Journal of Computer Information Systems, 49(1), pp. 17-26.

Birzer, M. (2003) The Theory of Andragogy Applied to Police Training. Policing: An International Journal of Police Strategies and Management, 26(1), pp. 29-42.

Birzer, M.L. and Tannehill, R. (2001) A More Effective Training Approach for Contemporary Policing, Police Quarterly, 4(2), pp. 233–252.

Bligh DA (1998) What's the Use of Lectures. Fifth Edition, Intellect, Exeter, UK.

Blum, F. (1955) Action Research- A Scientific Approach? Philosophy of Science, 22(1), pp.1-7.

Blumer, H. (1969) Symbolic Interactionism: Perspective and Method. Upper Saddle River, NJ: Prentice Hall.

Bonoma, T.V. (1985) Case Research in Marketing: Opportunities, Problems and a Process. Journal of Marketing Research, 22(2), pp. 199-208.

Bostrom, R. and Heinen, J. (1977) MIS Problems and Failures: A Socio-technical Perspective. Part 1: The Causes. MIS Quarterly, 1(3), pp.17-32.

Boud, D. and Feletti, G. (1997) Changing Problem-based Learning [Introduction]. In D. Boud and G. Feletti (eds), The challenge of problem-based learning, second edition, pp. 1-14. London: Kogan Page.

Boudreau, MC. and Robey, D. (2005) Enacting Integrated Information Technology: A Human Agency Perspective. Organization Science, 16(1), pp.3–18.

Bradford, D. and Pynes, J. (1999) Police Academy Training: Why Hasn’t It Kept Up with Practice? Police Quarterly, 2(3), pp.283–301.

Braun, V. and Clarke, V. (2006) Using Thematic Analysis in Psychology. Qualitative Research in Psychology, 3(2), pp.77-101.

Breitmayer, B.J., Ayres, L. and Knafl, K.A. (1993) Triangulation in Qualitative Research: Evaluation of Completeness and Confirmation Purposes. Image: Journal of Nursing Scholarship, 25(3), pp. 237-243.

Brown, H., Poole, M. and Rodgers, T. (2004) Interpersonal Traits, Complementarity, and Trust in Virtual Collaboration. Journal of Management Information Systems, 20(4), pp. 115-138.

Brown, J. (1997) European Policewomen: A Comparative Research Perspective. International Journal of the Sociology of Law, 25, pp. 1-19.

Brown, M. K. (1988) Working the street: Police Discretion and the Dilemmas of Reform. Second Edition, New York: Russell Sage Foundation.

Brown, S. A., Massey, A. P., Montoya-weiss, M. M. and Burkman, J. R. (2002) Do I really have to? User acceptance of mandated technology. European Journal of Information Systems, 11(4), pp.283-295.

Burkhardt, M. (1994) Social Interaction Effects following a Technological Change: A Longitudinal Investigation. The Academy of Management Journal, 37(4), pp.869-898.

Burton-Jones, A. and Straub, D. (2006) Reconceptualising System Usage: An Approach and Empirical Test. Information Systems Research, 17(3), pp. 228-246.

Cain, D. (2012) Gender Within a Specialised Police Department: An Examination of the Cultural Dynamics of a Police Firearms Unit. Unpublished Professional Doctorate. Portsmouth: University of Portsmouth.

Calder B.J. (1977) Focus Groups and the Nature of Qualitative Marketing Research. Journal of Marketing Research, 14(3), pp.353–364.

Carlson, J.R. and Zmud, R.W. (1999) Channel Expansion Theory and the Experiential Nature of Media Richness Perceptions. Academy of Management Journal, 42(2), pp 153-170.

Carroll, J.M., Mack, R.L., Lewis, C.H., Grishckowski, N.L. and Robertson, S.R. (1985) Exploring exploring a Word Processor. Human- Computer Interaction, 1(3), pp. 283-307.

Carroll, J.M., Smith-Kerker, P.L., Ford, J.R. and Mazur-Rimetz, S.A. (1987) The Minimal Manual. Human-Computer Interaction, 3(2), pp. 123-153.

Chan, J, Brereton, D, Legosz, M and Doran, S. (2001) E-policing: The Impact of Information Technology on Police Practices. Criminal Justice Commission, Brisbane.

Chan, J. (1997) Changing Police Culture: Policing in a Multicultural Society. Cambridge: Cambridge University Press.

Chan, J. (2001) The Technological Game: How Information Technology is Transforming Police Practice. Criminal Justice, 1(2), pp. 139-159.

Chan, J., Devery, C. and Doran, S. (2003) Fair Cop: Learning the Art of Policing. Toronto: University of Toronto Press.

Chapman, C, Paterson, M and Medves (2011) The QUIPPED Project: Exploring Relevance and Rigor of Action Research Using Established Principles and Criteria, The Qualitative Report, 16(1), pp. 208-228.

Charman, S. (2017) Police Socialisation, Identity and Culture-Becoming Blue. London: Palgrave Macmillan.

Charmaz, K. (2014) Constructing Grounded Theory: A Practical Guide through Qualitative Analysis. Second Edition, Thousand Oaks, California: Sage Publications.

Chua, S.L., Chen, D.-T. and Wong, A.F.L. (1999) Computer Anxiety and its Correlates: A Metanalysis. Computers in Human Behaviour, 15(5), pp.609–623.

Clark, T. D., Jones, M. C. and Zmud, R. W. (2009) Post-adoptive ERP Use Behaviors: A Dynamic Conceptualization. Proceedings of the 27th International Conference of the System Dynamics Society, Albuquerque, NM.

Cleveland, G. and Saville, G. (2007) Police PBL: Blueprint for the 21st Century. https://www.readkong.com/tmp/police-pbl-5997532-readkong-com.pdf [Accessed 08/01/2020]

Cockcroft, T. (2013) Police Culture: Themes and Concepts. Abingdon: Routledge.

Cockcroft, T. (2014) Police Culture and Transformational Leadership: Outlining the Contours of a Troubled Relationship. Policing: A Journal of Policy and Practice, 8(1), pp. 5-13.

Cockcroft, T. (2015) Golden Ages, Red Herrings and Post-Keynesian Policing: Understanding the Role of Police Culture in the Police Professionalism Debate. Nordisk Politiforskning, 2(2), pp. 183-196.

Cockcroft, T. and Beattie, I. (2009) Shifting Cultures: Managerialism and the Rise of "Performance". Policing: An International Journal of Police Strategies and Management, 32(3), pp. 526-540.

Cockcroft, T., Shan-A-Khuda, Schreders, Z. and Trevorrow, P. (2018) Police Cybercrime Training: Perceptions, Pedagogy, and Policy. Policing: A Journal of Policy and Practice, pay078, pp. 1-19.

Colliver, J. (2000) Effectiveness of Problem-based Learning Curricula: Research and Theory. Academic Medicine, 75(3), pp.259–266.

Colvin, C.A and Goh, A. (2005) Validation of the Technology Acceptance Model for Police. Journal of Criminal Justice, 33(1), pp. 89-95.

Compeau, D. R. and Higgins, C. A. (1995a) Application of Social Cognitive Theory to Training for Computer Skills. Information Systems Research, 6(2), pp.118-143.

Compeau, D. R. and Higgins, C. A. (1995b) Computer Self-Efficacy: Development of a Measure and Initial Test. MIS Quarterly, 19(2), pp. 189-211.

Compeau, D. R., Olfman, L. and Sein, M. K. (1995) End-user Training and Learning. Communications of the ACM, 38(7), pp 24-26.

Compeau, D. R.,Higgins, C. A. and Huff, S. (1999) Social Cognitive Theory and Individual Reactions to Computing Technology: A Longitudinal Study. MIS Quarterly, 23(2), pp. 145-158.

Connolly, T. and Thorn, B. K. (1987) Predecisional Information Acquisition—Effects of Task Variables on Suboptimal Search Strategies. Organisational Behaviour and Human Decision Processes, 39(3), pp.397-416.

Constable, J. and Smith, J. (2015) Initial Police Training and the Development of Police Occupational Culture. In P. Wankhade and D. Weir (eds), Police Services: Leadership and Management Perspectives (pp. 45-60). New York: Springer International Publishing.

Coogan, J and Herrington, N. (2011) Q-methodology: An Overview. Research in Secondary Teacher Education, 1(2), pp. 24-28.

Cooper, R. and Zmud, R. (1990) Information Technology Implementation Research: A Technological Diffusion Approach. Management Science, 36(2), pp.123-246.

Corbin, J and Strauss, A. (2015) Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Fourth edition. Sage Publications.

Cotton, J. (1995) The Theory of Learners: An Introduction. London: Kogan-Page.

Cragg, P. and King, M. (1993) Small-firm Computing: Motivators and Inhibitors. MIS Quarterly, 17(1), pp.47-60.

Crant, J.M. (2000) Proactive Behaviour in Organizations. Journal of Management, 26(3), pp.435–462.

Creswell, J.W. (1998) Qualitative Inquiry and Research Design: Choosing Among Five Traditions. Thousand Oaks, CA: Sage Publications.

Cross, P. K. (1981) Adults as Learners: Increasing Participation and Facilitating Learning. San Francisco: Jossey-Bass.

Davis, A. and Bostrom, R. (1993) Training End Users: An Experimental Investigation of the Roles of the Computer Interface and Training Methods. MIS Quarterly, 17(1), pp. 61-85.

Davis, F. D. (1989) Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly,13(3), pp. 319-339.

Davis, F. D., Bagozzi, R. P. and Warshaw, P. R. (1989) User Acceptance of Computer Technology: A Comparison of two theoretical models. Management Science, 35(8), pp.982-1003.

Davis, F. D., Bagozzi, R. P. and Warshaw, P. R. (1992) Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. Journal of Applied Social Psychology, 22(14), pp. 1111–1132.

Davison, R., Martinsons, M. and Kock, N. (2004) Principles of Canonical Action Research. Information Systems Journal, 14(1), pp.65-86.

Davison, R., Martinsons, M. and Ou, C. (2012) The Roles of Theory in Canonical Action Research. MIS Quarterly, 36(3), pp. 763-786.

DeLone, W.H. and McLean, E.R. (1992) Information Systems Success: The Quest for the Dependent Variable. Information Systems Research, 3(1), pp. 60–95.

DeLone, W.H. and McLean, E.R. (2003) The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. Journal of Management Information Systems, 19 (4), pp. 9-30.

Dennis, A. R., Wixom, B. H. and Vandenberg, R. J. (2001) Understanding Fit and Appropriation Effects in Group Support Systems via Meta-Analysis. MIS Quarterly, 25(2), pp.167–193.

DeSanctis, G and Poole, MS (1994) Capturing the Complexity in Advanced Technology Use-Adaptive Structuration Theory. Organization Science, 5(2), pp. 121-147.

