
Research Findings

KEY DETERMINANTS OF M-LEARNING ADOPTION FOR OPTIMAL PROFESSIONAL DEVELOPMENT IN THE WORKPLACE IN SOUTH AFRICA



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ABSTRACT

Professionals often find it difficult to find time to attend training. Still in its infancy in South Africa, mobile learning (m-learning) – learning using a web-enabled mobile electronic device such as a cell phone or tablet – holds promise as a platform to deliver relatively convenient and inexpensive learning programmes. This intensive study sought to identify the factors key to m-learning adoption for professional development and how they affected m-learning in a South African context. Accountancy practitioners and business school students were invited to participate in this study, and human resource directors were interviewed to gauge their responses to similar questions from a corporate point of view. The constructs of Ally and Gardiner's Hybrid Smart Mobile Device Acceptance Model (2012), which explored the moderating influence of device characteristics and usage on acceptance of smart mobile devices, was adapted to form the framework for the study. Two dimensions were added to the constructs of perceived usefulness and perceived ease of use (relevance and tool sets) to explore what aided construction of meaning. The four top factors – relevance, enjoyability, the perception of being in control, and motivation, each bore a significant relationship to the other, along with a sense of security, organisational beliefs, and others' beliefs. A third dimension – willpower, added to explore hedonic motivation, brought to light issues that sapped willpower, rather than supported it. Participants expressed a marked preference for independent rather than social learning. While a sturdy framework for m-learning construction emerged from this study, the findings are not generalisable.

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CHAPTER ONE: INTRODUCTION

'The history of education is littered with the corpses of technology-based projects that were killed because of the high operating costs, problems of adaptation to local conditions, lack of skilled personnel to operate the technologies, and lack of effectiveness.' (Bates, 1991, p1).

Context

The information revolution of the past three decades has changed the world. Economies need workforces that are much more sophisticated, better informed than ever, continually able to reshape their work profiles (Christie, 2008), who keep their value and currency in the face of changing demands, and can operate on the world stage in real time. According to Moore & Tait (2002, p83-84): "The challenge every country faces (is) to become a learning society and ensure that its citizens are equipped with the knowledge, skills and qualifications they will need in the 21st century." South Africa cannot afford to ignore these warnings if it is to fulfil its economic and social promises to its citizens.

Problem statement

South Africa's economic advancement is constrained by a lack of skills, from labour to management level (Deloitte, 2009; Nzimande, 2011; Sathekge, 2012; Hedley, 2012). The Scarce and Critical Skills List 2012-2013, and again in 2014, showed that the skills shortage runs across sectors, and is particularly acute in the technical and engineering fields, health, auditing and administration (Department of Higher Education and Training, n.d.; Government Gazette, 2014). Legislation has tried to address the skills shortage on one front by requiring a number of professions to formalise lifelong learning through registration with professional bodies that require the cyclical attainment of continuous professional development points to retain registration, particularly in the fields of finance, health, engineering sciences, law and estate agency (Saica [2013], Saipa [n.d.], Health Professions Council of SA [2011], Engineering Council of SA [2013]).

Professionals, meanwhile, express concern about the need for training taking them out of their practices, disrupting busy schedules with travel as well as training, and incurring what they regard as unnecessary cost (Shapiro, 2011). They opt for short courses and workshops, which are frequently ineffectual and a waste of money (Moon, 2004). Bartley & Golek (2004) point out that online training can be effective and less costly, and accessed remotely and asynchronously. However, while online training can alleviate cost, time and travel pressures, not all small practices have the infrastructure to access computer-based online training.

Proliferating mobile technology (GMSA Intelligence, 2015) offers new ways to access education online, and could conceivably be harnessed to resolve these skills shortages, as well as time and cost pressures.

Aim of the study

This study sought to identify the key determinants of m-learning adoption for optimal professional development in the workplace in order to inform and improve m-learning design and delivery in a South African setting.

This meant identifying several factors – the optimal situation in which a mobile device could be used to deliver learning, the preferred presentation methods, what learners find works best and are willing to try, and what does not work – to better deliver useful training, and possibly in a way that can be generalised to help alleviate South Africa's critical skills shortages.

Significance of study

When this study was initiated in 2013, a wealth of research existed on mobile learning in schools, mostly from other countries, and on design principles in general, as illustrated by EdITLib database searches on “m-learning in schools” (5 484 papers) and “m-learning design principles” (5 003 papers). In addition, a number of bodies had convened m-learning conferences and published reports since late 2010 – Unesco, GMSA, USAid, the World Bank and the World Economic forum (Botha *et al*, 2012). In South Africa the Meraka Institute was exploring mobile phone use to provide school-level education in South Africa, as was the Shuttleworth Foundation. However, there was a dearth of empirical evidence of the application of m-learning – the delivery and use of learning programmes via mobile devices – in South African workplaces, and for professionals in particular. This hiatus was not

peculiar to South Africa; according to a British study “it is clear that the educational potential of mobile devices in the executive education sector remains largely untapped” (Paine Schofield *et al*, 2011, p5.)

This study examined the strategic adoption of skills and knowledge development via m-learning among accountancy professionals and business school student and alumni. It focused on the extent of uptake, and the attitudes, beliefs, perceptions and practices pertaining to m-learning from both an individual and a corporate perspective.

It was hoped that it might disclose cues about local idiosyncrasies that could improve the way we deliver learning, and that the findings would be generalisable and lead to a framework that could be applied to achieve convenient, effective workplace-based training in South Africa’s cost-conscious and technologically constrained environment.

I believe the context has implications for the government sector as well as the private sector; while harried professionals might prefer to try to fit their learning around their schedules, rather than their schedules around their learning, this might also be the case for government workers and for employees of small and micro-sized businesses, who might be unable to take time off to dedicate to study.

The fact that cell phones are almost ubiquitous will not solve South Africa’s skills problems. It does, however, open up possibilities. The conclusion of Viljoen *et al* (2007), who studied the use of SMSes to support distance learning – that the use of cell phones to support learning would depend on the design of didactically sound m-learning environments – supported the need for a study such as this, despite its limited nature.

Research questions

The question central to this research is:

- What factors determine the uptake and effectiveness of m-learning for professional development, and how might these be leveraged?

The subquestions that helped answer this question explored:

- Attitudes towards, beliefs about, perceptions, expectations, uptake and experience of m-learning;
- Whether mobile device preferences and usage patterns influenced the uptake of development programmes delivered by mobile device for this group; and
- What m-learning activities were perceived as most effective for development, and why.

Each of the answers to the survey questions posed to participants constitutes a variable in the causal relationship, and should help to answer these questions.

Theoretical framework of the study

This study used a cognitive constructivist lens to adapt Ally and Gardiner's Hybrid Smart Mobile Device Acceptance Model (2012, p5) – which combined the constructs presented by the Technology Acceptance Model with Venkatesh *et al*'s model Unified Theory of Use and Acceptance of Technology 2 – to identify the key factors underpinning the adoption of m-learning for optimal professional development in South Africa.

Structure of this report

The literature review in Chapter 2 provides the context for this study, kicking off with a brief overview of the challenge of skills development in South Africa in terms of the national vision for the country and skills needed to realise it, and what professional bodies are doing to address the skills shortage. Next the trends and development in technology, learning projects and m-learning are reviewed, as are learning theories and technology adoption theories and models.

Chapter 3 describes the research methodology employed, participant selection criteria, data collection and analysis techniques, checks and balances to ensure credibility and reliability, how ethical standards were met, and how the findings have been reported.

Findings and discussion are set out in Chapter 4 thus:

- Descriptions of:
 - Participant demographics;
 - Findings from Group 1 interviews, sorted by study theme (subquestions)
 - Findings from Group 2 and 3 surveys, sorted by study theme (subquestions)
 - Findings through open and axial coding of transcripts from Group 1 interviews;
 - Findings through open and axial coding of transcripts from Group 2 and 3 open-ended answers to surveys; and
 - Statistical analysis of data from Groups 2 and 3
- Discussion of:
 - Group 1 findings, sorted by study theme

- Group 2 and 3 findings, sorted by study theme
- Summary of major, minor and unexpected themes emerging from Group 1
- Summary of major, minor and surprising themes emerging from Groups 2 and 3.

Conclusions and recommendations are set out in Chapter 5.

Appendices contain:

- Interview guide used for Group 1
- Questionnaire for Group 2
- Questionnaire for Group 3
- Table of open and axial coding of themes emerging from Company 1 interviews (Group 1)
- Table of open and axial coding of themes emerging from Company 2 interviews (Group 1)
- Aggregated table of open and axial coding of themes emerging from Companies 1 and 2 (Group 1)
- Table of open and axial coding of themes emerging from Group 2 and 3's answers to open-ended questions
- Table of correlations emerging from Group 2 and 3 survey data – those who had done m-learning (experience)
- Table of correlations emerging from Group 2 and 3 survey data – those who had not done m-learning (perceptions and expectations)

Definition of key terms used in this study

Continuous professional development (CPD): Skills and knowledge attainment that keep professionals updated and expands their expertise.

Continuous professional development (CPD) points: Skills points professionals must earn on an annual basis to maintain professional registration.

Executive education: Academic training “at graduate level business schools for managers, business leaders and executives” (MBA Brief, 2016).

Education: The knowledge and development resulting from systematic instruction (Merriam-webster.com, 2012); “cognitive mapping of reliable access to optimal states of mind” (Berg, n.d.). Ideally, education should lead to development, and the result should be mastery of field and self.

ICT: Information and communication technology.

Lifelong learning: “All learning activity undertaken throughout life, with the aim of improving knowledge, skills and competence, within a personal, civic, social and or employment-related perspective” (European Commission, cited by the European Society of Association Executives, 2007).

M-learning: Sharples *et al* (2005) argued that the “mobile” part of m-learning was the people who were doing it, rather than the devices used to take part, and endorsed a social constructivist approach to it. Laouris and Eteokleous (n.d.), noting that some authors regarded m-learning as a “natural evolution of e-learning” that permitted radical constructivism “because they dramatically increase our possibilities of communication and conversation”, regarded m-learning as a function of time (continuous, discontinuous [and to which I would add synchronous and asynchronous], space, environment, content, technology, content, available technology, delivery method, the learner’s “mental abilities, prior knowledge, preferences, motivation ... etc”), access to services such as databases and a learning community. For the purposes of this study m-learning is defined as the delivery and use of learning programmes via web-enabled mobile electronic devices.

Mobile device: Portable electronic device permitting access to data and information anywhere, online and offline.

CHAPTER TWO: LITERATURE REVIEW

Context

When this study began m-learning in the corporate environment was in its infancy and little literature was available on it, as noted under Significance of this Study on page 9, and repeated here for clarity's sake. When this study was initiated in 2013, a wealth of research existed on mobile learning in schools, mostly from other countries, and on design principles in general, as illustrated by EdITLib database searches on "m-learning in schools" (5 484 papers) and "m-learning design principles" (5 003 papers). In addition, a number of bodies had convened m-learning conferences and published reports since late 2010 – Unesco, GMSA, USAid, the World Bank and the World Economic forum (Botha *et al*, 2012). In South Africa the Meraka Institute was exploring mobile phone use to provide school-level education in South Africa, as was the Shuttleworth Foundation. However, there was a dearth of empirical evidence of the application of m-learning – the delivery and use of learning programmes via mobile devices – in South African workplaces, and for professionals in particular. This hiatus was not peculiar to South Africa; according to a British study "it is clear that the educational potential of mobile devices in the executive education sector remains largely untapped" (Paine Schofield *et al*, 2011, p5.)

The body of literature has expanded, but there is still a dearth of literature focusing on its use in a professional or executive education context.

The literature reviewed here examines the context for this study, starting with skills needs in South Africa; then moves to technology trends as they relate to professional development; the state of m-learning and adoption of it at home and abroad; and the theoretical lenses that underpin this study.

The challenge of skills development in South Africa

South Africa's vision for 2030, drawing on the New Growth Path Framework, seeks to expand scarce and key skills and improve productivity and administration (Patel, address, 2010). The key challenges to this are implementation, funding, the fragile global economy, external competition and competing domestic interests (Patel, 2010). A new approach is needed, with "new kinds of education and training, greater R&D support as well as the establishment of learning organisations in enterprises and state agencies" (Department of Economic Development, 2010, p17).