Dewey, J. (1931) Philosophy and Civilisation. Minton. New York: Balch and Co.

Dewey, J. (1938) Logic: The Theory of Inquiry. New York:Henry Holt.

Dick, P. and Jankowicz, D. (2001) A Social Constructionist Account of Police Culture and its Influence on the Representation and Progression of Female Officers: A Repertory Grid Analysis in a UK Police Force. Policing: An International Journal of Police Strategies and Management, 24(2), pp. 181-199.

Dishaw, M. T. and Strong, D. M. (1998) Supporting Software Maintenance with Software Engineering Tools: A Computed Task-Technology Fit Analysis. The Journal of Systems and Software, 44, pp.107–120.

Dishaw, M. T. and Strong, D. M. (1999) Extending the Technology Acceptance Model with Task Technology Fit Constructs. Information and Management, 36(1), pp. 9–21.

Docherty, C., Hoy, D., Topp, H. and Trinder, K. (2005) ELearning Techniques Supporting Problem-based Learning in Clinical Simulation. International Journal of Medical Informatics, 74(7/8), pp.527–533.

Dochy, F., Segers, M. and Bossche, P. (2003) Effects of Problem-based Learning: A meta-analysis. Learning and Instruction, 13, pp.533-568.

Doppler, K. (2004) Managing Change Successfully: Core Questions, Issues, and Strategies. Dynamics of Organisational Change and Learning. UK: John Wiley and Sons.

Dunkerley, E, Allen, D, Pearman, A, Karanasios, S and Crump, J.(2014) The Influence of Social Media on Information Sharing and Decision Making in Policing:

Research in Progress. In Proceedings of ISIC, the Information Behaviour Conference, Leeds, pp.2-5.

Durndell, A. and Haag, Z. (2002) Computer Self-efficacy, Computer Anxiety, Attitudes Towards the Internet and Reported Experience with the Internet, by Gender, in an East European sample. Computers in Human Behavior, 18(5), pp.521–535.

Eagly, A. and Chaiken, S. (1993) The Psychology of Attitudes. Fort Worth, TX: Harcourt Brace Jovanovich College Publishers.

Elie-Dit-Cosaque, C. and Straub, D. (2011) Opening the Black Box of System Usage: User Adaptation to Disruptive IT. European Journal of Information Systems, 20(5), pp. 589-607.

Elie-Dit-Cosaque, C., Pallud, J. and Kalika, M. (2011) The Influence of Individual, Contextual, and Social Factors on Perceived Behavioural Control of Information Technology: A Field Theory Approach. Journal of Management Information Systems, 28(3), pp. 201-234.

Engeström, Y. (1999) Innovative Learning in Work Teams: Analyzing Cycles of Knowledge Creation in Practice. In Engestriom, Y., Miettinen, R. and Punamki, R-L (eds), Perspectives on Activity Theory, Cambridge: Cambridge University Press.

Engeström, Y. (2001) Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization. Journal of Education and Work, 14(1), pp.133-156.

Engeström, Y. (2015) Learning by Expanding: An Activity-Theoretical Approach to Developmental Research. Second Edition, Cambridge: Cambridge University Press.

Fadel, K. (2012) User Adaptation and Infusion of Information Systems. Journal of Computer Information Systems, 52(3), pp.1-10.

Fadel, K. and Brown, S. (2010) Information Systems Appraisal and Coping: The Role of User Perceptions. Communications of the Association for Information Systems, 26(1), pp. 107-126.

Ferneley, E. H. and Sobreperez, P. (2006) Resist, Comply or Workaround? An examination of Different Facets of User Engagement with Information Systems. European Journal of Information Systems, 15(4), pp. 345-356.

Fichman, R. G. (1992) Information Technology Diffusion: A Review of Empirical Research. In Proceedings of the International Conference on Information Systems, 39, pp.195-206.

Fielding, N.G. (1994) Cop Canteen Culture. In T. Newburn and E.A. Stanko (eds), Just Boys Doing Business: Men, Masculinities and Crime, New York: Routledge.

Fishbein, M. and Ajzen, I. (1975) Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research. Reading, MA: Addison-Wesley Pub Co.

Flyvbjerg, B (2002) Making Social Science Matter: Why Social Inquiry Fails and How It Can Succeed Again. Cambridge: Cambridge University Press.

Flyvbjerg, B (2013) Five Misunderstandings About Case Study Research. In Savin-Baden and Major (eds), Qualitative Research: The Essential Guide to Theory and Practice, Milton Park, Abingdon, Oxon: Routledge.

Flyvbjerg, B. (2006) Five Misunderstandings About Case Study Research. Qualitative

Folch-Lyon, E. and Trost, J. (1981) Conducting Focus Group Sessions. Studies in Family Planning, 12(12), pp. 443-449.

Frese, M. and Fay, D. (2001) Personal Initiative: An Active Performance Concept for Work in the 21st Century. Research in Organisational Behaviour, 23, pp.133–187.

Fulk, J. (1993) Social Construction of Communication Technology. The Academy of Management Journal, 36(5), pp. 921-950.

Fuller, R. M. and Dennis, A. R. (2009) Does Fit Matter? The Impact of Task-Technology Fit and Appropriation on Team Performance in Repeated Tasks. Information Systems Research, 20(1), pp.2-17.

Galliers, R. (1993) Research Issues in Information Systems. Journal of Information Technology, 8(2), pp. 92–98.

Gallivan, M., Spitler, V. and Koufaris, M. (2005) Does Information Technology Training Really Matter? A Social Information Processing Analysis of Co-workers' Influence on IT Usage in the Workplace. Journal of Management Information Systems, 22(1), pp. 153-192.

Gebauer, J. and Ginsburg, M. (2009) Exploring the Black Box of Task-Technology Fit: The Case of Mobile Information Systems. Communications of the ACM, 52(1), pp.130-135.

Gebauer, J. and Shaw, M.J. (2004) Success Factors and Impacts of Mobile Business Applications: Results from a Mobile E-procurement Study. International Journal of Electronic Commerce, 8(3), pp.19-41.

Gebauer, J. and Tang, Y. (2008) Applying the Theory of Task-Technology Fit to Mobile Technology: The Role of User Mobility. International Journal of Mobile Communications, 6(3), pp. 321-344.

Gebauer, J., Gribbins M. and Shaw, M.J (2006) Task-Technology Fit for Mobile Information Systems. University of Illinois at Urbana-Champaign, College of Business Working Paper, 06-0107.

Gebauer, J., Shaw, M.J and Gribbins, M. (2010) Task-Technology Fit for Mobile Information Systems. Journal of Information Technology, 25, pp. 259-272.

Gersick, C. J. G. and Hackman, J. R. (1990) Habitual Routines in Task- performing Groups. Organisational Behavior and Human Decision Processes, 47(1), pp. 65–97.

Gibbs, G. R. (2007) Thematic Coding and Categorizing. In Qualitative Research Kit: Analysing Qualitative Data (pp. 38-55), London, England: Sage Publications.

Giddens, A. (1984) The Constitution of Society: Outline of the Theory of Structuration. Berkeley: University of California Press.

Ginzberg, M. J. (1981) Early Diagnosis of MIS Implementation Failure: Promising Results and Unanswered Questions. Management Science, 27(4), pp. 459-478.

Gist, M. E., Rosen, B. and Schwoerer, C. (1988) The Influence of Training Method and Trainee Age on the Acquisition of Computer Skills. Personnel Psychology, 41(2), pp. 255-265.

Gist, M. E., Schwoerer, C. and Rosen, B. (1989) Effects of Alternative Training Methods on Self-efficacy and Performance in Computer Software Training. Journal of Applied Psychology, 74(6), pp. 884-891.

Goldkuhl, G. (2004) Meanings of Pragmatism: Ways to Conduct Information Systems Research. Proceedings of the Second International Conference on Action in Language, Organisations and Information Systems (ALOIS), Linkoping University.

Goldkuhl, G. (2008a) Practical Inquiry as Action Research and Beyond. In Proceedings of the 16th European Conference on Information Systems, Galway.

Goldkuhl, G. (2008b) What Kind of Pragmatism in Information Systems Research? AIS Special Interest Group on Pragmatist IS Research, Proceedings of Inaugural Meeting AIS, Paris, pp.9-14.

Goldkuhl, G. (2012) Pragmatism Vs Interpretivism in Qualitative Information Systems Research. European Journal of Information Systems, 21(2), pp. 135-146.

Goles, T and Hirschheim, R (2000) The Paradigm is Dead, the Paradigm is Dead … Long Live the Paradigm: The Legacy of Burell and Morgan. Omega: The International Journal of Management Science, 28, pp 249-268.

Goodhue, D.L (1995) Understanding User Evaluations of Information Systems. Management Science, 41(12), pp.1827-1844.

Goodhue, D.L., Klein, B.D. and March, S.T. (2000) User Evaluations of IS as Surrogates for Objective Performance. Information and Management, 38(2), pp.87-101.

Goodhue, Dale L and Thompson, Ronald L (1995) Task-technology Fit and Individual Performance. MIS Quarterly, 19(2), pp.213-236.

Gregor, S. (2006) The Nature of Theory in Information Systems. MIS Quarterly, 30(3), pp.611-642.

Griffith, T. L and Northcraft, G. B. (1994) Distinguishing between the Forest and the Trees: Media, Features and Methodology in Electronic Communication Research. Organisation Science, 5(2), pp. 272-285.

Griffith, T. L. (1999) Technology Features as Triggers for Sense Making. Academy of Management Review, 24(3), pp. 472-488.

Gummesson, E. (2000) Qualitative Methods in Management Research. Second Edition, Thousand Oaks, London: Sage Publications.

Gupta, S and Bostrom, R (2009) Technology-Mediated Learning: A Comprehensive Theoretical Model. Journal of the Association for Information Systems, 10(9), pp. 686-714.

Gupta, S, Bostrom, R. and Huber, M. (2010) End-User Training Methods: What We Know, Need to Know. The Data Base for Advances in Information Systems, 41(4), pp.3-39.

Haddara, M. and Moen, H. (2017) User Resistance in ERP Implementations: A Literature Review. Procedia Computer Science, 121, pp. 859-865.

Haddon, L. (2006) The Contribution of Domestication Research to In-Home Computing and Media Consumption. The Information Society, 22(4), pp.195-203.

Hampton, P and Langham, M. (2005) A Contextual Study of Police Car Telematics: The Future of In-car Information Systems. Ergonomics, 48(2), pp.109-118.

Hansman, C.A. (2001) Context-Based Adult Learning. In S.B. Merriam (ed.), The New Update on Adult Learning Theory (pp. 43-51), San Francisco: Jossey-Bass.

Harding, S. (1986) The Science Question in Feminism. London: Cornell University Press.

Harrison, D., Mykytyn, P. and Riemenschneider, C. (1997) Executive Decisions about Adoption of Information Technology in small Business: Theory and Empirical Tests. Information Systems Research, 8(2), pp. 171-195.

Hartwick, J. and Barki, H. (1994) Explaining the Role of User Participation in Information System Use. Management Science, 40(4), pp.440-465.

Hartzel, K. (2003) How Self-efficacy and Gender Issues Affect Software Adoption and Use. Communications of the ACM, 46(9), pp.167–171.

Heslop, R. (2006) 'Doing a Maslow': Humanistic Education and Diversity in Police Training. The Police Journal: Theory, Practice and Principles, 79(4), pp.331-341.

Heslop, R. (2011) Community Engagement and Learning as 'Becoming': Findings from a Study of British Police Recruit Training. Policing and Society: An International Journal of Research and Policy, 21(3), pp. 327-342.

Hiltz, S. and Turoff, M. (1981) The Evolution of User Behaviour in a Computerised Conferencing Center. Communications of the ACM, 24(11), pp. 739-751.

Hirschheim, R. and Newman, M. (1988) Information Systems and User Resistance: Theory and Practice. The Computer Journal, 31(5), pp. 398 – 408.

HMIC (2002). Training Matters. London: Home Office. https://www.justiceinspectorates.gov.uk/hmicfrs/media/training-matters-20020101.pdf [Accessed 10/01/2020]

HMIC (2016) PEEL: Police Efficiency 2016. https://www.justiceinspectorates.gov.uk/hmic/wp-content/uploads/peel-police-efficiency-2016.pdf [Accessed 10/01/2020]

HMICFRS (2017) PEEL: Police Legitimacy (Cumbria Constabulary) 2017. https://www.justiceinspectorates.gov.uk/hmicfrs/publications/peel-police-legitimacy-2017-cumbria/ [Accessed 10/01/2020]

HMICFRS (2018) Public Perceptions of Policing in England and Wales 2018. https://www.bmgresearch.co.uk//wp-content/uploads/2019/01/1578-HMICFRS-Public-Perceptions-of-Policing-2018_FINAL.pdf [Accessed [10/01/2020]

Home Office (1983) Manpower, Effectiveness and Efficiency in the Police Service. 114/83 Circular, Home Office, London.

Home Office (2017) Fact Sheet: Police Funding for 2018/2019 Explained. https://homeofficemedia.blog.gov.uk/2017/12/19/fact-sheet-police-funding-for-2018-19-explained/ [Accessed 10/01/2020]

Hood, C. (1991) A Public Management for All Seasons? Public Administration, 69(1), pp. 3-19.

Houle, C. O. (1984) Patterns of Learning: New Perspectives on Life Span Education. San Francisco: Jossey-Bass.

House Of Commons. (2008) Select Committee on Home Affairs Seventh Report. http://www.publications.parliament.uk/pa/cm200708/cmselect/cmhaff/364/36402.htm [Accessed 10/01/2020]

House Of Commons. (2012) Mobile Information Programme. http://www.publications.parliament.uk/pa/cm201213/cmselect/cmpubacc/129/12906.htm [Accessed 10/01/2020]

Howard, E., Hubelbank, J. and Moore, P. (1989) Employer Evaluation of Graduates: Use of the Focus Group. Nurse Educator, 14(5), pp.38–41.

Hsiao-Lan, W., Wang, E. and Pei-Hung, J. (2005) Understanding Misalignment and Cascading Change of ERP implementation: A Stage View of Process Analysis. European Journal of Information Systems, 14(4), pp.324–334.

Hughes, D. and DuMont, K. (1993) Using Focus Groups to Facilitate Culturally Anchored Research. American Journal of Community Psychology, 21(6), pp.775–806.

Hynes, D. and Richardson, H (2009) What Use is Domestication Theory to Information Systems Research? In Y. Dwivedi, B. Lal, M. Williams, S. Schneberger and M. Wade (eds), Handbook of research on contemporary theoretical models in information systems. IGI Global.

Inquiry, 12(2), pp. 219-245.

Ioimo, R. and Aronson, J. (2003) The Benefits of Police Field Mobile Computing Realized by Non-patrol Sections of a Police Department. International Journal of Police Science and Management, 5(3), pp.195-206.

Ioimo, R. and Aronson, J. (2004) Police Field Mobile Computing: Applying the Theory of Task-technology Fit. Police Quarterly, 7(4), pp.403–428.

James, W. (1907) Pragmatism. A New Name for Some Old Ways of Thinking. New York: Longmans, Green & Co.

Jasperson, J., Cater, P.E. and Zmud, R.W. (2005) A Comprehensive Conceptualization of Post-adoptive Behaviour Associated with Information Technology Enabled Work Systems. MIS Quarterly, 29(3), pp.525–557.

Jasperson, J., Sambamurthy, V and Zmud, R. (1999) Social Influence and Individual IT Use: Unraveling the Pathways of Appropriation Moves. ICIS 1999 Proceedings. Paper 10.

Jiang, J., Muhanna, W. and Klein, G. (2000) User Resistance and Strategies for Promoting Acceptance Across Systems Types. Information and Management, 37(1), pp.25-36.

Johansen, B. and Wedderkopp, N. (2010) Comparison between Data Obtained through Real-time Data Capture by SMS and a Retrospective Telephone Interview. Chiropractic and Osteopathy, 18(10), pp. 1-7.

Kane G.C. and Labianca G. (2011) IS Avoidance in Health Care Groups: A Multilevel Investigation. Information System Research, 22(3), pp. 504-522.

Kaplan, B. and Duchon, D. (1988) Combining Qualitative and Quantitative Methods in Information Systems Research: A Case Study. MIS Quarterly, 12(4), pp. 571-586.

Karahanna, E., Straub, D. and Chervany, N. (1999) Information Technology Adoption Across Time: A Cross-Sectional Comparison of Pre-adoption and Post-adoption Beliefs. MIS Quarterly, 23(2), pp. 183-213.

Karanasios, S. and Allen, D. (2014) Mobile Technology in Mobile Work: Contradictions and Congruencies in Activity Systems. European Journal of Information Systems, 23(5), pp. 529-542.

Kaschek, R. (2008) Challenges to Information Systems Development. AIS Special Interest Group on Pragmatist IS Research, Proceedings of Inaugural Meeting AIS, Paris, pp. 61-66.

Kashefi, A. (2014) Investigating the Link between Users IT Adaptation Behaviours and Individual-Level IT Use Outcomes Using the Coping Model of User Adaptation: A Case Study of a Work System Computerisation Project. Published PhD thesis. Brunel University.

Kashefi, A., Abbott, P. and Ayoung, A. (2015) User IT Adaptation Behaviours: What Have We Learned and Why Does it Matter? Twenty-first Americas Conference on Information Systems, Puerto Rico.

Kay, J. and Thomas, R. C. (1995) Studying Long-term System Use. Communications of the ACM, 38(7), pp.61-69.

Keen, P. (1991) Relevance and Rigour in Information Systems Research. Information Systems Research: Contemporary Approaches and Emergent Traditions. Amsterdam, pp. 27-50.

Kew, ST (2010) Text Messaging: An Innovative Method of Data Collection in Medical Research. BMC Research Notes, 3, article no. 342, pp.1-6.

Kirk, J. and Miller, M. (1986) Reliability and Validity in Qualitative Research. Newbury Park, California: Sage Publications.

Kitzinger J. (1996) Introducing Focus Groups. In Mays N. and Pope C. (eds), Qualitative Research in Health Care, London: B. M. J. Publishing Group.

Klein, H. and Myers, M (1999) A Set of Principles for Evaluating and Conducting Interpretive Field Studies in Information Systems. MIS Quarterly, 23 (1), pp 67-93.

Kling, R. (1980) Social Analyses of Computing: Theoretical Perspective in Recent Empirical Research. ACM Computing Surveys (CSUR), 12(1), pp. 61–110.

Knowles, M. (1984) The Adult Learner: A Neglected Species. Houston, TX: Gulf Publishing Company.

Knowles, M. S. (1980) The Modern Practice of Adult Education: From andragogy vs. pedagogy. New York: Association Press.

Knowles, M. S. (1990) The Adult Learner: A Neglected Species. Houston, TX: Gulf Publishing Co.

Koh, C. E., Prybutok, V. R., Ryan, S. D. and Wu, Y. (2010) A Model for Mandatory Use of Software Technologies: An Integrative Approach by Applying Multiple Levels of Abstraction. Informing Science: The International Journal of an Emerging Trans discipline, 13, pp. 177–203.

Koh, G. C., Khoo, H. E., Wong, M. L. and Koh, D. (2008) The Effects of Problem-based Learning during Medical School on Physician Competency: A Systematic Review. Canadian Medical Association Journal, 178(1), pp.34–41.

Koper, C., Lum, C., Willis, J.J., Woods, D.J. and Hibdon, J. (2015) Realizing the Potential of Technology in Policing: A Multisite Study of the Social, Organizational, and Behavioral Aspects of Implementing Policing Technologies. Washington, DC: National Institute of Justice, Police Executive Research Forum.

Lalley, J. and Miller, R. (2007) The Learning Pyramid: Does it Point Teachers in the Right Direction? Education, 128(1), pp.64–79.

Landry, M. and Banville, C. (1992) A Disciplined Methodological Pluralism for MIS Research. Accounting, Management and Information Technologies, 2(2), pp. 77–97.

Lankton, N., Wilson, E. and Mao, E. (2010) Antecedents and Determinants of Information Technology Habit. Information and Management, 47(5-6), pp.300-307.

Lapointe, L. and Beaudry, A. (2014) Identifying IT User Mindsets: Acceptance, Resistance and Ambivalence. 47th Hawaii International Conference on System Science, pp. 4619-4628. Waikoloa, Hawaii: IEEE.

Lapointe, L. and Rivard, S. (2005) A Multilevel Model of Resistance to Information Technology Implementation. MIS Quarterly, 29(3), September, pp. 461-491.

Lazarus, R. S. and Folkman, S. (1984) Stress, Appraisal and Coping. New York: Springer Publishing Company.

Lee, A. and Baskerville, R. (2003) Generalising Generalisability in Information Systems Research. Information Systems Research, 14(3), pp. 221-243.

Lee, S., Kim, Yeong and Lee, J. (1995) An Empirical Study of the Relationships among End-user Information Systems Acceptance, Training and Effectiveness. Journal of Management Information Systems, 12(2), pp. 189-202.