Different professions have adopted the acquisition and maintenance of continuous professional development (CPD) points to ensure association members' competence. The Health Professions Council describes the purpose of continuous professional development as to help "health professionals to maintain and acquire new and updated levels of knowledge, skills and ethical attitudes that will be of measurable benefit in professional practice and to enhance and promote professional integrity" for the benefit of clients (HSPCA, 2011). Its rationale is echoed by accountancy bodies Saica and Saipa, the Estate Agency Affairs Board, and the Engineering Council of South Africa (Saica [2013], Saipa [n.d.], Health Professions Council of SA [2011], Estate Agency Affairs Board [n.d.], Engineering Council of SA [2013]). They are among the plethora of bodies now obliged by law to require members to accrue a set number of accredited study or educational equivalent hours each year.

It is evident, then, that the need for learning and development has been clearly articulated at government level. Professional bodies have responded by forcing on their members, and policing, compliance requirements that are often cumbersome and costly.

Technology trends and their role in professional development

Technology convergence, combined with cloud computing and cheap data, saw ubiquitous computing become a reality in first-world countries in 2010 (Kennedy, 2011).

The top technology trends changing education, according to Gartner (in Bremmen, 2016), were expected to be adaptive, personalised learning; use of predictive analytics to support students and cut dropout rates; better application of customer relationship management systems to streamline business processes; an exo-, rather than infra- structure, leveraging cloud services to integrate institutional tools, partnerships and services; open, rather than proprietary microcredentials (badging) to motivate students; greater emphasis on digital assessment; increasing importance of open educational resources in driving down costs; listening and sensing technology; and increasing emphasis on collaboration technology, particularly for global organisations. Smith (2015) concurred on tailored learning and cloud service adoption, and added gamification, mobile learning and wider e-book acceptance to the mix.

Brown (2005) described the ideal target audience for m-learning as employed, first-world, technology literate, and having a preference for studying at their own pace in their own time and place. He points out that while this does not describe African learners in general, Africa has good cell phone penetration.

In South Africa connectivity has improved dramatically, expanding from about 17% at 8,5-million users, many via smartphone, in 2011 (Goldstuck, 2012) to 49% – 26,8-million people – in November 2015 (GMSA Intelligence, 2015). Broadband penetration, important because of the speed and stability of access it offers in comparison to other means of accessing the internet, was at 41% (Internetworldstats, 2015). The implication of this is that m-learning could be used for mass learning delivery.

While digital training programmes are expensive to produce, as noted by Bartley & Golek (2004), the cost is mitigated where they have mass reach.

And despite learning technologies' being criticised as "Fordist assembly line production ... teaching and learning" (Amory, 2010), it is worth considering whether template-driven e-learning production might provide a key to rolling out cost-effective skills and development programmes to help drive economic advancement in South Africa.

The fact that mobile technology can be used whenever and wherever people have a free moment is also worth considering. A Newspaper Association of America study (2012) of news consumption patterns shows peaks in mobile phone news browsing while commuting, "at breaks", and before bed. I felt it was worth investigating whether this kind of information-seeking behaviour might be transferred to professional development if similarly convenient access to course material could be provided.

Lelliot *et al* (2000) note that the vision of an able, networked society is seductive – ICTs offer the opportunity to reorganise relationships and production, can cut training costs where teaching is needed on a mass scale, is specialised or needed in remote places – but they do not directly address productivity, change, development or the need for lifelong learning.

M-learning projects in Africa and the Middle East

A Unesco working paper on m-learning points out that a skills shortage is not a phenomenon peculiar to South Africa, but the experience across Africa and the Middle East (Isaacs, 2012).

Mobile learning, in its infancy in the region, mostly targets secondary-school and university students. A handful of adult learning programmes target literacy, health and agriculture projects, and until very recently most have *supported* rather than *delivered* learning. Tanzania's BridgeIT project provides videos via cell phone; Egypt's Message Sent initiative used phones to improve women's numeracy and literacy. Among the South African projects are Dr Math, a phone-based maths tutoring programme using a free instant messaging application; the Yoza Cellphone Stories writing project; MoMath, another maths project; the Dr Life Orientation and Life Skills initiative, which provides subject support and

advice (Isaacs, 2012); Ukufunda Virtual School, an m-learning project that provides learning resources to teachers, parents and schools (The Reach Trust, 2015); LevelUp, an m-learning programme that rewards participating high school learners who solve maths and science problems each day with airtime and supermarket vouchers (Mylevelup, 2016); and CellSchool, a mobile matric revision programme incorporating short lessons, tutoring at set hours, and night-before-exam coaching (DMMA, 2012).

Besides highlighting challenges for mass rollout, such as data cost and a lack of technical and programming standardisation, these small-scale projects demonstrated opportunities for more situated, personalised and self-directed learning (Isaacs, 2012).

However, in 2015 Vodacom changed the game, rolling out free school content on Vodacom e-school to its subscribers and zero-rating data used to access the e-school portal (Vodacom, 2015).

Adoption of mobile learning

Mobile learning is portable, connected, can be customised, interactive and context sensitive, and offers lifelong learning opportunities (Paine Schofield *et al*, 2011; Tucker, 2010). At the same time it enables supported decision-making (Paine Schofield *et al*, 2011), and gives access to materials and networks.

Kukulska-Hulme and Traxler (2005) see m-learning as a flexible, “personal, unobtrusive, spontaneous, ‘anytime, anywhere’ way ... to access educational ... material”.

The use of phones in learning permits communication, production and participation, facilitating social construction of knowledge (Tucker, 2010). Tucker explored the notion of integrating mobile learning into US army leadership training, using cellphones to blog about trainees’ ideas and orders to elicit feedback from peers. She suggested that geolocation features made smartphones particularly useful for field exercises. Engineers, ordnance disposal specialists and engineers could use them for troubleshooting; wikis could be used at all levels in the army for subjects ranging from etiquette to medevac procedures and operating equipment; apps could be used to support marksmanship, urban operations, terrain analysis and so on; augmented reality could present simulations for negotiating and counterinsurgency training. She also envisaged taking advantage of short breaks (10 to 15 minutes) for learning. But she envisaged this in a blended learning setting, and pointed out that research was needed to determine whether cellphones were the right tools for particular learning objectives, the benefits of such approaches, to pinpoint what accounted for learning, how to sequence apps for learning, and how to scaffold lifelong learning.

Education trends

While mobile learning has been in use in nursing and for other medical personnel for some years (Kukulska-Hulme and Traxler, 2005), its use in executive development remained largely untapped (Paine Schofield *et al*, 2011). Adoption at corporate level, gauged across 20 countries and 29 industries by a Cox eLearning Consultants study (Cox and Sanner, 2012), showed corporate ownership of m-learning “solutions” at 0,4% in 2011, and tipped to reach 17,7% in 2013, supporting leadership or management training, product training and support, technical training, and to a lesser extent, soft skills training. By 2013 a handful of big companies had begun to adopt it. Accenture was one international example.

By 2015 more than a quarter (26,4%) of training in corporate America was being delivered by digital means (Training, 2015). Seventy-three percent of organisations did some compliance training online; 26% did all compliance training online (*ibid*).

Reliance on classroom learning (“just in case”) was being supplemented by on-demand (“just in time”) learning. And just as lines between formal and informal learning were blurring so were the lines between working and private time (Paine Schofield *et al*, 2011). It seems that mobile learning could take advantage of this, slotting into quiet moments on a device that is always at hand and always connected, as mooted by Tucker (2010).

Meanwhile, Moocs – massive open online courses – took off. By late 2014, more than 1,03-million people had participated in HarvardX and MITx Moocs, more than 300 000 of them taking more than one course (Ho *et al*, 2015). Another 1,3-million people registered for courses but went no further than this. Thirty-nine percent of those who participated were or had been teachers, many of whom were teaching elsewhere the courses for which they had registered, and were likely to transfer their learning into their own classrooms. Fifty-seven percent of those who participated intended to earn certificates; 24% did (*ibid*). The average completion rate for Moocs was 15% (Jordan, 2015).

Models and theories

Isaacs (2012, p34) believes that “the theoretical and conceptual underpinnings of mobile learning remain undefined; the methodologies for knowledge production, research and evaluation are still emergent; and the empirical evidence and practical experience in the region ... is sparse. Mobile learning opens up new vistas for pedagogical and institutional change, offering a window of hope for more successful and lasting educational transformations than those attempted by previous ICT in education initiatives in the region.”

In light of this I examined several widely accepted learning theories and technology models to assess what could apply in the context of this study.

Learning theories – the continuum from behaviourism, cognitivism and social construction to cognitive constructivism ... and the theory of equivalence

While behaviourism sees knowledge as a “**passively** absorbed behavioural repertoire” (Berkeley Graduate Division, 2015), cognitive constructivism aims to help students assimilate new information by **actively** adapting and building on what they know in order to accommodate the new information. Behaviourism does not explain the thought processes that draw a student along the continuum of learning, through knowing and into understanding.

Learning, in the constructivist paradigm, is the active discovery that leads to knowledge (Berkeley Graduate Division, 2015).

The first wave of cognitivism recognised thought processes, particularly manipulation of mental states, as computational processes. Piaget (1964) noted that experience was the basis of learning, and that learning occurred as individuals made sense of new information by accommodating and assimilating it in light of previous experience. As each student was introduced to new ideas in a systematic and linear fashion, he or she would bring his or her own schemata to bear on the environment, and adjust according to feedback, constructing a reality in a series of approximations (Hamlyn, 1978, p49-53). Constructing the “how” of a thing, which is what leads to understanding, was described by Piaget (1964) as having *got to the structure of modification of a thing*.

Vygotsky (1978), Bruner (1996), and Lave and Wenger (Jaworski, 1996) agreed that this experience could be assisted by providing scaffolding and collaboration.

Brown *et al* (1959) pointed out that Piaget’s notion of assimilation and accommodation was similar to Vygotsky’s appropriation: an idea was adopted as part of the learner’s world view as a result of compromise between his or her own opinions and those of others. It would seem then, that interaction with others has the power to reinforce or extinguish a view.

Jaworski (1996, online) drew on Voigt, Lave and Wenger, Leont’ev and Vygotsky to summarise learning as the *individual construction and social mediation of knowledge within a community of practice*. Such communities could be harnessed to “scaffold learning in order to foster mastery (Bruner, 1996, p17-18). Such scaffolding helps guide the sequence of

recognising a problem, and then comprehending a solution, which may be generalised (Wood *et al*, 1976, p90).

Knowing, then, is an action participated in by the learner; learning requires comparison of new knowledge with prior knowledge, reinforcing or adapting it. Social interaction contributes to the construction of individual knowledge; shared meaning and understanding develop through negotiation in the learning environment.

John Locke felt that ideas – not knowledge – were born of experience (an empiricist view), while Immanuel Kant felt that knowledge came *through* – but not *from* experience (a rationalist view) (Hamlyn, 1978, p3).

Cognitive development assumes a pre-existent structure in order to be able to compare and contrast things (Hamlyn, 1978, p25). Knowledge is useful only where it is applicable to a task at hand, is intelligible, builds on what the learner already knows (Hamlyn, 1978, p6), gives a reason for something being so and demonstrates truth (1978, p13). Thus: this plate is ceramic, the last one I dropped broke; it would be prudent to hold this one firmly while carrying it from the table to the sink.

Reasoning, therefore, provides the foundation for understanding. This is the process Saettler refers to when he says that integration of new knowledge is required for knowledge to be transformed into understanding (2004, p7). Understanding is more than knowing. It is the transformation of information or knowledge into something meaningful for the recipient.

Language (symbolic representation) is needed to reconstruct sensory experience (Piaget, 1964, p10). Alone, it does not, however, describe how understanding is reached. This, said Piaget, was a product of social transmission (p13), would be lasting provided the learner had reached a state of equilibrium (p17), and might be transferrable to other situations. Where knowledge acquisition is the learning of skills and information – creating the sum of what is known – through experience or education (South African Concise Oxford Dictionary, p641), the *making of meaning* requires the connection of bits of information.

When information is received it is perceived as a stimulus, briefly stored as an image, sensation, taste, smell or sound (Abadzi, 2006, p28) – all of which may be processed simultaneously – and which (drawing on Miller and Abadzi) may be connected to previous knowledge, previous emotion, or perceived through the veil of current emotion. It may be compared with, contrasted against, or assimilated into the current knowledge base to form a new perception. Abadzi's description of encoding and consolidation of learning as an integration of the "features of the object to be remembered" drawn from around the brain (verbal functions in the left hemisphere, visiospatial in the right) (2006, p146-p147) is elucidated by Miller's observation that simultaneous and successive discrimination draws on

different faculties to encode and permit recall and abstraction of stimuli (1956, p81-97). Thus we see that different faculties work together to integrate information; understanding requires the ability to connect the linguistic, the logical-mathematical, the perceptual and the emotional. So we see that reasoning leads to understanding, and this can improve interest and motivation, leading to improved skills.