Lee, Y., Kozar, K. and Larsen, K. (2003) The Technology Acceptance Model: Past, Present and Future. Communications of the Association for Information Systems, 12, article no.50, pp. 752-780.

Leidner, D. E. and Jarvenpaa, S. L. (1995) The Use of Information Technology to Enhance Management School Education: A Theoretical View. MIS Quarterly, 19(3), pp. 265-291.

Leonard-Barton, D. (1987) Implementing Structured Software Methodologies: A Case of Innovation in Process Technology. INFORMS Journal of Applied Analytics, 17(3), pp. 6-17.

Leonard-Barton, D. and Deschamps, I. (1988) Managerial Influence in the Implementation of New Technology. Management Science, 34(10), pp. 1252-1265.

Levy, J. A. (1988) Intersections of Gender and Aging. The Sociological Quarterly, 29(4), pp.479-486.

Lewin, K. (1947a) Frontiers in Group Dynamics. Human Relations, 1, pp.5-41.

Lewin, K. (1947b) Frontiers in Group Dynamics II. Human Relations, 1, pp.143-153.

Lewin, K. (1951) Field Theory in Social Science. Harper and Bros, New York.

Lewis, W., Agarwal, R. and Sambamurthy, V. (2003) Sources of Influence on Beliefs about Information Technology Use: An Empirical Study of Knowledge Workers. MIS Quarterly, 27(4), pp. 657-678.

Lievrouw, L. and Livingstone, S. (eds) (2002) Handbook of New Media: Social Shaping and Social Consequences. London: Sage Publications.

Lim, K., Ward, L. and Benbasat, I (1997) An Empirical Study of Computer System Learning: Comparison of Co-Discovery and Self-Discovery Methods. Information Systems Research, 8(3), pp. 254-272.

Limayem, M., Hirt, S. G. and Cheung, C. M. K. (2007) How Habit Limits the Predictive Power of Intention: The Case of Information Systems Continuance. MIS Quarterly, 31(4), pp. 705-737.

Lin, C. (2004) Examining Technology Usability and Acceptance in Digital Government: A Case Study in Law Enforcement. University of Arizona.

Lindsay, R., Jackson, T. W. and Cooke, L. (2009) The Impact of Mobile Technology on a UK Police Force and their Knowledge Sharing. Journal of Information and Knowledge Management, 8(2), pp. 101–112.

Lindsay, R., Jackson, T. W. and Cooke, L. (2010) Mobile Access to Information Systems in Law Enforcement: An Evaluation of its implications for Data Quality. The Electronic Journal Information Systems Evaluation, 13(2), pp. 143-152.

Lindsay, R., Jackson, T. W. and Cooke, L. (2011) Adapted Technology Acceptance Model for Mobile Policing. Journal of Systems and Information. 13(4), pp. 389-407.

Lindsay, R., Jackson, T. W. and Cooke, L. (2014) Empirical Evaluation of a Technology Acceptance Model for Mobile Policing. Police Practice and Research: An International Journal, 15(5), pp. 419-436.

Lippert, S. (2007) Investigating Postadoption Utilisation: An Examination into the Role of Interorganisational and Technology Trust. IEEE Transactions on Engineering Management, 54(3), pp. 468-483.

Loftus, B. (2008) Dominant Culture Interrupted: Recognition, Resentment and the Politics of Change in an English Police Force. British Journal of Criminology, 48(6), pp. 756-777.

Loftus, B. (2009) Police Culture in a Changing World. Oxford: Oxford University Press.

Loftus, B. (2010) Police Occupational Culture: Classic Themes, Altered Times. Policing and Society: An International Journal of Research and Policy, 20(1), pp. 1-20.

Louis, M. R. and Sutton, R. I. (1991) Switching Cognitive Gears: From Habits of Mind to Active Thinking. Human Relations, 44(1), pp.55-76.

Lu, J., Yao, J.E. and Yu, C.S. (2005) Personal Innovativeness, Social Influences and Adoption of Wireless Internet Services via Mobile Technology. Journal of Strategic Information Systems, 14(3), pp. 245–268.

Lucas, A (2010) Corporate Data Quality Management: From Theory to Practice. In Information Systems and Technologies (CISTI) Fifth Iberian Conference, IEEE.

Lucas, H. and Spitler, V.K. (1999) Technology Use and Performance: A Field Study of Broker Workstations. Decision Sciences, 30(2), pp. 291-311.

Lum, C. (2009) Translating Police Research into Practice. Ideas in American Policing, no. 11. Washington, DC: Police Foundation.

Lum, C., Koper, C. and Willis, J. (2016) Understanding the Limits of Technology's Impact on Police Effectiveness. Police Quarterly, 20(2), pp.135-163.

Lynott, P. P. and McCandless, N. J. (2000) The Impact of Age vs. Life Experience on the Gender Role Attitudes of Women in Different Cohorts. Journal of Women and Aging, 12(2), pp. 5-21.

Lyytinen, K and Rose, GM (2003) The Disruptive Nature of Information Technology Innovations: The Case of Internet Computing in Systems Development Organizations. MIS Quarterly, 27(4), pp. 557–596.

Maanen, V. (1978) People Processing: Strategies of Organisational Socialisation. Organisational Dynamics, 7(1), pp.19-36.

Majchrzak, A., Malhotra, A. and John, R. (2005) Perceived Individual Collaboration Know-how Development through Information Technology-enabled Contextualization: Evidence from Distributed teams. Information Systems Research, 16(1), pp.9-27.

Majchrzak, A., Rice, R., Malhotra, A., King, N. and Ba, S. (2000) Technology Adaptation: The Case of a Computer-Supported Inter-organisational Virtual Team. MIS Quarterly, 24(4), pp.569-600.

Malaurent, J. and Avison, D. (2015) Reconciling Global and Local Needs: A Canonical Action Research Project to Deal with Workarounds. Information Systems Journal, 26(3), pp. 227-257.

Manning, P. K. (2003) Policing Contingencies. Chicago: University of Chicago Press.

Marakas, G. M. and Hornik, S. (1996) Passive Resistance Misuse: Overt Support and Covert Recalcitrance in IS implementation. European Journal of Information Systems, 5(3), pp. 208-219.

Marcolin, B., Compeau, R., Munro, M. and Huff, S. (2000) Assessing User Competence: Conceptualisation and Measurement. Information Systems Research, 11(1), pp. 37-60.

Markus, M. (1983) Power, Politics and MIS Implementation. Communications of the ACM, 26(6), pp. 430-444.

Marshall, A. (2014) Designing Telemedicine Apps that Health Commissioners will Adopt. In: IEEE, (ed.) 14th Conference of Open Innovation Association FRUCT. IEEE, pp. 63-68.

Marshall, A. and Bidmead, E. (2018) Using Telemedicine in Practice: Implications for Workforce Development. International Journal of Practice-based Learning in Health and Social Care, 6(2), pp. 111-124.

Marshall, C. and Rossman, G. (1995) Designing Qualitative Research, Newbury Park, CA: Sage Publication.

Mathieson, K. (1991) Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behaviour. Information Systems Research, 2(3), pp.173-191.

Mawby, R. and Wright, A. (2005) Police Accountability in the United Kingdom. Written for the Commonwealth Human Rights Initiative. https://www.humanrightsinitiative.org/programs/aj/police/res_mat/police_accountability_in_uk.pdf [Accessed 10/01/2020].

Mayer, R.E. (1981) The Psychology of How Novices Learn Computer Programming. Computing Surveys, 13(1), pp. 121-141.

McGrath, J. E. (1991) Time, Interaction, and Performance (TIP): A Theory of Groups. Small Group Research, 22(2), pp. 147–174.

McKay, J. and Marshall, P. (2001) The Dual Imperatives of Action Research. Information Technology and People, 14(1), pp.46-59.

McKeown, B. and Thomas, D. (2013) Q Methodology. Second Edition, California: Sage Publications.

Mcknight, D.H., Carter,M., Thatcher , J.B., et al. (2011) Trust in a Specific Technology: An Investigation of its Components and Measures. ACM Transactions on Management Information Systems, 2 (2), pp. 1–15.

McNish, M. (2002) Guidelines for Managing Change: A Study of their Effects on the Implementation of New Information Technology Projects in Organisations. Journal of Change Management, 2(3), pp. 201-211.

Meissonier, R. and Houze, E. (2010) Toward an 'IT Conflict-Resistance Theory': Action Research during IT Pre-implementation. European Journal of Information Systems, 19(5), pp.540–561.

Merriam, S. (1998) Qualitative Research and Case Study Applications in Education. San Francisco: Jossey-Bass Publishers.

Merton R.K., Fiske M. and Kendall P.L. (1990) The Focused Interview: A Manual of Problems and Procedures. Second Edition, New York: Free Press.

Mikkelsen, A., Ogaard, T., Lindoe, P.H. and Olsen, O.E. (2002) Job Characteristics and Computer Anxiety in the Production Industry. Computers in Human Behavior, 18(3), pp.223–239.

Mingers, J. (2001) Combining IS Research Methods: Towards a Pluralist Methodology. Information Systems Research, 12(3), pp.240-259.

Moore, G. C. and Benbasat, I. (1991) Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. Information Systems Research, 2(3), pp. 192-222.

Morash, M. and Haarr, R. (2012) Doing, Redoing, and Undoing Gender: Variation in Gender Identities of Women Working as Police Officers. Feminist Criminology, 7(1), pp. 3-23.

Morgan, D. L. (1997) Focus Groups as Qualitative Research. Second Edition. Thousand Oaks, California: Sage Publications.

Morris, M. and Venkatesh, V. (2000) Age Differences in Technology Adoption Decisions: Implications for a Changing Work Force. Personnel Psychology, 53(2), pp. 375-403.

Morris, M., Venkatesh, V. and Ackerman, P. (2005) Gender and Age Differences in Employee Decisions about New Technology: An Extension of the Theory of Planned Behaviour. IEEE Transactions on Engineering Management, 52(1), pp. 69-84.

Mowrer, R. R. and Klein, S. B. (2001) Handbook of Contemporary Learning Theories. Mahwah, New Jersey, Lawrence Erlbaum Associates.

Myers, M and Avison, D. (2002) Qualitative Research in Information Systems: A Reader. London: Sage Publications.

National Audit Office (2016) The Work of the National Audit Office in the Police and Fire Sectors. https://www.nao.org.uk/wp-content/uploads/2016/07/The-work-of-the-National-Audit-Office-in-the-police-and-fire-sectors-Briefing-pack.pdf [Accessed 07/01/2020]

Nelson, R. and Cheney, P. (1987) Training End Users: An Exploratory Study. MIS Quarterly, 11(4), pp.547-559.

Neufeld, V. R. and Barrows, H. S. (1974) The "McMaster philosophy": An Approach to Medical Education. Journal of Medical Education, 49, pp.1040-1050.

Norman P. and Smith, L. (1995) The Theory of Planned Behaviour and Exercise: An Investigation into the Role of Prior Behaviour, Behavioural Intentions and Attitude Variability. European Journal of Social Psychology, 25(4), pp.403-415.

Norman, A. and Allen, D. (2005) Deployment and Use of Mobile Information Systems: A Case Study of Police Work. Proceedings of the MOBIS Conference, Leeds, UK, pp. 203-228.

Norman, G. and Schmidt, H. (2000) Effectiveness of Problem-based Curricula: Theory, Practice and Paper Darts. Medical Education, 34, pp.721–728.

Norzaidi, M. D., Chong, S. C., Murali, R. and Salwani, M. I. (2009) Towards a Holistic Model in Investigating the Effects of Intranet Usage on Managerial Performance: A study on Malaysian Port Industry. Maritime Policy and Management, 36(3), pp.269–289.

Nunn, S. (2001) Police Information Technology: Assessing the Effects of Computerization on Urban Police Functions. Public Administration Review, 61(2), pp.221-234.

Øgland, P. (2014) The Principle of Researcher-Client Agreement in Canonical Action Research. Conference: Nettverk for organisasjonsforskning i Norge (NEON), Stavanger, Norway.

Olfman, L. and Mandviwalla, M. (1994) Conceptual Versus Procedural Software Training for Graphical User Interfaces: A Longitudinal Field Experiment. MIS Quarterly, 18(4), pp. 405-426.

Oliver, R. and Bearden, W. (1985) Crossover Effects in the Theory of Reasoned Action: A Moderating Influence Attempt. Journal of Consumer Research, 12(3), pp.324-340.

Oliver, R. L. (1980) A Cognitive Model for the Antecedents and Consequences of Satisfaction Decisions. Journal of Marketing Research, 17(4), pp. 460-469.

Ong, C.-S. and Lai, J.-Y. (2006) Gender Differences in Perceptions and Relationships among Dominants of E-learning Acceptance. Computers in Human Behavior, 22, pp.816–829.

Orlikowski, W and Gash, D. (1994) Technological Frames: Making Sense of Information Technology in Organizations. ACM Transactions on Information Systems, 12(2), pp.174-207.

Orlikowski, W J and Baroudi, J (1991) Studying Information Technology in Organizations: Research Approaches and Assumptions. Information Systems Research, 2 (1), p 1-28.

Orlikowski, W, Yates, J., Okamura, K. and Fujimoto, M. (1995) Shaping Electronic Communication: The Metastructuring of Technology in the Context of use. Organisation Science, 6(4), pp. 423-445.

Orlikowski, W. (1992) The Duality of Technology: Rethinking the Concept of Technology in Organisations. Organisation Science, 3(3), pp. 398-427.

Orlikowski, W. (2000) Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organisations. Organisation Science, 11(4), pp. 404-428.

Ouellette, J. and Wood, W. (1998) Habit and Intention in Everyday Life: The Multiple Processes by Which Past Behaviour Predicts Future Behaviour. Psychological Bulletin, 124(1), pp. 54-74.

Padilla-Meléndez, A., Aguila-Obra, A. and Garrido-Moreno, A. (2013) Perceived Playfulness, Gender Differences and Technology Acceptance Model in a Blended Learning Scenario. Computers and Education, 63, pp.306-317.

Palmer, I. (2011) Is the United Kingdom Police Service Receptive to Evidence-based Policing? Testing attitudes towards experimentation (Unpublished master's thesis). Cambridge University, Uk.

Paoline, E. A., III, Myers, S. M. and Worden, R. E. (2000) Police Culture, Individualism, and Community Policing: Evidence from Two Police Departments. Justice Quarterly, 17(3), pp.575-605.

Paoline, E.A. and Terrill, W. (2014) Police Culture: Adapting to the Strains of the Job. Durham, NC, Carolina Academic Press.

Paoline, Eugene. (2004) Shedding Light on Police Culture: An Examination of Officers' Occupational Attitudes. Police Quarterly, 7(2), pp. 205-236.

Parker, S.K., Williams, H.M. and Turner, N. (2006) Modelling the Antecedents of Proactive Behavior at Work. Journal of Applied Psychology, 91 (3), pp.636–652.

Patton, M. Q. (2002) Qualitative Research and Evaluation Methods, Third Edition, Sage Publications, Inc.

Peel, D. (2005) The Significance of Behavioural Learning Theory to the Development of Effective Coaching Practice. International Journal of Evidence Based Coaching and Mentoring, 3(1), pp. 18-28.

Peirce, C S (1878) How to Make our Ideas Clear. Popular Science Monthly, reprinted in Thayer (1982).

Piaget, J. (1970) Science of Education and the Psychology of the Child. Orion Press, New York.

Pica, D. and Sørensen, C. (2004) On Mobile Technology in Context: Exploring Police Work. Journal of Computing and Information Technology, 12, pp.287–295.

Pica, D. (2006) The Rhythms of Interaction with Mobile Technologies: Tales from the Police. PhD thesis, London School of Economics and Political Science (United Kingdom)

Pica, D., Sørensen, C. and Allen , D.K. (2004) On Mobility and Context of Work: Exploring Mobile Police Work. Proceedings of the Thirty-Seventh Hawaii International Conference on System Sciences, Hawaii, pp. 1-11.

Poole, M. S. and DeSanctis, G. (1990) Understanding the Use of Group Decision Support Systems: The Theory of Adaptive Structuration. In J. Fulk and C. Steinfeld (eds), Organizations and Communication Technology, Beverly Hills, CA: Sage Publications.

Poole, M. S. and DeSanctis, G. (2004) Structuration Theory in Information Systems Research: Methods and Controversies. In M. E. Whitman and A. B. Woszczynski (eds), Handbook of Information Systems Research, Hershey, PA: Idea Group.

Poon, EG, Blumenthal, D., Jaggi, T., Honour, MM., Bates, DW. and Kaushal, R. (2004) Overcoming Barriers to Adopting and Implementing Computerized Physician Order Entry Systems in U.S. hospitals. Health Affairs, 23(4), pp. 184–190.

Povey, K. (2001) Open all Hours: A Thematic Inspection Report on the Role of Police Visibility and Accessibility in Public Reassurance. https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjyhI2M4qXQAhVsLcAKHWFxA1sQFggaMAA&url=https%3A%2F%2Fwww.justiceinspectorates.gov.uk%2Fhmic%2Fmedia%2Fopen-all-hours-20011130.pdf&usg=AFQjCNFbhUBKQuQDPvSwz05ZWnIA8V1utw&sig2=PxBDoPosoSmcHuSiQ47cGQ [Accessed 07/01/2020]

Punch, M. (1983) Officers and Men: Occupational Culture, Inter-rank Antagonism, and the Investigation of Corruption. In M. Punch (ed.), Control in the Police Organisation, Cambridge, MA: MIT Press.

Punch, M. (2009) Police Corruption: Deviancy, Accountability and Reform in Policing. Cullompton, Devon: Willan.

Raban, A. (1988) Word Processing Learning Techniques and User Learning Preferences. ACM SIGCHI Bulletin, 20(2), pp. 83-87.

Rabe-Hemp, C. E. (2008a) Female Officers and the Ethic of Care: Does Officer Gender Impact Police Behaviors? Journal of criminal justice, 36(5), pp.426-434.

Rabe-Hemp, C. E. (2008b) Survival in an “All Boys Club”: Policewomen and their Fight for Acceptance. Policing: An International Journal of Police Strategies & Management, 31(2), pp. 251-270.

Rabe-Hemp, C. E. (2009) POLICEwomen or PoliceWOMEN? Doing Gender and Police Work. Feminist Criminology, 4(2), pp. 114-129.

Reiner, R. (1992) The Politics of the Police. Second Edition, New York, London: Harvester Wheatsheaf.

Reiner, R. (1998) Process or Product? Problems of Assessing Individual Police Performance. In Brodeur, J. (Ed.), How to Recognize Good Policing: Problems and Issues, Sage Publications and Police Executive Research Forum.

Reiner, R. (2000) The Politics of the Police. Third Edition, Oxford: Oxford University Press.

Reiner, R. (2010) The Politics of the Police. Fourth Edition, Oxford: Oxford University Press.

Reuss-Ianni, E. (1983) Two Cultures of Policing: Street Cops and Management Cops. New Brunswick, New Jersey: Transaction Publishers.

Richardson, H. and Robinson, B. (2007) The Mysterious Case of the Missing Paradigm: A Review of Critical Information Systems Research 1991–2001. Information Systems Journal, 17(3), pp. 251–270.

Rivard, S. and Lapointe, L. (2012) Information Technology Implementers’ Responses to User Resistance: Nature and Effects. MIS Quarterly, 36(3), September, pp. 897-920.

Rizzuto, T., Schwarz, A. and Schwarz, C. (2014) Toward a Deeper Understanding of IT adoption: A multilevel analysis. Information and Management Journal, 51(4), pp. 479-487.

Roberts, T. (1991) Gender and the Influence of Evaluations in Self-Assessments in Achievement Settings. Psychological Bulletin, 109(2), pp. 297-308.

Robey, D. (1995) Theories That Explain Contradiction: Accounting for the Contradictory Organisational Consequences of Information Systems. Proceedings of the Sixteenth International Conference on Information Systems, Amsterdam, pp.55-63.

Robson, C (2011) Real World Research. Third Edition, Chichester: Wiley.

Rogers, E. M. (1983) Diffusion of Innovations. Third Edition. New York: Free Press of Glencoe.

Rosen, L. D., D. C. Sears and M. M. Weil (1987) Computerphobia. Behavior Research Methods, Instruments, and Computers, 19, pp.167–179.

Saariluoma, P. and Hannakaisa Isomäki (2009) Future Interaction Design II. London: Springer.

Saeed, K. and Abdinnour, S. (2013) Understanding Post-adoption IS Usage Stages: An Empirical Assessment of Self-service Information Systems. Information Systems Journal, 23(3), pp. 219-244.

Saga, V.L. and Zmud, R.W. (1994) The Nature and Determinants of IT Acceptance, Routinization, and Infusion. In Diffusion, Transfer and Implementation of Information Technology, L.Levine (ed.), North-Holland, Amsterdam.

Saleem, H., Beaudry, A. and Croteau, A. (2011) Antecedents of Computer Self-Efficacy: A Study of the Role of Personality Traits and Gender. Computers in Human Behaviour, 27(5), pp.1922-1936.

Savin-Baden, M. and Major, H. (2013) Qualitative Research: The Essential Guide to Theory and Practice. Milton Park, Abingdon, Oxon: Routledge.