What are the underlying mechanics?

First stimuli are recognised; these are compared to information already known; and then a response is prepared (Bruer, 1997, p11). A number of iterations of the process may be required to reach shared understanding. More often than not this understanding is aided by the use of symbols, whether language, written or spoken, or by images bringing a series of events or parts together to illustrate a whole.

As skills acquisition requires new knowledge to be consolidated and embedded in memory, understanding needs to draw on memory to draw facts and logic together. While the amount of information that can be remembered at a go is limited to between four and seven items when isolated as pitch, intensity, loudness, hue, taste, location and sensation, when these variables are combined, humans are able to make several judgements simultaneously (Miller, 1956, p81-97). To remember a thing, information must pass through short-term or working memory, which recognises it as verbal or visiospatial, categorises it, and then stores it as new, adjusts what is already known, or discards it as irrelevant. Because only four to seven items can be handled at a time, complex concepts may take practice (Abadzi, 2006, p27).

However, if new items are grouped together, the number of bits of data in each chunk can be increased if the inputs are grouped and named, and the new name is remembered instead of the individual bits. Miller calls this recoding.

The key factors in acquiring and internalising understanding are activation of attention, perception, encoding and retrieval of information; organising it; and processing it. Processing it into meaningful terms is greatly aided by social discourse, suggesting that the assertion that learning environments should enable interaction that supports “reflection, argumentation and refutation” (Brown *et al*, n.d., p159) to construct meaning is correct.

The transmission of knowledge and linking of items is deeply influenced by context (Varma *et al*, 2001, p792), and its receipt by emotion. State (emotion and situation) is encoded along with the receipt of information, and if the state is not available to act as a cue, information retrieval and generalisation may be difficult (Abadzi, 2006, p172-173).

The implications here are that we need to pay attention not only to the operational means of acquiring understanding, but also the factors that influence its receipt – context and emotion.

The second wave of constructivism, propounded by Bruner, Lave and Wenger, among others, emphasised the construction of understanding through **meaningful tasks situated in relevant, real-world contexts**, rather than as abstractions, as well as collaborative construction of knowledge through social negotiation.

The keys to activating learning, knowledge and understanding are, therefore: attention, perception, encoding and retrieval.

The basic cognitive competences that should flow from learning are “knowledge, comprehension, application, analysis, synthesis and evaluation” (Mayes and De Freitas, 2004, p11, drawing on Bloom’s Taxonomy, 1956). Other outcomes that flow from learning, such as reflexivity, psychomotor and other skills can surely flow only from the mastery of these basic cognitive competences.

A constructivist learning environment, therefore, requires:

- A meaningful problem, project or question as a focus for learning;
- To be set in a specific context;
- Opportunity to manipulate aspects of the problem;
- Related cases to provide different perspectives and scaffold learning;
- Resources to help learners understand and solve the problem; and
- Tools that help learners visualise relationships between objects, articulate their understanding of problems, “perform routine tasks such as calculation and memorisation”, and aid information search, conversation and collaboration (Pennsylvania State University online resource, n.d., citing Jonassen [1999], online).

In addition, constructivist learning environments:

- Provide multiple representations of reality to simulate real-world complexity;
- Emphasise knowledge construction rather than reproduction; and
- Encourage reflection on experience (Trinity College, online, n.d.).

The constructivist teacher would have to provide resources that guide the learner in “a process of active discovery ... to assimilate new knowledge to old and to modify the old to accommodate the new” (*ibid*).

Cognitive constructivism focuses on the mental processes that underpin learning (Berkeley Graduate Division, 2015) – the acquisition of skills and knowledge through experience, study or teaching; knowing – a state of awareness (usually referring to skills and

information, but also including beliefs); and understanding – comprehension, the product of abstract thought (South African Concise Oxford Dictionary, p659, p641, p1220).

The implications for course development are that while “skill and drill” exercises are useful to build mental fact banks, “strategies that help students ... actively assimilate and accommodate new material” are more important. The Berkley writers suggest ploys such as asking students to explain ideas in their own words, providing questions that help them structure their reading and – as learning in this framework “is largely self-motivated”, to use ungraded tests and “questions to monitor their own understanding of the material” (*ibid*).

Does this imply that social construction is not really necessary to create meaning? Anderson and Garrison (1998, cited in Anderson, 2003) wrote that deep and meaningful interaction could be created through three modes – “teacher-student; student-student; and content-student”. Reviewing the 1998 paper, Anderson (2003) articulated an equivalency theorem:

“Deep and meaningful formal learning is supported as long as one of the three forms of interaction (student–teacher; student-student; student-content) is at a high level. The other two may be offered at minimal levels, or even eliminated, without degrading the educational experience.

“High levels of more than one of these three modes will likely provide a more satisfying educational experience, though these experiences may not be as cost or time effective as less interactive learning sequences.”

(Anderson, 2003)

He concluded that any one of these modes could substitute for the others. “Getting the mix right involves a series of tradeoffs, and knowing how one type of interaction can effectively substitute for another provides an essential decision-making skill in the distance educators’ knowledge base.”

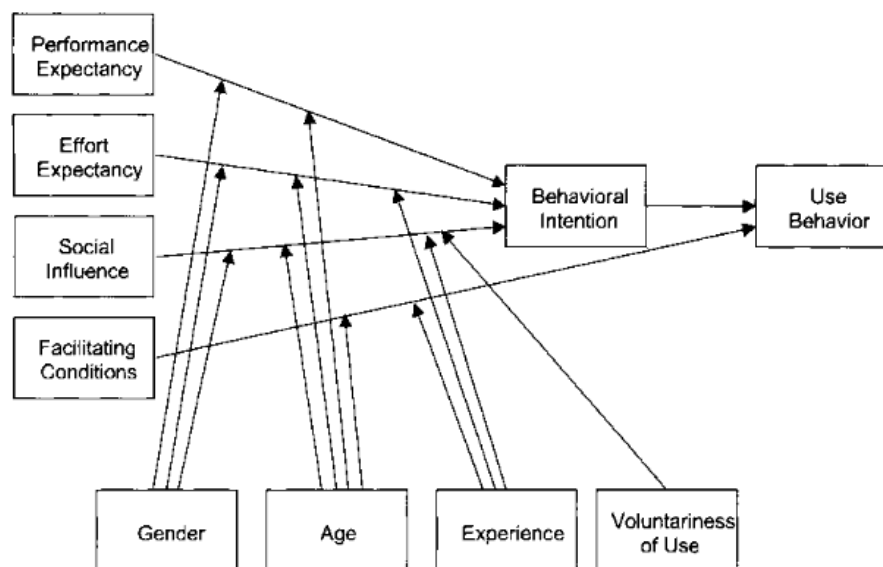
Unified Theory of Acceptance and Use of Technology (Utaut) and Utaut 2

The Unified Theory of Acceptance and Use of Technology model was devised by Venkatesh *et al* (2003) to predict the drivers of technology acceptance in the workplace.

In constructing the model, Venkatesh *et al* studied Fishbein and Ajzen’s Theory of Reasoned Action, which examined attitude towards behaviour in order to predict behaviour; Davis’s Technology Acceptance Model, which examined perceived usefulness and ease of

use in order to predict attitude; Davis's Motivational Model, covering intrinsic and extrinsic motivation; the Theory of Planned Behaviour, which extended the Theory of Reasoned Action by incorporating perception of control of behaviour and the ease with which the behaviour could be performed; Combined TAM-TPB, which "combined the predictors of the Theory of Planned Behaviour with the perceived usefulness of the Technology Acceptance Model"; The Model of PC Utilisation, which takes into account job fit, complexity of technology, affect, and social and facilitating factors; Rogers' Innovation Diffusion Theory, which incorporates voluntariness of use; and Social Cognitive Theory, which incorporated expectations of performance, sense of accomplishment and anxiety.

FIGURE 1: UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT) MODEL



Venkatesh, V., Morris, M.G., Davis, G.B. (2003) User acceptance of information technology: toward a unified view. *MIS Quarterly* 27(3) p425-478.

Construct definitions:

Behavioural intention: The degree to which a person has formulated conscious plans to perform or not perform some specified future behaviour.

Effort expectancy: The degree of ease associated with the use of the system.

Facilitating conditions: The degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system.

Performance expectancy: The degree to which an individual believes that using the system will help him or her to attain gains in job performance.

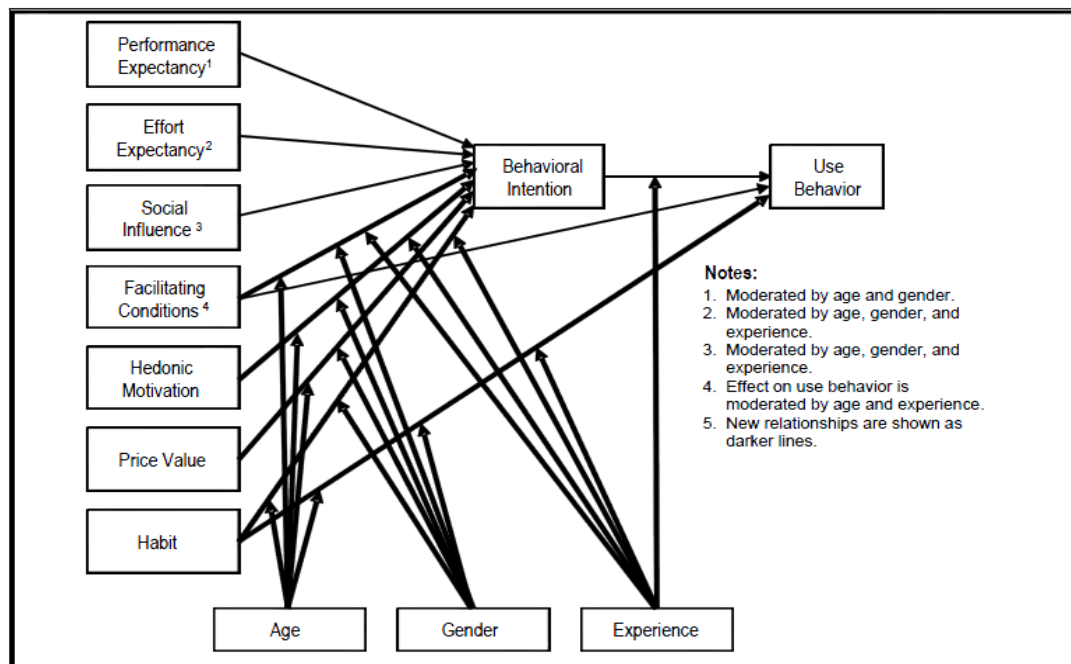
Social influence: The degree to which an individual perceives that important others believe he or she should use the new system.

Voluntariness: The extent to which potential adopters perceive the adoption decision to be non-mandatory.

(Venkatesh et al, 2003)

However, a deeper understanding of the dynamic influences at play was needed (Venkatesh *et al*, 2003, p426). Thus followed the Unified Theory of Acceptance and Use of Technology 2 (Utaut2), which examines enjoyment, cost, habit, facilitating conditions, trust, perceived security and social influence, alters the relationships between factors conceptualised in Utaut, drops voluntariness, and adds perceived enjoyment (hedonic motivation), price, and habit (automatic behaviour over time) as critical predictors of technology use “to complement the theory’s focus on intentionality as the overarching mechanism and key driver of behaviour (Venkatesh *et al*, 2012).