Sawyer, S., Allen, J.P. and Lee, H. (2003) Broadband and Mobile Opportunities: A Socio-technical Perspective. Journal of Information Technology, 18(2), pp.121–136.

Scheepers, R., Scheepers, H and Ngwenyama, OK (2006) Contextual Influences on User Satisfaction with Mobile Computing: Findings from Two Healthcare Organisations. European Journal of Information Systems, 15(3), pp.261-268.

Schein, E.H. (2004) Organisational Culture and Leadership. Third edition, San Francisco, CA: Jossey-Bass.

Schmuck, R. (2006) Practical Action Research for Change. Second Edition, Thousand Oaks, California: Sage Publications.

Schreuders, Z. C., Cockcroft, T., Butterfield, Elliot, JR., Soobhany, AR and Shan-A-Khuda, M. (2018) Needs Assessment of Cybercrime and Digital Evidence in a UK Police Force. Report-CARI Project. Leeds: Leeds Beckett University Cybercrime and Security Innovation Centre.

Schwarz, A. (2003) Defining Information Technology Acceptance: A Human-Centred, Management-Oriented Perspective. Unpublished doctoral dissertation, University of Houston-University Park.

Scott, J.E. and Kaindl, L. (2000) Enhancing Functionality in an Enterprise Software Package. Information and Management, 37(3), pp. 111-122.

Seale, C., Gobo, G., Gubrium, J and Silverman, D (2007) Qualitative Research Practice. First Edition. London: Sage Publications.

Sfard, A. (1998) On Two Metaphors for Learning and the Dangers of Choosing just One. Educational Researcher, 27(2), pp. 4-13.

Shemmings, D. (2006) Quantifying Qualitative Data: An Illustrative Example of the Use of Q methodology in Psychosocial Research. Qualitative Research in Psychology, 3(2), pp147-165.

Sherman, L.W. (1998) Evidence-Based Policing. Washington, DC: The Police Foundation.

Sherman, L.W. (2015) A Tipping Point for 'Totally Evidenced Policing:' Ten Ideas for Building an Evidence-Based Police Agency. International Criminal Justice Review, 25(1), pp.11-29.

Shuell, T.J. (1986) Cognitive Conceptions of Learning. Review of Educational Research, 56(4), pp. 411-436.

Siau, K., Lim, E. and Shen, Z. (2001) Mobile Commerce: Promises, Challenges, and Research Agenda. Journal of Database Management., 12(3), pp. 4-14.

Silverman, D. (2014) Interpreting Qualitative Data. Fourth Edition, Thousand Oaks, California: Sage Publications.

Silverstone, R. and Haddon, L. (1996) Design and the Domestication of Information and Communication Technologies: Technical Change and Everyday life. In R. Silverstone and R. Mansell (eds), Communication by Design. The Politics of Information and Communication Technologies. Oxford, UK: Oxford University Press.

Silvestri, M. (2003) Women in Charge: Policing, Gender and Leadership. Cullompton, Devon: Willan Publishing.

Silvestri, M. (2007) 'Doing' Police Leadership: Enter the 'New Smart Macho'. Policing and Society, 17(1), pp. 38–58.

Silvestri, M. (2015) Gender Diversity: A Hop, Skip and a Jump Forwards and Back. In Special Issue on Police Diversity Policing: A Journal of Policy and Practice, 9(1), pp.56-64.

Silvestri, M. (2017) Police Culture and Gender: Revisiting the 'Cult of Masculinity'. Policing: A Journal of Policy and Practice, 11(3), pp. 289-300.

Silvestri, M., Tong, S. and Brown, J. (2013) Gender and Police Leadership: Time for a Paradigm Shift? International Journal of Police Science & Management, 15(1), pp. 61-73.

Simon, S. and Werner, J. (1996) Computer Training through Behaviour Modelling, Self-paced, and Instructional Approaches: A Field Experiment. Journal of Applied Psychology, 81(6), pp.648-659.

Simon, S., Grover, V, Teng, J. and Whitcomb, K. (1996) The Relationship of Information System Training Methods and Cognitive Ability to End-user Satisfaction, Comprehension, and Skill Transfer: A Longitudinal Field Study. Information Systems Research, 7(4), pp. 466-490.

Simsek, Z. and Veiga, J. F. (2001) A Primer on Internet Organizational Surveys. Organizational Research Methods, 4(3), pp.218–235.

Skolnick, J H. (1994) Justice Without Trial: Law Enforcement in Democratic Society. Third Edition, London: Wiley.

Slavin, R. E. (1995) Cooperative Learning: Theory, Research, and Practice. Second Edition. Boston, MA: Allyn and Bacon.

Sørensen, C. and Pica, D. (2005) Tales from the Police: Rhythms of Interaction with Mobile Technologies. Information and Organization, 15(2), pp 125-149.

Southgate, P. (1985) Police Output Measures: Past Work and Future Possibilities. In Burrows, J., Heal, K. and Tarling, R. (eds), Policing Today, Home Office: Research and Planning Unit Publications, London.

Spitler, V. (2005) Learning to Use IT in the Workplace: Mechanisms and Masters. Journal of Organisational and End User Computing, 17(2), pp.1-25.

Staples, D and Seddon, P (2004) Testing the Technology-to-Performance Chain Model. Journal of Organizational and End User Computing, 16(4), pp. 17-36.

Staples, D., Wong, I and Seddon, P. (2002) Having Expectations of Information Systems Benefits that Match Received Benefits: Does it Matter? Information and Management, 40(2), pp. 115-131.

Starbuck, W. and Webster, J. (1991) When is Play Productive? Accounting, Management and Information Technology, 1(1), pp.71-90.

Stein, A. H. and Bailey, M. M. (1973) The Socialization of Achievement Orientation in Females. Psychological Bulletin, 80(5), pp.345–366.

Stein, M. K., Newell, S., Wagner, E. L. and Galliers, R. D. (2015) Coping with Information Technology: Mixed Emotions, Vacillation, and Nonconforming Use Patterns. MIS Quarterly, 39(2), pp. 367-392.

Stewart D. and Shamdasani P. (2015) Focus Groups Theory and Practice. Third Edition, Thousand Oaks, California: Sage Publications.

Straub, D., Limayem, M. and Karahanna-Evaristo, E. (1995) Measuring System usage: Implications for IS Theory Testing. Management Science, 41(8), pp. 1328-1342.

Strauss, A. and Corbin, J (1998) Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Second edition. Sage Publications.

Susan, G. and Evered, R. (1978) An Assessment of the Scientific Merits of Action Research. Administrative Science Quarterly, 23(4), pp. 582-603.

Susman, G. (1983) Action Research: A Sociotechnical Systems Perspective. In: Morgan, G., Ed., Beyond Method: Strategies for Social Research, Sage, Newbury Park, pp. 95-113.

Tams, S., Thatcher, J. and Craig, K. (2018) How and Why Trust Matters in Post-Adoptive Usage: The Mediating Roles of Internal and External Self-Efficacy. Journal of Strategic Information Systems, 27(2), pp.170-190.

Taylor, P., Russ-Eft, D. and Chan, D. (2005) A Meta-Analysis Review of Behaviour Modelling Training. Journal of Applied Psychology, 90(4), pp.692-709.

Taylor, S. and Todd, P. (1995) Understanding Information Technology Usage: A Test of Competing Models. Information Systems Research, 6(2), pp. 144-176.

Teddlie, C. and Tashakkori, A. (2003) Major Issues and Controversies in the Use of Mixed Methods in the Social and Behavioral Sciences. In A. Tashakkori and C. Teddlie (eds), Handbook of Mixed Methods in Social and Behavioral Research, Thousand Oaks, CA: Sage Publications.

Terrill,W.,and Mastrofski, S. D. (2002) Situational and Officer-based Determinants of Police Coercion. Justice Quarterly, 19(2), pp.215-248.

Thatcher, J. B., McKnight, D. H., Baker, E. W., Arsal, R., and Roberts, N. (2011) The Role of Trust in Postadoption Exploration: An Empirical Investigation of Knowledge Management Systems. IEEE Transactions on Engineering Management, 58(1), pp. 56–70.

Thatcher, J. B., Zimmer, J. C., Gundlach, M. J. and McKnight, D. H. (2008) Internal and External Dimensions of Computer Self-Efficacy: An Empirical Examination. IEEE Transactions on Engineering Management, 55(4), pp. 628-644.

Thatcher, J.B. and Perrewé, P.L. (2002) An Empirical Examination of Individual Traits as Antecedents to Computer Anxiety and Computer Self-efficacy. MIS Quarterly, 26(4), pp. 381–396.

Thong, J., Hong, Se-Joon and Tam, Kar (2006) The Effects of Post-adoption Beliefs on the Expectation-Confirmation Model for Information Technology Continuance. International Journal of Human-Computer Studies, 64(9), pp.799-810.

Tilley, N. and Laycock, G. (2014) The Police as Professional Problem-Solvers. In J. Brown (ed.), The Future of Policing, London: Routledge.

Todd, P. and Benbasat, I. (1999) Evaluating the Impact of DSS, Cognitive Effort and Incentives on Strategy Selection. Information Systems Research, 10(4), pp. 287– 380.

Todd, P. and Benbasat, I. (2000) The Impact of Information Technology on Decision Making: A Cognitive perspective. In Framing the Domains of IT Management: Projecting the Future through the past, R. W. Zmud (Ed), Pinnaflex Educational Resources, Inc, Cincinnati, OH, pp. 1-14.

Trauth, EM and O'Connor B (1991) A Study of the Interaction between Information Technology and Society: An Illustration of Combined Qualitative Research Methods. In (Nissen, HE, Klein, HK and Hirschheim, R, (eds), Information Systems Research: Contemporary Approaches and Emergent Traditions, Elsevier, Amsterdam.

Trist, E. (1976) Engaging with Large-scale Systems. In Clark, A. (eds), Experimenting with Organisational Life: The Action Research Approach, New York: Plenum Press.

Turel, O. (2006) Contextual Effects on the Usability Dimensions of Mobile Value-added Services: A conceptual framework. International Journal of Mobile Communication, 4(3), pp.309–332.

Tyre, M.J. and Orlikowski, W.J. (1994) Windows of Opportunity: Temporal Patterns of Technological Adaptation in Organisations. Organisation Science, 5(1), pp. 98-118.

Tyre, M.J. and Orlikowski, W.J. (1996) The Episodic Process of Learning by Using. International Journal of Technology Management, 11(7-8), pp. 790-798.

Van Offenbeek, M., Boonstra, A. and Seo, D. (2013) Towards Integrating Acceptance and Resistance Research: Evidence from a Telecare Case Study. European Journal of Information Systems, 22(4), pp. 434-454.

Vander Kooi, G. (2006) Problem-based Learning: An Attitudinal Study of Police Academy Students (Doctoral dissertation, Western Michigan University, 2006) Publication no. AAT 3243173.

Venkatesh, V. (1999) Creation of Favourable User Perceptions: Exploring the Role of Intrinsic Motivation. MIS Quarterly, 23(2), pp. 239-260.

Venkatesh, V. (2000) Determinants of Perceived Ease of Use: Integrating Perceived Behavioural Control, Computer Anxiety and Enjoyment into the Technology Acceptance Model. Information Systems Research, 11(4), pp. 342-365.

Venkatesh, V. and Bala, H. (2008) Technology Acceptance Model 3 and a Research Agenda on Interventions. Decision Sciences, 39(2), pp. 273-315.

Venkatesh, V. and Davis, F.D. (1996) A Model of Antecedents of Perceived Ease of Use: Development and Test. Decision Science, 27(3), pp. 451-481.

Venkatesh, V. and Davis, F.D. (2000) A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. Management Science, 46(2), pp. 186-204.

Venkatesh, V. and Morris, M. (2000) Why Don't Men Ever Stop to Ask for Directions? Gender, Social Influence, and their Role in Technology Acceptance and Usage Behaviour. MIS Quarterly, 24(1), pp.115-139.

Venkatesh, V., Brown, S. A. and Bala, H. (2013) Bridging the Qualitative-Quantitative Divide: Guidelines for Conducting Mixed Methods Research in Information Systems. MIS Quarterly, 37(1), pp. 21-54.

Venkatesh, V., Morris, M. and Ackerman, P. (2000) A Longitudinal Field Investigation of Gender Differences in Individual Technology Adoption Decision-Making Processes. Organisational Behaviour and Human Decision Processes, 83(1), pp.33-60.

Venkatesh, V., Morris, M., Davis, G. and Davis, F. (2003) User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27 (3), pp. 425–478.

Venkatesh, V., Speier, C. and Morris, M. (2002) User Acceptance Enablers in Individual Decision Making About Technology: Toward an Integrated Model. Decision Sciences, 33(2), pp.297-316.

Waddington, P. (1999) Police (Canteen) Culture: An Appreciation. The British Journal of Criminology, 39(2), pp.287-309.

Walsh, J. L. (1977) Career Styles and Police Behavior. In D.H. Bayley (Ed.), Police and society. Beverly Hills, CA: Sage Publications.

Walsham, G. (1993) Interpreting Information Systems in Organisations. John Wiley and Sons, New York.

Walsham, G. (1995) Interpretive Case Studies in IS Research: Nature and Method. European Journal of information systems, 4(2), pp 74-81.

Walsham, G. (2006) Doing Interpretive Research. European Journal of Information Systems, 15(3), pp. 320-330.

Wang, W., Butler, J. E., P-A Hsieh, J. J. and Sheng-Hsun, H. S. U. (2008) Innovate with Complex Information Technologies: A Theoretical Model and Empirical Examination. Journal of Computer Information Systems, 49(1), pp. 27-36.

Wang, W., P-A Hsieh, J. J., Butler, J. E. and Sheng-Hsun, H. S. U. (2015) Innovate with Complex Information Technologies: A Theoretical Model and Empirical Examination. Computer Information Systems Faculty Publication. Paper 27.

Warshaw, PR. (1980) A New Model for Predicting Behavioural Intentions: An Alternative to Fishbein. Journal of Marketing Research, 17(2), pp. 153-172.

Watts, S. and Stenner, P. (2005) Doing Q methodology: Theory, Method and Interpretation. Qualitative Research in Psychology, 2, pp. 67-91.

Werth, E. (2011) Scenario Training in Police Academies: Developing Students' Higher-level Thinking Skills. Police Practice and Research, 12(4), pp. 325-340.

Westley, W. A. (1970) Violence and the Police: A Sociological Study of Law, Custom, and Morality. Cambridge, MA: MIT Press.

Wheeler, B. C. and Valacich, J. S. (1996) Facilitation, GSS and Training as Sources of Process Restrictiveness and Guidance for Structured Group Decision Making: An Empirical Assessment. Information Systems Research, 7(4), pp.429–450.

White, M. D. and Escobar, G. (2008) Making Good Cops in the Twenty- First Century: Emerging Issues for the Effective Recruitment, Selection and Training of Police in the United States and Abroad. Crime and Criminal Justice, 22(1–2), pp. 119–134.

Williams, R. and Edge, D. (1996) The Social Shaping of Technology. Research Policy, 25, pp.865-899.

Willis, J. and Mastrofski, S. (2017) Understanding the Culture of Craft: Lessons from Two Police Agencies. Journal of Crime and Justice, 40(1), pp. 84-100.

Willis, J.J. (2013) Improving Police: What's Craft Got to Do with It? Ideas in American Policing, no. 16. Washington DC: Police Foundation.

Wilson, J.Q. (1968) Varieties of Police Behaviour: The Management of Law and Order in Eight Communities. Cambridge: Harvard University Press.

Wilson, R. and Rutherford, A. (1989) Mental Models: Theory and Application in Human Factors. Human Factors, 31(6), pp. 617-634.

Wiredu, G. (2007) User Appropriation of Mobile Technologies: Motives, Conditions and Design Properties. Information and Organization, 17(2), pp.110–129.

Wirth, W., Von Pape, T. and Karnowski, V. (2008) An Integrative Model of Mobile Phone Appropriation. Journal of Computer-Mediated Communication, 13(3), pp.593-617.

Wolcott, H. (2009) Writing up Qualitative Research. Third Edition, Thousand Oaks, California: Sage Publications.

Wood, E J. (2004) Problem-based Learning: Exploiting Knowledge of How People Learn to Promote Effective Learning. Bioscience Education, 3(1), pp. 1-12.

Workman-Stark, A. L. (2017) Understanding Police Culture. In Inclusive Policing from the Inside Out, pp. 19-35. Springer International Publishing.

Wright, K. (2006) Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services. Wiley Online Library.

Wu, Y., Chang, K. and Guo, X. (2014) Network Density as a Double-Edged Sword: A User Adaptation Approach of IT System Use. In Proceedings of 35th International Conference on Information Systems, Auckland 2014.

Yang, S., Hsu, C., Sarker, S. and Lee, A. (2017) Enabling Effective Operational Risk Management in a Financial Institution: An Action Research Study. Journal of Management Information Systems, 34(3), pp.727-753.

Yarusso, L. (1992) Constructivism vs. Objectivism. Performance and Instruction Journal, 31(4), pp. 7-9.

Yi, M. and Davis, F. (2001) Improving Computer Training Effectiveness for Decision Technologies: Behaviour Modelling and Retention Enhancement. Decision Sciences, 32(3), pp. 521-544.

Yin, R. K. (1984) Case Study Research: Design and Methods. Newbury Park, Sage Publications.

Young, M. (1991) An Inside Job. Oxford: Clarendon Press.

Zigurs, I and Khazanchi, D (2008) From Profiles to Patterns: A New View of Task-Technology Fit. Information Systems and Quantitative Analysis Faculty Publications. 22.

Zigurs, I., Buckland, B.K., Connolly, J.R. and Wilson, E.V. (1999) A Test of Task-Technology Fit Theory for Group Support Systems. Database for Advances in Information Systems, 30(3-4), pp. 34-50.

Appendix 1 - The Pilot Study Use of Kelvin Devices Survey

The Use of Kelvin Devices in [redacted] Constabulary Survey

University of Cumbria is conducting a research project on the use of the Kelvin mobile devices in [redacted] Constabulary. The study is examining how the Kelvin devices affect various aspects of police work and ways of overcoming any current problems associated with the use of the devices. For further clarification on the overall aim of the study please contact Dr. Nicoletta Policek (nicoletta.policek@cumbria.ac.uk)

This is a confidential online survey. We are not asking for your identity on the survey, and individual responses will not be reported to the Constabulary or to any third parties.

You can access the survey using your Kelvin device. Thank you for your participation – we greatly value your input.

If you have difficulty accessing or submitting the online survey, please contact Noorhan Abbas noorhan.abbas@uni.cumbria.ac.uk. Please submit the completed survey by Friday 17th of November 2017.

We would like to thank George Mason University for allowing us to use parts of their questionnaire in our survey.

*Required

University of Cumbria | TEN years 2007-2017

To what extent do you agree or disagree with the following statements?

1. **The use of the Kelvin device helps me to engage in proactive, self-initiated activities.** *

Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

2. **The use of the Kelvin device helps me to be productive in my daily work.** *

Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

3. **The use of the Kelvin device helps me to improve the way I interact and communicate with the public.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

4. **The use of the Kelvin device helps me to be more effective in helping victims.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

5. **The use of the Kelvin device creates extra work for me.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

6. **The use of the Kelvin device makes my work interesting.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

7. **It is important to the public that I am knowledgeable about the latest information technologies.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

8. **Using my Kelvin device frustrates me.** *

Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

9. **The demands of using my Kelvin device take time away from aspects of police work that I enjoy.** *

Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

10. **Using my Kelvin device enhances my job satisfaction.** *

Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

11. **Generally, the Kelvin mobile phone is easy to use.** *

Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

12. **I am satisfied with the quality of information I can access from my Kelvin device.** *

Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

13. **The Kelvin devices improve communication between me and my line-supervisor.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

14. **The Kelvin devices improve relationships between me and other officers/detectives.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

15. **My supervisor uses information technology to track and monitor my daily activities.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

16. **Supervisors use information technology to identify under-performing officers.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

17. **Information technology generates statistics that are valuable in assessing officer performance.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

18. **Information technology generates statistics that are valuable in assessing the Constabulary's performance.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

19. **My supervisor expects me to use the Kelvin device to identify and respond to crime problems.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

20. **Information technology improves supervision and management within the Constabulary.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

General Views on Technology

21. **In general, younger officers/detectives are more receptive to using technologies than older officers/detectives.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

22. **Up-to-date technology improves the image of the Constabulary in the eyes of the public.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

23. **In general, technology functions well in [redacted] Constabulary.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

24. **In comparison to my fellow officers, I consider myself "technology-savvy".** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

25. **I like to experiment with new technologies.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

26. **In the Constabulary, officers who use technology in creative or innovative ways are more likely to be rewarded than those who do not.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

27. **The Constabulary puts more value on officers making decisions based on data and analysis than on officers using their personal experience.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

Implementation of Technology

28. **The Constabulary adequately prepared me to use the Kelvin devices.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

29. **Overall, supervisors and senior officers in the Constabulary work hard to generate the widespread acceptance of technology.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

30. **I feel that the Constabulary adopts technologies that are designed to meet important needs.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

31. **Before implementing a new technology, senior managers work hard to get input from employees.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

32. **After implementing a new technology, the Constabulary seeks regular feedback from employees on how it is working.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

33. **After implementing a new technology, the Constabulary provides sufficient help and support to employees who are experiencing problems with it.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

34. **In general, I am satisfied with how new technologies are implemented in the Constabulary.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

35. **The successful implementation of a new technology in the Constabulary depends on supervisors and senior management requiring its use.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

36. **The Constabulary tends to adopt technologies that are often not useful.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Not Applicable

Kelvin Devices Applications and Features

37. **Name the application/s that you find useful (Please leave blank if you don't think there are any useful applications).**

38. **Name the application/s that should be removed from the device.**

39. **Name the application/s that need/s improvement.**

40. **Would adding an instant messaging application (like Whatsapp) be helpful in communicating with your team?** *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe

41. **Do you prefer using the desktop over using your Kelvin device?** *

Mark only one oval.