FIGURE 2: UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY 2

(Venkatesh *et al*, 2012)

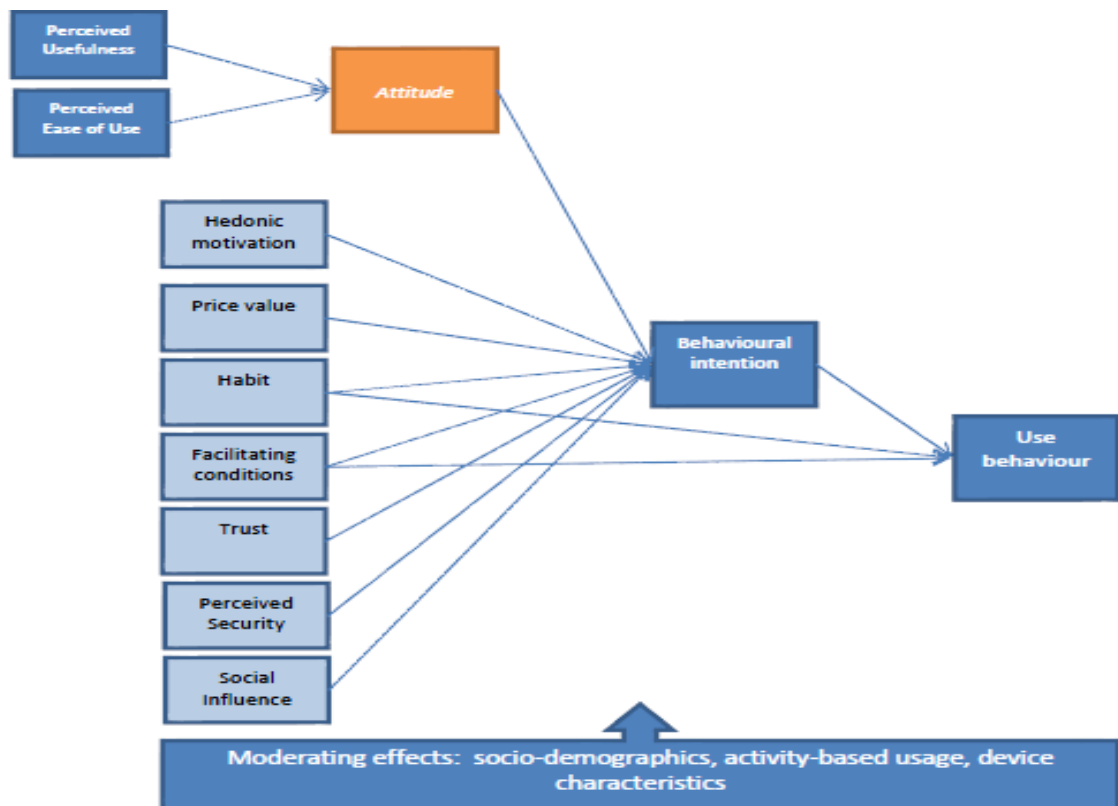
Bagozzi (2007, p244), who felt parsimony was “the Achilles Heel” of the Technology Acceptance Model, said that despite Utaut using 49 independent variables to predict behaviour, it omitted factors he felt were important: “planning, overcoming obstacles, resisting temptations, monitoring progress to goal achievement, readjusting actions, maintaining effort and willpower, and reassessing and even changing goals and means” (Bagozzi, 2007, p245).

The lack of parsimony in the Utaut models was echoed by Williams *et al* (online, n.d., p8): despite Ventakesh *et al* (2012, p172) observing an improvement in behavioural intention explanation (from 56% to 74%), a review by Williams *et al* of Utaut citations pointed out that while it provided a useful tool, many studies used only a few of its constructs.

The Hybrid Smart Mobile Device Acceptance Model

With the proliferation of functions and applications for mobile devices, Ally and Gardiner (2012, p5) felt it appropriate to adapt Utaut 2 into The Hybrid Smart Mobile Device Acceptance Model, combining the constructs presented by the Technology Acceptance Model – which was devised to predict acceptance of information technology and workplace usage by gauging attitude towards the technology through perceived usefulness and ease of use – with the Utaut2 research model.

FIGURE 3: HYBRID SMART MOBILE DEVICE ACCEPTANCE MODEL



(Ally and Gardiner, 2012)

Use of theory and models in this study

While Ally and Gardiner's Hybrid Smart Mobile Device Acceptance Model – which explored the moderating influence of device characteristics and usage on acceptance of smart mobile devices – offered a sound set of constructs relevant to this research, it lacked constructs to explore what, when using technology, assisted in the construction of meaning, and might therefore constitute a key factor in the adoption of m-learning among professionals.

To take into account perceived importance of and change in knowledge, comprehension, application, analysis, synthesis and evaluation, and to test the relevance of the setting in m-learning, it was therefore necessary to add the following elements deemed crucial to a cognitive constructivist learning environment (drawing on Jonassen [1999], cited in Pennsylvania State University [n.d.]; Trinity University [n.d.]; and Berkeley Graduate Division 2015]) to the **perceived usefulness** dimension of Ally and Gardiner's model to construct the research instruments (Appendix 1) used in this study:

- Relevance
 - Perceived meaningfulness of problems, cases, projects or questions
 - Perceived meaningfulness of contexts presented
 - Level of complexity presented

Tool sets suggested by the same sources (Pennsylvania, Trinity and Berkley) were used to extend the extend exploration of perceptions of ***ease of use***:

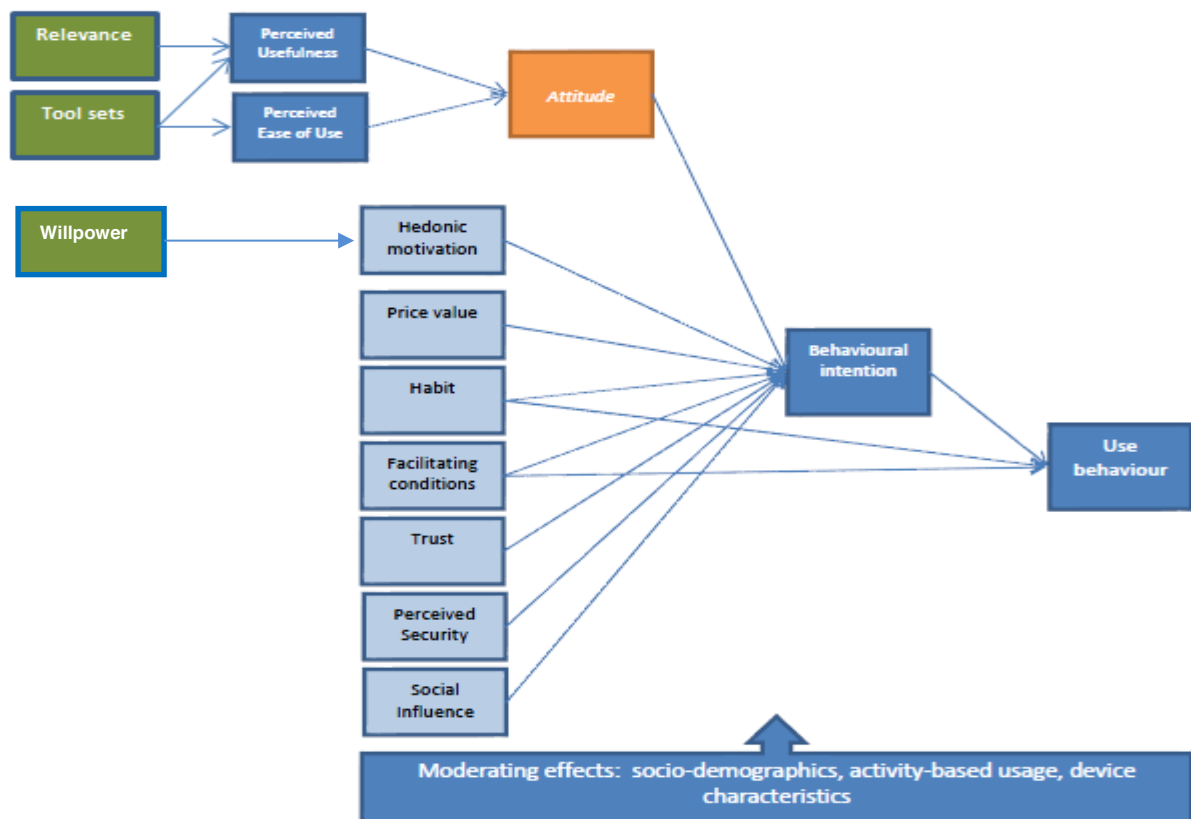
- Tool sets
 - Manipulability of aspects of problem
 - Problem-solving tools
 - Information search aids
 - Collaborative tools (probing the quality of discourse)
 - Reflective opportunities
 - Achievement monitoring

Taking into account Bagozzi's criticism of Utaut2, willpower was added to the **hedonic** leg of the model.

- Willpower – action to:
 - Overcome obstacles
 - Resist temptations
 - Maintain effort and willpower
 - Adjust action

However, this study brought to light issues that sapped willpower, rather than supported it.

FIGURE 4: EXTENDED HYBRID SMART MOBILE DEVICE ACCEPTANCE MODEL



Ally and Gardiner's (2012) Hybrid Smart Mobile Device Acceptance Model extended to explore cognitive constructivist elements.

CHAPTER THREE: METHODOLOGY

Research paradigm

This intensive study takes a cognitive constructivist approach to clarify attitudes to, experiences of and perceptions about the use of mobile devices in executive education in order to determine the key factors for optimal professional development through m-learning in South African workplaces.

Research methodology

Sayer (2002) noted that quantitative – or extensive – research could point to the extent of patterns being repeated in a population, but not to what *caused* those patterns. Instead, he suggested an intensive approach that would shed light on “substantial relationships of connection” through accounts of causal explanations of events, investigating what produced a certain change, rather than only highlight the common patterns that would be highlighted in extensive study.

Stoekar (2013), in recounting how Sayer (1998, 2002) turned “the usual distinction between qualitative and quantitative research on its head”, describes the former as collecting observations from interviews “that a researcher then interprets rather than counts” and the latter as “counting characteristics of something and then conducting statistical analysis to see if there any patterns”.

Sayer, in addition, had demonstrated that qualitative data could be turned into quantitative data by counting, for example, how often specific phrases were used, and turning this into a data set. He showed that “intensive research – focusing intensively on one or a few cases – was better for studying cause and effect than extensive research”, which in many cases produced superficial results (Stoekar, 2005).

Sayer (2002) noted that while intensive and extensive studies served different purposes, they also displayed different but complementary strengths and weaknesses. So while statistical analysis could not explain the mechanisms that caused a thing, it could provide quantitative descriptions for the formal associations that emerged through the analysis of interviews and surveys.

Consequently, this intensive study began with interviews and surveys. The data collected was coded into themes, rankings and ratings, and the picture that emerged among the variables was scrutinised, exploring the role of attitudes, beliefs, expectations, perceptions, uptake and experience of m-learning deemed significant in my extended version of Ally and Gardiner's Hybrid Smart Mobile Device Acceptance Model (depicted in Figure 4). Statistical analysis was then used to explore the interrelatedness of the significant factors that emerged.

The research instruments

The research instruments used in this study – an interview guide and an online questionnaire – were based on an extended version of Ally and Gardiner's Hybrid Smart Mobile Device Acceptance Model, which built on Utaut2 to explore the moderating influence of device characteristics and usage on acceptance of smart mobile devices.

Two additional constructs – relevance and tool sets – were required to explore what, when using technology, assisted in the construction of meaning, and might therefore constitute a key factor in the adoption of m-learning among professionals. A third construct, willpower, was added to take into account Bagozzi's criticism of Utaut2, which was not addressed in Ally and Gardiner's model.

The constructs, their origins and the questions devised to explore them are set out in Appendix 1.

Study participants

The study was limited to convenience samples – described by Creswell (2012) as participants “willing and available to be studied”. While this has its limitations in that “the researcher cannot say with confidence that the individuals are representative of the population” (*ibid*), the participants did have common interests.

The original study group comprised three sets of participants with inseparable interests: human resources executives responsible for accountancy professionals' development; accountancy professionals who belonged to the South African Institute of Chartered Accountants (Saica); and accountancy professionals employed by the firms at which human resource executives were interviewed. The third group was approached in order to triangulate the extent of congruence between the attitudes of those being trained and those responsible for arranging training.

However, the questionnaire circulated to accountants at both organisations where human resource executives were interviewed attracted only two responses, so this line of inquiry was abandoned.

Seeking a similar but more accessible sample to expand the survey database, a business school student-and-alumni sample was then recruited, and the focus of the study shifted from attempting to triangulate data drawn from accountants and their HR executives to assessing the perceptions, attitudes and experience of a broader group of people with an interest both in business and in further studies. The business school group also had access to m-learning, and was asked the same questions as the accountancy professionals in order to gauge their attitudes, beliefs, expectations, perceptions, uptake and experience of m-learning.

Participant selection

Ultimately participants formed three groupings for the purposes of this study:

- **Criteria for group 1:** Human resources executives in large organisations that employed accountancy professionals, and who were responsible for these professionals' development from a corporate perspective.
- **Criteria for Group 2:** Accountancy professionals who belonged to a professional body. As these professionals were obliged by law to pursue continuous professional development, and some m-learning was available in their field, they were likely to have developed attitudes towards how they carried out this learning.

This group of participants was homogenous in that they practiced the same profession, needed to adhere to a common set of professional principles and ethics, and had a common need to ensure that they kept their CPD points up in order to continue to practise as registered professionals, but disparate in that they worked in a broad variety of sectors, experienced different organisational cultures, and were likely to come from different ethnic backgrounds.