- ◯ Yes
- ◯ No

42. **How often do you use the desktop to input information other than the intelligence information into Sleuth?** *

43. **Do you use the Kelvin's pocket notebook feature every day?** *

Mark only one oval.

- ◯ Yes
- ◯ No

44. **Do you find typing using the Kelvin keyboard to record information in the Kelvin's pocket notebook an easy job?** *
Mark only one oval.

- Yes
- No
- Maybe

45. **Is charging your phone in the middle or towards the end of the shift a challenge?** *
Mark only one oval.

- Yes
- No

46. **Is the predictive text feature frustrating?** *
Mark only one oval.

- Yes
- No

47. **Is it important for you to have a policy of use for the Kelvin devices?** *
Mark only one oval.

- Yes
- No
- May be

Personal Use

48. **Do you use your personal mobile phone to** *
Tick all that apply.

- [ ] Check your personal emails
- [ ] Access your Facebook account
- [ ] Access your Twitter account
- [ ] Check other phone applications

E-learning Packages

49. **I am satisfied with the e-learning system** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree

50. **The e-learning system helps me improve my job performance** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree

51. **The e-learning system helps the Constabulary to achieve its goal** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree

52. **I prefer to use a handout to learn new material and then take the test on the computer** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree

53. **Adding interactive info-graphics to the e-learning material will help me learn faster.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree

54. **It would be helpful if I can complete the e-learning course using my Kelvin device.** *
Mark only one oval.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree

For Patrol officers only

55. **The use of the Kelvin mobile phone helps me:**
Tick all that apply.

- [ ] Locate wanted persons, suspects and other persons of interest.
- [ ] Locate vehicles of interest.
- [ ] Collect and search for information.
- [ ] Determine how to respond to a crime problem.
- [ ] Check the history of a specific location or person(s) before responding to a call for service.
- [ ] Increases my capacity to prevent crime on patrol when not answering calls for service.
- [ ] Enhances my safety on the job.

Background Information

Finally, we would like to ask few questions about your background

56. **What is your rank?** *

57. **How long have you been working in the police?** *

58. **What is your age?** *

59. **Which area are you based in?** *

60. **Which unit/department are you currently serving?** *

61. **Did you use your Kelvin to complete this survey?** *
Mark only one oval.

- ( ) Yes
- ( ) No

Appendix 2 - The Training Sessions' Feedback Survey

Technology Training Session Design Survey

Collar Number * *Required*

University of Cumbria is conducting a research project on enhancing the technology training at [redacted] Constabulary. The study will examine how technology training sessions should be designed to support officers in performing various aspects of police work. For further clarification on the overall aim of the study please contact Dr. Nicoletta Policek (nicoletta.policek@cumbria.ac.uk)

This is a confidential online survey. Individual responses will not be reported to the Constabulary or to any third parties.

Thank you for your participation – we greatly value your input.

If you have difficulty accessing or submitting the online survey, please contact Noorhan Abbas noorhan.abbas@uni.cumbria.ac.uk. Please submit the completed survey by Friday 16th of November 2018.

To what extent do you agree or disagree with the following statements?

1. Being able to practise technology features/functionalities in the training session could help officers appreciate the ease of use of the feature. * *Required*

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

2. Being able to practise technology features in the training session could help officers appreciate the usefulness of the feature. * *Required*

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

3. My trust in technology features could be boosted because of practising using the features in the training session. * *Required*

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

4. When I use a reliable feature, I share my experience with my colleagues. * Required

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

5. Using real-life scenarios in the training session consolidates my learning of the features presented * Required

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

6. Technology training sessions that focus on useful and reliable features could promote using these features. * Required

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

7. Discussing the different contexts that the technology feature could be applied in helped me extend my knowledge about the feature. * Required

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

8. Discussing different contexts that the technology feature could be applied in helped me appreciate the usefulness of the feature. * Required

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

9. Did you find the features presented generally useful? * Required

- Yes
- No

10. a. Arrange these features in the order of usefulness to yourself (1. S Note, 2. Person/Vehicle information, 3. Speech to text/dictation). * Required

10. b. In what context did you find using the dictation feature most useful? * Required

11. Do you find information about technology features in newsletters and emails useful? * Required

- Yes
- No

12. Any suggestions on how to improve the technology training in the Constabulary? * Required

13. Any comments about the training session you attended? * Required

Final page

Thank you very much for your kind support...

Appendix 3 Pilot Study Participant Information Sheet and Consent Form

'The Benefits and Drawbacks of using Kelvin Devices'

Participant Information Sheet

About the study

[redacted] Constabulary has recently introduced new mobile devices for all police officers, PCSOs, the Special Constabulary and a small number of police staff roles. The anticipated benefits are improved visibility, bridging the productivity gap created by having fewer officers, removing duplication of processes therefore making efficiency savings and quicker information propagation. Nine focus groups will be conducted to study the positive/negative impact of technology on officers as well as discuss how to maximise the benefits of the new technology to both the officers and the Constabulary.

Why have you asked me to take part and what will I be required to do?

You have been invited to participate in this focus group because you are a user of the new mobile phones. All participants are kindly invited to share their positive/negative experiences in addition to any new ideas that would help in enhancing the use of the new technology.

What if I do not wish to take part or change my mind during the study?

Your participation in the study is entirely voluntary. You are free to withdraw from the study at any time without having to provide a reason for doing so.

What happens to the research data?

All the focus groups sessions will be audio recorded. The sessions will be recorded using a Dropbox audio recorder application. The Dropbox folder will be password protected. The files will be modified using the Audacity program to change the pitch of the audio files so voices are not recognizable. In addition to that, data will be anonymised, analysed and divided into main themes.

At the end of the pilot study, the audio files will be stored on a password protected USB and kept for a year in the University of Cumbria and then destroyed. Any screenshots of the devices or the applications will be anonymised. A PhD student (Noorhan Abbas) in the University of Cumbria will have access to the data.

How will the research be reported?

All the results will be presented to the Constabulary in a report and/or a presentation. The data will be used in publishing a paper and also in a doctoral dissertation. All data will be completely anonymised.

How can I find out more information?

Please contact the researcher directly (noorhan.abbas@uni.cumbria.ac.uk). University of Cumbria, Department of Business, Law, Policing and Social Science, Fusehill St, Carlisle CA1 2HH

What if I want to complain about the research

Initially you should contact the researcher directly. However, if you are not satisfied or wish to make a more formal complaint you should contact Diane Cox, Director of Research Office, University of Cumbria, Bowerham Road, Lancaster, LA1 3JD. diane.cox@cumbria.ac.uk

University of Cumbria

'The Benefits and Drawbacks of using Kelvin Devices'

Participant Consent Form

Please answer the following questions by circling your responses:

Have you read and understood the information sheet about this study? YES NO

Have you been able to ask questions and had enough information? YES NO

Do you understand that you are free to withdraw from this study at any time, and without having to give a reason for withdrawal? YES NO

Your responses will be anonymized. Do you give permission for members of the research team to analyze and quote your anonymous responses? YES NO

Please sign here if you wish to take part in the research and feel you have had enough information about what is involved:

Signature of participant:.. **Date:**................

Name (block letters):..

Appendix 4 Training Sessions' Participant Information Sheet and Consent Form

Participant Information Sheet

About the study

This research project aims to enhance the usage of some applications on the Kelvin devices by using the Fit-appropriation Model. The study should also seek to understand the different factors influencing achieving efficient and effective usage of the mobile technology such as social norms, culture, officers' IT skills and the context of use. The fit-appropriation process of the mobile devices should consider the nature of interaction of police officers with their devices.

Why have you asked me to take part and what will I be required to do?

You have been invited to participate in this focus group because you are a user of the mobile phones. All participants are kindly invited to share their positive/negative experiences in addition to any new ideas that would help in enhancing the quality of police data through the use of the new technology.

What if I do not wish to take part or change my mind during the study?

Your participation in the study is entirely voluntary. You are free to withdraw from the study at any time without having to provide a reason for doing so. Details of information collected from the interviews/focus groups will not be passed to the Constabulary.

What happens to the research data?

All the sessions will be audio recorded using a Dropbox audio recorder application. The Dropbox folder will be password protected. The files will be modified using the Audacity program to change the pitch of the audio files so voices are not recognizable. In addition to that, data will be anonymised, analysed and divided into main themes.

At the end of the study, the audio files will be stored on a password protected USB and kept for a maximum of two years in the University of Cumbria and then destroyed. Any screenshots of the devices or the applications will be anonymised. A PhD student (Noorhan Abbas) and Dr. Nicoletta Policek (PhD Supervisor) at the University of Cumbria will have access to the data.

How will the research be reported?

All the results will be presented to the Constabulary in a report and/or a presentation. The data will be used in publishing a paper and also in a doctoral dissertation. All data will be completely anonymised.

How can I find out more information?

Please contact the researcher directly (noorhan.abbas@uni.cumbria.ac.uk). University of Cumbria, Department of Business, Law, Policing and Social Science, Fusehill St, Carlisle CA1 2HH

What if I want to complain about the research?

Initially you should contact the researcher or her PhD supervisor directly. However, if you are not satisfied or wish to make a more formal complaint you should contact Prof. Diane Cox, Director of Research Office, University of Cumbria, Bowerham Road, Lancaster, LA1 3JD. diane.cox@cumbria.ac.uk

Who should I contact if I have any further questions?

Please contact the researcher/s directly (details below) at any time even after completion of the study

Noorhan Abbas	Dr Nicoletta Policek
PhD Student	Associate Professor in Policing and Criminology (PhD Supervisor)
University of Cumbria	University of Cumbria
Fusehill Street	Fusehill Street
Carlisle	Carlisle
Cumbria	Cumbria CA1 2HH
CA1 2HH	
noorhan.abbas@uni.cumbria.ac.uk	nicoletta.policek@cumbria.ac.uk