- **Criteria for Group 3:** South African business school students. Their similarity to Group 2 lay in their interest in both business and learning, and the fact that some m-learning was available to them. They also worked in a broad variety of sectors, experienced different organisational cultures, and were likely to come from different ethnic backgrounds.

TABLE 1: GROUP SELECTION CRITERIA

Participant groups	Selection criteria	Number in group	Data collection method
1	Human resources executives in large organisations that employ accountancy professionals	3	Interview
2	Accountancy professionals who belong to the South African Institute of Chartered Accountants	Potential 27 000+; 141 valid responses	Online questionnaire
3	Business school students and alumni	Potential 2 000+; 150 valid responses	Online questionnaire

Data collection techniques

This study approached the three groups using two techniques – interviews and an online survey.

Those in the first participant group, human resource directors at a major consultancy and a bank, were interviewed to ascertain how mobile learning was employed in their organisations. The interviews were guided by a script that tied the line of inquiry closely to the questions asked of Groups 2 and 3 in the online survey.

Groups 2 and 3 were asked to complete an online survey that used both Likert-scale and open-ended questions to explore their attitudes to and beliefs about:

1. The kind of mobile devices they had;
2. How they used them;
3. The study platforms they had used;
4. The time they had available for study;
5. The nature of the skills they believed they needed;
6. Their attitudes towards and beliefs about:
 - Directing their learning;
 - The nature of their learning needs;
 - What motivated them to learn;
 - How they felt they learnt best;
7. Their perceptions about:
 - Their control over their use of time and their learning;
 - The study platforms they had used;

- The study platforms available;
 - How their learning needs were best served; and
8. The learning activities they found most useful, and why they found them useful.

Answers to the first four questions were expected to provide context.

From a theoretical perspective, answers to questions 5 to 8, which related to control over the performance of a behaviour, were expected to shed light on the likelihood of improving the prospects of action emanating from *planned behaviour*. *Andragogy* assumes that learners have a readiness to learn; the target group's mandatory learning requirements might predispose them towards or constitute a form of readiness. Answers to questions 5 to 8, particularly those relating to their experience of learning platforms and activities, were expected to shed light on what motivated participants, and what helped them direct their own learning.

The exploration of the extent of participants' self-direction and attitudes towards learning, along with their perceptions of control and learning tool and platform preferences, were expected to help expose the key determinants of m-learning adoption for professional development.

The third group – initially expected to be accountancy professionals at the companies where human resource directors were interviewed – would have been asked to complete the questionnaire to assess the extent of correlation or disconnect between their views and the human resource directors' views. Ultimately, this group was replaced with a sample of business school students, so the triangulation initially envisaged was not possible. However, the business school students, whose fields of study were similar to the second group's, were expected to provide a picture that could be related to the first group's views and experience.

Where participants were asked to give ratings, Likert scales were used, in most cases a scale of 1 – weakest, or strongly disagree – to 5 – strongest, or strongly agree. Final rankings were calculated by dividing total score per factor by the number of responses to the question, producing final rankings on a scale of 1 to 5. Accountancy professionals and business school students rankings were averaged separately, and then together to give a mean. In most instances the accountancy professionals' rankings were lower than business school rankings. So while they ranked things in the same order, a mean rating did not always make sense; this has been noted on affected tables.

The online questionnaires were tested with colleagues drawn from the finance departments in my own organisation and adjusted where necessary, as were the interview questions, which were piloted with our human resources department.

How participants were reached

Group 1: Permission was requested from the human resource directors to interview them and to circulate the questionnaire link among their staff.

Group 2: A professional accountancy body was approached for assistance in mailing its members links to the online survey and encouraging them to complete it.

Group 3: Business school students and alumni were asked via e-mail to complete a web-based questionnaire.

Group 1, the human resource directors, were interviewed at their offices, using an interview guide based on questions similar to the ones used for the accountancy professionals and business school students, but re-angled to take into account their organisational perspective. They were guided through a set of open-ended questions adjusted for the fact that their organisations had used m-learning.

Participants in Groups 2 and 3 answered identical demographic questions, and then those who had used m-learning were guided to a set of questions adjusted for the fact that they had used it. Participants who had not used m-learning were guided to a similar set of questions angled to take into account the fact that they had not used m-learning.

Data analysis

The interview transcripts and survey participants' responses to open-ended questions were subjected to the rigorous iterative analytical coding process outlined by Creswell (2012).

They were read and re-read to identify the concepts – phenomena – relevant to this study (open coding, as described by Strauss and Corbin, 1998). The annotations on these transcripts were tabulated, re-examined and re-sorted into broad categories, and then sifted again by properties. The number of mentions for each was noted, and examples of participants' words were given to illustrate the phenomena, sorted by property. Next a selective code was generated to encapsulate the main features of each category. Lastly, the

selective code was analysed, providing a framework within which to make recommendations on each category.

Replies to the online questionnaire were filtered using a survey engine. The data was sorted into themes and sifted into categories, and trends identified.

The patterns that emerged were scrutinised for interrelationships and to see whether any one factor or combination of factors appeared more likely to contribute to the success of professional development through m-learning, as well as to correlate the attitudes, beliefs, and expectations of the human resources group with the experience and perceptions of those participating in the programmes offered by the human resources group.

The relationships exposed by the data were mapped to make visible any patterns showing strong preferences and relationships between variables that demonstrated the key determinants of m-learning adoption for optimal professional development in the workplace in a South African context, and which might be useful to underpin mobile learning design.

Statistical analysis was also carried out to explore whether there were correlations between factors deemed significant under Utaut2.

Credibility and reliability

Sin (2010) points out that reliability – the extent to which a study's findings can be replicated – is not easy to apply to qualitative research, as research settings change.

It was necessary, in interpreting the data collected from both the questionnaires and the interviews, to consciously set aside any preconceived notions about the outcomes. The findings were audited for logic of inferences, appropriateness of themes, and degree of researcher bias, and compared to and contrasted with literature that had emerged by the time this study was completed.

Participants were drawn from reputable organisations, so it was assumed that their responses would be reliable and credible. Initially it was hoped that the pool of accountancy professionals would be big enough to produce meaningful patterns from which credible inferences could be drawn: even a 2% to 3% response from Saica's 27 260 South Africa-based members (Saica, 2012) would have produced 545 to 817 responses. However, with only 141 responses, it was necessary to expand the survey, so a Johannesburg-based business school was approached. This elicited another 150 valid responses – a total sample base big enough to yield numeric analysis in some instances but not big enough to permit regression analysis of some data.

The sample of human resource directors approached was purposive, again drawn from highly reputable organisations that operate internationally, so as sources of data should be credible. The interviews were recorded to ensure accuracy in transcription.

The limitations anticipated in this study included that:

- The study was limited to self-evaluation of perceptions of change in levels of knowledge, comprehension, application, analysis, synthesis and evaluation provided by m-learning, and self-evaluation – while providing a snapshot of perceptions – can be subjective;
- M-learning is in its infancy in corporate South Africa, so experience of it at the time the research was carried out was limited. As it turned out, only 30% of the sample group had experienced m-learning;
- The recruitment groups might not materialise as planned; and
- The response rate might be low.

To overcome these problems:

- A concerted effort was made to reach accountancy professionals at organisations with international m-learning programmes;
- Once it was established that the original recruitment group was too small to provide meaningful data, it was supplemented with a second recruitment group with similar interests;
- Expectations were explored as well as perceptions stemming from experience; and
- The findings were offered to the organisations involved for use in their professional development programmes.

Ethics

Participation in this study was voluntary, and the collection of data permission-based.

For the interview reports, coding was used to conceal the identity of interviewees.

The data will be disposed of within five years of completion of the study.

Reporting findings

Ratings and other measurements have been tabulated, and the findings have been described and then discussed in a narrative that, as Creswell (2010) suggests, supports themes.

Relationships between distinctive categories that have emerged are clearly stated, as described by Sin (2010), in the discussion, and quotes from interviews have been used to clarify meanings where appropriate. Any contradictions or anomalies noted have been contrasted where possible with the literature.

Weaknesses in the study, and any further limitations that emerge, are noted in Chapter 5, along with the implications of the findings.

CHAPTER FOUR: FINDINGS AND DISCUSSION

Research participant demographics

Group 1

Group 1 constituted human resource directors from a major professional consultancy group and a bank. Both organisations employed accountancy professionals; both operated internationally; both, at international level, were mega operations, and both employed hundreds of people in South Africa.

Their environments were similar in that they were both multinational, large, operating in highly competitive and highly regulated environments, so with extraordinary regard for compliance training. Both pushed staff to keep up with compliance training requirements.

TABLE 2: GROUP 1 DESCRIPTORS

Company 1	Company 2
Mega-sized international consultancy (280 000 internationally, 1 850 permanent employees in SA, scores of them accountancy professionals); learning organisation made up of knowledge workers Information source: talent manager, South Africa	Mega-sized international bank operating in 22 countries, several hundred accountancy professionals employed in business aspects of organisation, rotated internationally Information sources: South Africa-based global talent head and head of accountant training programme
Self-described as a learning organisation	Self-described as conservative, focused on compliance; Seeks to expose candidates without risk; Wants to build confidence
Environment: highly competitive, highly regulated	Environment: highly competitive, highly regulated
Training focuses on regulatory compliance, sectoral understanding, and compliance	Training focuses on regulatory compliance, ability to prevent fraud

Groups 2 and 3

As the initial study group recruited elicited many more “have not done m-learning but interested in it” participants than “experienced” ones, the study group was widened to include business school students and alumni, who were felt to have broadly similar interests in business and a need to learn.

Data was collected from 291 participants in Groups 2 and 3, 83 of whom had participated in m-learning. A total of 141 valid responses were elicited from the professional accountancy

organisation, and 150 from the business school student and alumni group. Almost 68% worked for private businesses, while almost 16% worked for government; the rest identified as NGO workers, academics or “other”.

TABLE 3: COMPARISON - GROUPS 2 AND 3

Valid responses from	Frequency	%	Valid %	Cumulative %
Accountancy professionals	141	48,5	48,5	48,5
Business school group	150	51,5	51,5	51,5
Total	291	100	100	100

Categorisation

Participants from Groups 2 and 3 were then categorised according to whether they had trained using a mobile device, had not trained using a mobile device but were interested in doing so, or were not interested in training using a mobile device.

TABLE 4: CATEGORISING GROUPS 2 AND 3

Participation in m-learning	Frequency	%
Have participated	83	31,4
Interested but have not participated	157	59,5
Not interested	24	9,1

Those who were not interested in training using a mobile device gave varying reasons for this – 6% of participants said they would rather be trained by a person, and 1% said their mobile devices were their own property and they did not use them for work, while 1% said their mobile devices were for their leisure, and they preferred not to use them for work.

Responses from those who had trained using mobile devices were separated from those who were interested but had not used mobile devices into “experience of m-learning” and “expectation of m-learning” respectively.

The demographics of the “experienced” and “expectation” groups are given in sequence below for ease of comparison between groups.

Home base: All participants had ties to South Africa either through their membership of the accountancy professionals’ body or the business school.

Ninety-one percent of study participants were based in South Africa, the majority in Gauteng (70,3%), 14,8% in Western Cape, 5,5% in KwaZulu-Natal, 4,7% in Free State, 1,3% each in Eastern Cape, Northern Cape and Mpumalanga, and 0,4% each in Northern

Province and Northwest. A total of 3,8% were based in Nigeria, 1,2% in Lesotho, 0,8% each in Zimbabwe and Ghana, and 0,4% each in Zambia, Mozambique, Tanzania, Uganda, Swaziland, France and Canada.

Of those who had participated in m-learning, 82% were based in South Africa, 6% in Nigeria, 2% in Zimbabwe, 1% each in Canada, Ghana, Swaziland, Tanzania and Uganda. Four percent did not identify their home base.

Organisational strata: Of the 222 participants who were employed, 23,4% described their posts as in top leadership; 5,4% in senior management, 19,4% in middle management, 2,3% as junior management, 37,4% as professional, and 12,2% as administrators.

However, among those who had done m-learning, 33% described themselves as top leadership, 23% each as professionals or senior management, 4% as middle management, 2% as junior management, and none as administrators.

TABLE 5: JOB LEVELS, GROUPS 2 AND 3, TOTAL PARTICIPANTS

Organisational Strata		Accountancy Professionals	Business School	Total
Top leadership	Count	40	12	52
	% of total	18,0%	5,4%	23,4%
Senior management	Count	8	4	12
	% of total	3,6%	1,8%	5,4%
Middle manager	Count	28	15	43
	% of total	12,6%	6,8%	19,4%
Junior manager	Count	1	4	5
	% of total	0,5%	1,8%	2,3%
Professional	Count	37	46	83
	% of total	16,7%	20,7%	37,4%
Administrator	Count	5	22	27
	% of total	2,3%	9,9%	12,2%
TOTAL		119	103	222
		53,6%	46,4%	100%

Age: The biggest age group among total participants was 26 to 35 (41,9%), followed by 36 to 49 (35,6%), 50 to 65 (13,7%), 18-25 (6,3%), and tailed by those older than 65 (2,5%).

The age range for accountancy professionals who had done m-learning tended to be a little older than that of business school m-learners, with 28% of accountancy professional m-learners 50 or older, and 67% 36 or older, against 6% of business school m-learners older than 50, and 49% 36 or older.

TABLE 6: DEMOGRAPHICS - AGE GROUPS, THOSE WHO HAVE EXPERIENCED M-LEARNING

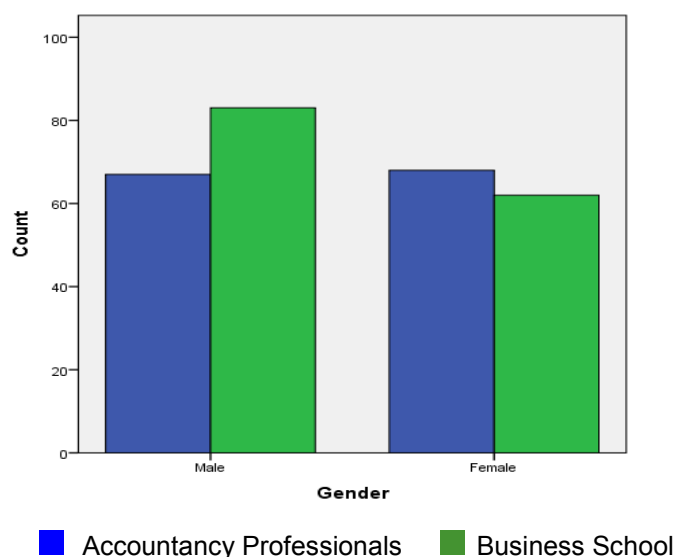
Age Group	Accountancy Professionals	Business School	Cumulative
18-25	3%	6%	5%
26-35	31%	40%	36%
36-49	39%	43%	41%
50-65	22%	6%	13%
Older than 65	6%	0%	2%

Gender: More men (53,6%) participated in the study than women (46,4%). Likewise, more men (60,2%) than women (37,3%) had participated in m-learning (2,4% skipped the gender question).

While the older accountancy professional participants were male, the younger group was almost evenly divided between male and female, inferring that there has been genuine transformation on a gender basis in field of accounting, which traditionally was dominated by men (Trotman, 2001).

TABLE 7: DEMOGRAPHICS – GENDER, THOSE WHO HAVE EXPERIENCED M-LEARNING

Gender	Accountancy Professionals	Business School	Cumulative
Male	55,60%	63,80%	60,20%
Female	44,40%	31,90%	37,30%



Highest level of education: The biggest group of respondents had professional qualifications (37,8%). A total of 17,7% reported having honours degrees; 14,8% diplomas; 11,7% were graduates; 7,4% had masters degrees and another 7,4% matric; 2,1% “other”; and 1,1% doctorates.

Among those who had done m-learning, the highest proportion (33%) had a professional qualification; 75% of accountancy professionals gave “professional qualification” as their highest level of education.

TABLE 8: DEMOGRAPHICS – EDUCATION LEVELS, HAVE EXPERIENCED M-LEARNING

Education	Accountancy Professionals	Business School	Cumulative
Matric	0%	9%	5%
Diploma	3%	28%	17%
Undergrad	3%	17%	11%
Honours	6%	11%	8%
Masters	0%	21%	12%
Doctorate	3%	0%	1%
Professional qualification	75%	0%	33%

Organisations: A total of 31,2% of respondents were from mega organisations (1001 or more employees); 27,7% from micro organisations (1-15 employees); 14,7% from small organisations (16-50 employees); 9,9% from large organisations (251-1000 employees); and 7,9% from small-to-medium-sized organisations (51-250 employees). Most of the respondents (67,8%) worked for private business; 15,7% identified as government employees; 2,8% as academics; 1,2% as from nongovernment organisations; and 10,6% as from “other” types of organisations.

Among those who had done m-learning, 27% of respondents were from mega organisations (1001 or more employees); 21% from micro organisations (1-15 employees); 20% from small organisations (16-50 employees); 6% from large organisations (251-1000 employees); and 19% from small-to-medium-sized organisations (51-250 employees). Most of the participants (51%) worked for private business; 10% identified as government employees; 3% as academics; 1% as from nongovernment organisations; and 9% as from “other” types of organisations.

Sectors: While participants were identified in almost every sector, the largest concentrations were in education (13,1%); chemicals (12,3%); services (8,3%); banking (5,6%); public

sector (4%); information and communication technology; mining and metals; manufacturing services and financial services (3,6% each); and insurance (3,2%).

The breakdown was different among those who had done m-learning. The biggest concentration was again in education (9%), but followed by banking (7%), the public sector, and ICT (5% each); the automobile and automotive, manufacturing, mining and metals, and telecommunications sectors (4% each); development finance, insurance, energy, and construction and materials (3% each); and the forestry and paper, healthcare and pharmaceuticals, chemicals, oil and gas, personal and household goods, and transport sectors (1% each).

Travel for work: A total of 36,1% reported never or rarely travelling for work locally, almost half never travelled nationally for work (23,6% did several times a year), and more than three quarters (75,3%) never travelled for work internationally. Of those travelling locally, 66,4% were away for more than a day at a time, 48% of them for up to a week at a time, and 25,4% for a week or more at a time.

Among those who had done m-learning, 26,8% reported never or rarely travelling for work locally, 22,5% never travelled nationally for work (21,3% did several times a year), and 38,8% never travelled for work internationally. Of those travelling locally, 63,4% were away for up to a day at a time, 49% were away for more than a day at a time, 56,3% of them for up to a week at a time, and 38,8% for a week or more at a time.

FINDINGS

1: Findings from interviews with two organisations' human resource directors

This section outlines the discussion and **describes** the **major themes** that emerged from the talent directors at two large firms that employ accountants.

Attitudes towards, beliefs about, perceptions, expectations, uptake and experience of m-learning from an organisational perspective

While their environments and prime learning requirements were similar, the culture of the two organisations was very different. The first, a consultancy, was described as a learning organisation that removed excuses for people not training; the second was described as conservative, wanting to build staff confidence and expose candidates without risk.

From both organisations' point of view, the best and most fit-for-purpose training was required.

Compliance training was handled by digital learning where proof of completion and competence could be collected.

Collaborative learning was highly valued, though while one organisation felt that m-learning was appropriate for everybody, the other did not. Both noted that some topics were better suited to m-learning than others, particularly compliance training.

While both organisations were keenly aware of the time cost of training, Company 2 put network security ahead of convenience for staff, so generally did not permit staff to access training on its systems off site.

Company 1 went to great lengths to ensure that training was easily accessible for staff on the go, and expected them to get on with it whether travelling between clients locally or across continents. It had worked hard to remove excuses for not training,

"When people are delinquent [do not complete mandatory training on schedule] ... because of the big financial impact on them they come up with all sorts of excuses.... The long and the short of it is we've removed the excuses. You actually can't do it in the traffic because there's a quiz at the end of it, but you could listen to the content. If I'm an analyst

working in [our] strategy segment there are a whole lot of courses that I will have to do in that year in order to build industry skills. They get pushed very heavily.”

The organisation focused on structured learning, internships and accredited training because of BEE skills development requirement changes. In addition, specialists needed industry certification. This organisation was determined to expose staff to the best faculty it could find, and delivered such training to staff in virtual environments.

Cost had become “a huge driving force” for Company 1; the operation could not afford to fly people across the world for training, employee learning time was at a premium, and competitors were doing “a lot of innovative things”. This organisation intended to increase virtual training by 600%, estimating that it would make a cost saving over five years averaging 40% per person.

Company 2 also put pressure on staff to comply, and while it supported sending them on training that that would yield CPD points, noted that staff rarely collected their certificates, so had concluded that certification was not that important to them.

While both organisations delivered compliance training via virtual learning, the first, which delivered about 60% of its training in a virtual environment, expected most employees to access it in the office via wifi. It had had instances where staff who were travelling between clients had racked up data bills of “R30 000 to R40 000. It's happened more than once.... We were in a team meeting the other day and I was demonstrating – ‘wow, look how cool this is’ and I get: ‘Can I claim for my data?’” While the organisation realised how important on-the-go training was for its staff, who travelled frequently, it did not yet have a policy on data reimbursement, and realised that a data usage and reimbursement policy would be necessary.

While Company 2 also pushed hard to ensure that people complied, it felt that training did not “have to be fancy – just fit for purpose”.

Do mobile device preferences and usage patterns influence the uptake of development programmes delivered by mobile device?

This was not clear for either organisation. However, Company 2 felt staff did not have strong preferences, and used whatever was available.

Neither organisation had noticed a marked gender or age bias in staff uptake of m-learning.

What m-learning activities are perceived as most effective for development, and why?

Company 1's talent manager voiced a preference for audio and for digital collaboration as training delivery mechanisms.

Audio was portable and could fill travelling hours for his highly mobile staff, so they had open access to condensed voice and text versions of current business books to help them keep up with current practices, trends and thinking.

Because the organisation also felt that collaboration and knowledge-sharing were vital, it offered telepresence for virtual training, used a knowledge exchange, collaborative applications Stream, Yammer and other social media ("so many they are hard to keep track of") for collaboration in communities of practice.

The company kept a learning repository, and structured learning internships and accredited training were used to formalise learnerships across the business.

The effectiveness of these learning channels had not been measured.

Organisation 2 did not have a marked preference for the medium of training provided it was "fit for purpose". Policy and other compliance training was mandatory, so it was provided online. Webinars and simulations were used where appropriate. While the organisational culture preferred face-to-face collaboration, team collaboration was encouraged via Sharepoint – an online repository – and competitions were used to encourage staff to keep up with training. Cost was not an issue – the organisation "tends to throw money at graduates". It used both international and local faculty for its training, and covered the cost of data for staff, but did not permit staff off premises to access training on its system for security reasons.

Concepts emerging from interviews

Open coding of interview transcripts produced six concepts of importance to human resource executives: compliance, challenges, communities, training and attitudes. Axial coding refined these into the following categories and properties (full tables in Appendices 1 and 2):

TABLE 9: INDUSTRY VIEW

Open code	Categories	Properties
Compliance	Industry:	Professional association
	Individual:	Compliance failure
	Organisational:	Compliance requirement
Challenges	Industry level:	Compliance
	Organisational:	Cost
		Capacity
		International
		Security
	Individual:	Traits
Convenience	Organisational:	Ease of access
		Urgency
	Individual:	Ease of access
		Mobility
		Changing habit
Communities	Organisational:	Collaboration
		Global view
		Industry skills
	Individual:	Sharing
		Channel clutter
		Demographics
Training	Informal:	Type
		Access
		Communities of practice
		Own devices
	Formal:	Specialised
		Capacity
		Monitoring
		Needs
		Training pushed to people
		Simulations
		Continuous professional development
		Competitive
Attitude	Organisation:	Who pays
		Cost
		Policy
		Appropriateness
		Security
		Range
		Quality
		Solutions
	Individual:	Who pays
		Efficiency
		Status
		Uptake
		Demographics

2: Findings from Groups 2 and 3 – accountancy professionals and business school survey participants

This section **describes** uptake of m-learning, attitudes towards, beliefs about, perceptions, expectations, and experience of m-learning among accountancy professionals and business school participants.

Uptake

Eighty-three of the 291 digital survey participants (28,5%) had participated in mobile learning.

Twenty-four (8,2%) were not interested in it, 17 (5,8%) of them preferring to be trained by a person. Seven of those who were not interested in it (2,4%) were unable to imagine learning on a mobile device; five (1,7%) felt that their mobile devices were their personal property and therefore not to be used for work, with three of these (1%) saying in addition that their devices were for leisure, so not to be used for work.

The broader group had participated in face-to-face events (83%), courses online (53%), webcasts or seminars online (46%), programmes downloaded on PC or mobile device (41%), and courses on CD (31%).

Those who had done m-learning had participated in face-to-face events (90%), courses online (80%), webcasts or seminars online (60%), programmes downloaded on PC or mobile device (73%), and courses on CD (46%).

TABLE 10: UPTAKE OF DIFFERENT KINDS OF LEARNING

Participated in....	All survey participants %	Survey participants who have experienced m-learning		
		Accountancy Professionals %	Business School %	Cumulative %, have done m-learning
Face-to-face events (lectures, seminars, workshops)	83	92	89	90
Courses online	53	81	80	80
Webcasts or seminars online	46	75	48	60
Programmes downloaded on my PC or mobile device	41	75	72	73
Courses on CD	31	47	46	46

While a total of 53% of study participants had participated in online courses, only 30% – 83 people – reported participating using mobile devices to do them.

Almost 61% of study participants were interested in training using a mobile device but had not yet done so, while 9,2% were not interested in using a mobile device. Six percent of this last group said they would prefer to be trained by a person, 2% were unable to imagine studying using a mobile device, and 1% each said they were not interested in training using a mobile device because their mobile devices were personal property, and for their leisure, not for work. One person commented that it would be difficult to complete assignments and research on a mobile device.

Accountancy professionals who had done m-learning tended to be a little older than business school m-learners, with the biggest group aged 36-49 (41%). This demonstrates as a fallacy the widely held assumption that m-learning will be rejected by older people with study needs.

TABLE 11: SURVEY PARTICIPANTS WHO HAVE EXPERIENCED M-LEARNING

Age	All survey participants %	Accountancy Professionals %	Business School %	Cumulative, have done m-learning %
18-25	6	3	6	5
26-35	42	31	40	36
36-49	35	39	43	41
50-65	14	22	6	13
Older than 65	2	6	0	2

The study shows a larger proportion of top management (33%) among those who have tried m-learning than any other group.

While convenience and ease of access were listed by these participants more frequently than any other reason when asked what prompted them to use m-learning, only one participant in top management – a business owner – listed “mandatory compliance training” among what she had covered by m-learning. The others listed ICT, Prince 2, business administration, leadership training, technical training, customs administration; postgraduate diploma, MBA and BML qualifications; a string of accounting qualifications - CIMA, ACCA, MBA, CFA, IIA, IFRS and LIFA; and then bank internal audit and accounting, tax, labour law, ethics, quality and risk management, German, research, sustainability, Pastel Payroll, supply chain management, presentation, finance management and sustainability.

A slightly greater proportion of m-learning participants were from mega organisations (almost 28%) than other types of organisations, and a great many more identified as from private organisations than government institutions.

It appears that while small organisations are as pressed as bigger organisations to save costs and time (Economist Intelligence Unit, 2009), bigger organisations – though not quite ready to adopt m-learning on a mass scale – certainly support m-learning, partly because making it more convenient for staff helps the organisations meet regulatory requirements and stay abreast of developments, which is vital to maintain a competitive edge.

TABLE 12: M-LEARNERS' ORGANISATION TYPES

Organisation by staff numbers	Survey participants who have experienced m-learning, %			Organisation type	Survey participants who have experienced m-learning, %		
	Accountancy Professionals	Business School	Cumulative %		Accountancy Professionals	Business School	Cumulative, %
1-5	17	11	13	Private business	78	49	61
6-15	6	11	8	Government	0	21	12
16-35	14	17	16	NGO	3	0	1
36-50	6	2	4	Academic	3	4	4
51-100	11	6	8	Other	14	9	11
101-250	8	13	11				
250-1000	11	2	6				
1001 or more	22	30	27				

While the greatest proportion of m-learning participants identified as from the services sector, which covers a multitude of interests, the next largest concentration of individuals in this study who specified their sector and had done m-learning were from the education sector.

TABLE 13: SURVEY PARTICIPANTS, BY SECTOR, WHO HAVE EXPERIENCED M-LEARNING

Sector	Accountancy Professionals %	Business School %	Cumulative, have done m-learning %
Services	11%	4%	15%
Education	6%	4%	10%
Banking	4%	2%	6%
Financial services	4%	1%	5%
ICT	5%	0%	5%
Mining and metals	4%	1%	5%
Other – accounting	4%	1%	5%
Other – auditing	5%	0%	5%
Public sector entity	2%	2%	5%
Construction and materials	2%	1%	4%
Media	4%	0%	4%
Agriculture and agriprocessing	2%	0%	2%
NGO	2%	0%	2%
Oil and gas	2%	0%	2%
Other – consulting	1%	1%	2%
Other – marketing	1%	1%	2%
Telecommunications	2%	0%	2%
Chemicals	0%	1%	1%
Manufacturing	1%	0%	1%
Other – legal	1%	0%	1%
Other – property	1%	0%	1%
Other – staffing	1%	0%	1%
Retail	1%	0%	1%
Transport	0%	1%	1%

Attitudes

To gauge attitudes, participants who had used m-learning were asked about their perception of the usefulness and relevance of what they had studied by m-learning, what kind of activities and tools their m-learning courses used and how relevant they were in terms of their work, how easy they found using m-learning in comparison to other study options, and the perceived degree of change in knowledge and understanding of the subject studied. To get a sense of how friends, family, colleagues and employers might have influenced their perceptions, participants were asked what they thought these people's beliefs about m-learning were.

Sixty-eight percent of those who had participated in m-learning knew someone else who had done it. Of these, 58% were workplace colleagues, 51% were colleagues and acquaintances at other workplaces, 45% were friends, 33% were family, and 24% were colleagues or acquaintances in other countries (some fell into overlapping groups).

Both groups felt strongly that the people they knew who had done m-learning had adopted it because it was convenient and they could work on it anywhere in spare moments and – a little less strongly – that these acquaintances travelled a lot and needed access to the material when out of the office, and that it was more cost effective than face-to-face training. Known others' perceptions of convenience and cost effectiveness were largely in line with participants' own experience.

Known others' perceptions of convenience and cost effectiveness were largely in line with participants' own experience.

TABLE 14: PERCEPTION OF KNOWN OTHERS' REASONS FOR UPTAKE

People I know who participated in m-learning (e-learning using a mobile device) used it because (perceived reasons for uptake ranked on five-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = don't know, 4 = agree, 5 = strongly agree):

Accountancy Professionals		Ranking Business School		Combined ranking	
It was convenient because they could work on it anywhere in spare moments	4,38	It was convenient because they could work on it anywhere in spare moments	4,40	It was convenient because they could work on it anywhere in spare moments	4,39
They travel a lot and need it as reference material out of the office	3,95	It was cheaper than accessing a course another way	3,70	They travel a lot and need it as reference material out of the office	3,79
They preferred it over another means to access a particular course	3,65	They travel a lot and need it as reference material out of the office	3,67	They preferred it over another means to access a particular course	3,63
It was cheaper than accessing a course another way	3,14	They preferred it over another means to access a particular course	3,62	It was cheaper than accessing a course another way	3,46
It was the only way the course was offered	3,00	It was a novelty	3,29	It was the only way the course was offered	2,96
It was a novelty	2,48	It was the only way the course was offered	2,93	It was a novelty	2,92

Importance of others' opinions on using m-learning

Participants leant towards feeling it was a bit important for the organisation to believe they should use m-learning, but overall did not feel others' opinions mattered much. Accountancy professionals cared markedly less than the business school group about others' opinions, particularly those of their families.

TABLE 15: IMPORTANCE OF OTHERS' BELIEFS

How important is it to you that the following believe you should use m-learning? People or entity whose beliefs are most important, ranked on five-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = don't know, 4 = agree, 5 = strongly agree

Accountancy Professionals		Ranking Business School		Combined ranking	
Organisation	3,09	Organisation	3,67	Organisation	3,42
Colleague	2,95	Line manager	3,42	Line manager	3,23
Line manager	2,95	Colleague	3,27	Colleague	3,13
Client/s	2,55	Family member	3,19	Friend outside my organisation	2,85
Friend outside my organisation	2,41	Friend outside my organisation	3,16	Client/s	2,81
Family member	2,18	Client/s	3,67	Family member	2,77

Importance of perceived organisational beliefs

Participants across the board felt strongly that their organisations believed that learning was essential to their business. Overall speedy access and ease of uptake were important to their organisations, followed by helping personnel train at their own convenience and on demand. While they believed their organisations felt m-learning was cost effective, this was ranked least important.

TABLE 16: PERCEIVED ORGANISATIONAL BELIEFS

My organisation believes (ranking derived from five-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = don't know, 4 = agree, 5 = strongly agree):

Accountancy Professionals		Ranking Business School		Combined ranking	
That learning is essential to the business	4,54	That learning is essential to the business	4,42	That learning is essential to the business	4,47
In delivering learning on demand	4,24	That speed of access and ease of uptake are important	4,16	That speed of access and ease of uptake are important	4,23
In helping personnel train at their own convenience	4,31	In helping personnel train at their own convenience	4,12	In helping personnel train at their own convenience	4,21
That m-learning is cost-efficient	4,18	In delivering learning on demand	4,09	In delivering learning on demand	4,15
That speed of access and ease of uptake are important	4,31	That m-learning is cost-efficient	3,93	That m-learning is cost-efficient	4,04

Perception of control in m-learning

Freedom to study when and where they wished topped the rankings for all participants in this section of the study, closely followed by being able to work at their own pace.

While being in control of their learning was ranked more highly on average by business school participants than studying alone, studying alone was a marked preference for accountancy professionals. Both found it easy to pick up the programme and learn wherever they were.

TABLE 17: PREFERENCES AND CONTROL

Statements ranked according to experience, using a five-point Likert scale where 1 = strongly disagree and 5 = strongly agree

Accountancy Professionals		Ranking Business School		Combined ranking	
Being able to study when and where I wanted to was better than having to go to lectures at set times.	4,50	Being able to study when and where I wanted to was better than having to go to lectures at set times.	4,56	Being able to study when and where I wanted to was better than having to go to lectures at set times.	4,54
I like being able to work on the programme at my own pace.	4,33	I like being able to work on the programme at my own pace.	4,25	I like being able to work on the programme at my own pace.	4,29
I like to study alone.	4,28	I was in control of my learning on this programme.	4,19	I was in control of my learning on this programme.	4,21
I was in control of my learning on this programme.	4,25	I found it easy to pick up the programme and learn wherever I was.	4,15	I like to study alone.	4,19
I found it easy to pick up the programme and learn wherever I was.	4,13	I like to study alone.	4,12	I found it easy to pick up the programme and learn wherever I was.	4,14
I found I could work on the programme only in a quiet place.	3,63	Anytime access made me more disciplined about the time I spent studying.	4,10	Anytime access made me more disciplined about the time I spent studying.	3,75
Anytime access made me more disciplined about the time I spent studying.	3,29	I found I could work on the programme only in a quiet place.	3,52	I found I could work on the programme only in a quiet place.	3,56
Anytime access made me less disciplined about studying time.	2,75	I like to study with others.	3,18	I like to study with others.	2,93
I like to study with others.	2,58	Anytime access made me less disciplined about studying time.	2,91	Anytime access made me less disciplined about studying time.	2,84

Perception of cost and quality of m-learning

Overall, participants felt that the lower cost of m-learning was a fair trade-off for the benefits of face-to-face learning, and that this made up for not having immediate feedback from a lecturer or fellow students in a classroom setting. Responses showed a slight inclination towards paying more for a course that saved travelling time and to study when participants wished.

TABLE 18: COST AND QUALITY FACTORS

Statements ranked according to experience, using a five-point Likert scale where 1 = strongly disagree and 5 = strongly agree

Accountancy Professionals		Ranking Business School		Combined ranking	
The quality of the course I did was as good as face-to-face training.	4,05	The quality of the course I did was as good as face-to-face training.	4,05	The cheaper cost of m-learning was a fair trade-off for the benefits of face-to-face training.	3,96
The cheaper cost of m-learning was a fair trade-off for the benefits of face-to-face training.	3,95	The lower cost of m-learning balanced not having immediate feedback from a lecturer on hand.	3,78	The quality of the course I did was as good as face-to-face training.	3,94
The convenience of m-learning balanced not having immediate feedback from a lecturer on hand.	3,86	The convenience of m-learning balanced not having immediate feedback from a lecturer on hand.	3,86	I would pay more for a course that permits me to study when I wish.	3,65

Lower cost compensated for not having immediate input from fellow learners in a physical classroom.	3,82	The cheaper cost of m-learning was a fair trade-off for the benefits of face-to-face training.	3,95	Convenience compensated for not having immediate input from fellow learners in a physical classroom.	3,63
Convenience compensated for not having immediate input from fellow learners in a physical classroom.	3,82	Lower cost compensated for not having immediate input from fellow learners in a physical classroom.	3,82	The convenience of m-learning balanced not having immediate feedback from a lecturer on hand.	3,60
The lower cost of m-learning balanced not having immediate feedback from a lecturer on hand.	3,78	I would pay more for a course that saves me time travelling.	3,50	I would pay more for a course that saves me time travelling.	3,44
I would pay more for a course that permits me to study when I wish.	3,52	I would pay more for a course that permits me to study when I wish.	3,52	The lower cost of m-learning balanced not having immediate feedback from a lecturer on hand.	3,41
I would pay more for a course that saves me time travelling.	3,50	Convenience compensated for not having immediate input from fellow learners in a physical classroom.	3,82	Lower cost compensated for not having immediate input from fellow learners in a physical classroom.	3,31

Perception of security of m-learning

Fifty-seven percent of m-learning participants said their training was accessed online via a website, while 11% accessed theirs offline via an application or programme downloaded on their mobile devices. For accountancy professionals, comfort in the reliability of access to the course was paramount. They found tools provided easy to use, felt their personal information and the work they did on the course was secure. Business school participants ranked these things in a slightly different order: they felt their personal information was secure, their devices provided reliable access to the course, and that the tools provided were easy to use. Neither group was as confident about the stability of their internet connection, though they broadly agreed that their connections were reliable.

TABLE 19: SECURITY

Accessing my training via a website, I felt that...

Statements ranked according to experience, using a five-point Likert scale where 1 = strongly disagree and 5 = strongly agree

Accountancy Professionals		Ranking Business School		Combined ranking	
My device (laptop/iPad/smartphone etc) provided reliable access to the course	4,35	My personal information was secure	4,48	My device (laptop/iPad/smartphone etc) provided reliable access to the course	4,43
It was easy to use the tools provided	4,29	My device (laptop/iPad/smartphone etc) provided reliable access to the course	4,47	My personal information was secure	4,40
My personal information was secure	4,24	The work I did on the course was secure	4,42	The work I did on the course was secure	4,35
The work I did on the course was secure	4,24	It was easy to use the tools provided	4,32	It was easy to use the tools provided	4,31
My internet connection was reliable	4,12	My internet connection was reliable	4,31	My internet connection was reliable	4,24
I used all the tools provided	4,12	I used all the tools provided	4,16	I used all the tools provided	4,15
My device (laptop/iPad/smartphone etc) provided reliable access to the course	4,35	My personal information was secure	4,48	My device (laptop/iPad/smartphone etc) provided reliable access to the course	4,43

Motivation

Collecting continuous professional development (CPD) points (required for accountancy professionals to remain registered) was more highly ranked by business school participants than accountancy professionals. Self-improvement (desire for an expanded knowledge base, lifelong learning, new skills, staying up to date and improved performance outstripped the desire for CPD points among accountancy professionals. Those desires were to a large degree echoed by the business school participants. However, “doing what is expected of me” was more important to accountancy professionals than business school students, to whom a change of professional focus and improving chances of promotion were slightly more important.

TABLE 20: MOTIVATION

I participate in training because I want:

Motivation ranking derived from five-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

Accountancy Professionals		Ranking Business School		Combined ranking	
To expand my knowledge base	4,51	To expand my knowledge base	4,83	To expand my knowledge base	4,69
My learning to be a lifelong process	4,49	To learn new skills	4,74	To learn new skills	4,63
To learn new skills	4,47	My learning to be a lifelong process	4,72	My learning to be a lifelong process	4,62
To stay up to date in my field	4,46	To acquire CPD* points	4,60	To stay up to date in my field	4,53
To improve what I do	4,43	To stay up to date in my field	4,58	To improve what I do	4,51
To refresh my skills	4,41	To improve what I do	4,57	To acquire CPD* points	4,48
To acquire CPD* points	4,31	To refresh my skills	4,52	To refresh my skills	4,48

To do what is expected of me	3,54	To change my professional focus	4,22	To change my professional focus	3,85
To change my professional focus	3,33	To improve my chances of promotion	4,18	To improve my chances of promotion	3,71
To improve my chances of promotion	3,09	To do what is expected of me	3,82	To do what is expected of me	3,70

*Continuous professional development

Expectations

Broad expectations were explored, again through a set of statements ranked on a Likert scale rating. Though the scores differed between groups, the order of ranking was identical: m-learning turned out to be convenient; participants had expected that this would be the case; they all seemed to have a competitive streak, expecting to earn A's on a course and liking to benchmark their progress against others. Not all, however, reported being able to benchmark their progress against others.

TABLE 21: EXPECTATIONS

Mark the following statements according to your experience:

Ranking derived from five-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = don't know, 4 = agree, 5 = strongly agree

Accountancy Professionals		Ranking Business School		Combined ranking	
M-learning was convenient.	4,38	M-learning was convenient.	4,52	M-learning was convenient.	4,46
I thought m-learning would be convenient.	4,21	I thought m-learning would be convenient.	4,36	I thought m-learning would be convenient.	4,30
I expect to earn "A"s on a course.	3,65	I expect to earn "A"s on a course.	4,06	I expect to earn "A"s on a course.	3,89
I like to benchmark my progress against others'.	2,78	I like to benchmark my progress against others'.	3,76	I like to benchmark my progress against others'.	3,37
We could benchmark our progress against others in this course.	2,36	We could benchmark our progress against others in this course.	3,06	We could benchmark our progress against others in this course.	2,78

This section describes mobile device preferences and usage patterns that might influence the uptake of development programmes delivered by mobile device.

Availability of devices

Eighty-six percent of survey participants owned a mobile phone, while 58% had mobile phones provided by their organisations. Sixty-seven percent of participants owned laptops, while the same proportion was provided with laptops by their organisations. Twenty-five percent owned PCs, while 31% had access to PCs at work. Fifty-four percent owned tablets, while 22% had access to them at work. One percent of participants owned no mobile devices, and 4% did not have access to any mobile devices through their workplace.

TABLE 22: ACCESS TO DEVICES AMONG ALL PARTICIPANTS

Origin	Accountancy Professionals				Business School				Combined access	
	Through office		Own		Through office		Own		Through office	Own
Mobile phone	96	33%	127	44%	71	25%	120	42%	58%	86%
Laptop/notebook	96	33%	96	33%	98	34%	98	34%	67%	67%
Tablet	38	13%	92	32%	25	9%	64	22%	22%	54%
PC	33	12%	37	13%	55	19%	35	12%	54%	25%
None	3	1%	1	0,3%	8	3%	1	0,3%	4%	1%

Of those who had participated in m-learning, 93% owned a mobile phone, while 70% were provided with mobile phones by their organisations. Eighty-three percent of participants owned laptops, while 82% were provided with laptops by their organisations. Thirty percent owned PCs, while 34% had access to PCs at work. Fifty-four percent owned tablets, while 22% had access to them at work. One percent of participants owned no mobile devices, and 4% did not have access to any mobile devices through their workplace. Proportionally more of those who had experienced m-learning reported access to mobile devices, particularly mobile phones (93% compared with 86% overall), laptops (83% against 67%), and tablets (69% against 54%).

TABLE 23: ACCESS TO DEVICES AMONG THOSE WHO HAD EXPERIENCED M-LEARNING

Origin	Accountancy Professionals				Business School				Combined access	
	Through office		Own		Through office		Own		Through office	Own
Mobile phone	24	32%	32	40%	29	38%	42	53%	70%	93%
Laptop/notebook	32	42%	27	34%	30	39%	39	49%	82%	83%
Tablet	11	14%	27	34%	13	17%	28	35%	32%	69%
PC	9	12%	10	13%	17	22%	14	13%	34%	30%
None	0	0%	0	0%	1	1%	0	0%	1%	0%

Use of mobile devices

Top use across both groups (“often”) among total participants was sending and receiving e-mail (79% in total); followed by internet search (78%); setting alarms and reminders (73%); social networking (60%); checking work documents and taking photographs (48% each); transmitting documents (46%); working on documents (42%); recording videos (24%); playing games (17%) and recording voice (15%).

TABLE 24: TOTAL PARTICIPANTS OFTEN USED THEIR MOBILE DEVICES TO....

Activity	Accountancy Professionals		Business School		Total	
	N	% of total	N	% of total	N	% total
Record voice	10	4%	33	12%	43	15%
Play games	21	7%	27	9%	48	17%
Record videos	27	9%	42	15%	69	24%
Work on documents	61	21%	61	21%	122	42%
Transmit documents	69	24%	64	22%	133	46%
Take photographs	68	24%	70	24%	138	48%
Check work documents	70	24%	67	23%	137	48%
Communicate on social networks	83	29%	91	32%	174	60%
Set alarms and reminders	113	39%	97	34%	210	73%
Search the internet	114	40%	110	38%	224	78%
Send and or receive e-mail	116	40%	110	38%	226	79%

Those who participated in m-learning (Table 25) reported markedly greater and more frequent use of mobile devices across all activities investigated – often playing games: 25% vs 17% of total study participants (Table 24); often recording voice: 26% vs 15%; often recording videos: 31% vs 24%; often taking photographs: 61% vs 48%; often working on documents: 65% vs 42%; often transmitting documents: 68% vs 46%; often communicating on social networks: 71% vs 60%; often checking work documents: 73% vs 48%; often setting alarms and reminders: 82% vs 73%; often searching the internet: 89% vs 78%; and often sending and or receiving e-mail: 94% vs 79%.

TABLE 25: THOSE WHO TOOK PART IN M-LEARNING OFTEN USED THEIR MOBILE DEVICES TO....

Activity	Accountancy Professionals		Business School		Total	
	N	% of total	N	% of total	N	% total
Play games	5	16%	13	32%	18	25%
Record voice	2	6%	17	41%	19	26%
Record videos	5	15%	19	43%	24	31%
Take photographs	15	43%	31	72%	48	61%
Work on documents	23	66%	28	65%	51	65%
Transmit documents	25	72%	30	67%	56	68%
Communicate on social networks	19	56%	36	82%	55	71%
Check work documents	25	34%	67	23%	56	73%
Set alarms and reminders	28	80%	36	84%	64	82%
Search the internet	31	86%	40	91%	71	89%
Send and or receive e-mail	32	89%	44	98%	76	94%

This section describes m-learning activities that are perceived as most effective for development

Perceived usefulness of studies by topic

Accountancy professionals ranked updates (tax and legal, and not, strictly speaking, purely courses), courses on accounting or auditing principles, financial management and legal updates as most useful to them in comparison with courses delivered by other means.

Business school participants ranked business management, financial management, reporting principles and business analytics as the most useful m-courses they had done compared with courses delivered by other means. Tax updates appeared on their list, but at the bottom. Their rankings here were generally much higher than accountancy professionals' rankings.

Overall financial and business management, sector-specific regulations, reporting principles and sales courses were perceived as the top five topics in m-learning compared with courses delivered by other means.

TABLE 26: PERCEIVED USEFULNESS OF STUDIES BY TOPIC

What did you study using m-learning and how useful did you find it in comparison to courses delivered by other means? Only those applicable ranked.

Usefulness ranking derived from five-point Likert scale: 1 = useless, 2 = not very useful, 3 = a bit useful, 4 = useful, 5 = very useful

Accountancy Professionals		Ranking Business School		Combined ranking	
1. Tax updates	3,83	1. Business management	4,57	1. Financial management	4,45
2. Accounting or auditing principles	3,36	2. Financial management	4,57	2. Business management	4,43
3. Financial management	3,28	3. Reporting principles	4,56	3. Sector-specific regulations	4,42
4. Legal updates	3,20	4. Risk management	4,52	4. Reporting principles	4,40
5. Ethics	3,16	5. Business analytics	4,50	5. Sales	4,39
6. Reporting principles	3,13	6. Communication skills	4,48	6. Accounting/auditing principles	4,37
7. Legal concepts	3,06	7. Environmental analysis	4,44	7. Communication skills	4,32
8. Small business issues	3,06	8. Marketing	4,44	8. Marketing	4,32
9. Sector-specific regulations	3,00	9. Sales	4,43	9. Business analytics	4,31
10. Business management	2,72	10. Ethics	4,39	10. Risk management	4,31
11. Risk management	2,69	11. Accounting or auditing principles	4,39	11. Small business issues	4,31
12. Business analytics	2,50	12. Sector-specific regulations	4,38	12. Environmental analysis	4,29
13. Marketing	2,40	13. Small business issues	4,38	13. Legal updates	4,29
14. Communication skills	2,39	14. Contracting	4,29	14. Detecting fraud	4,28
15. Forecasting	2,24	15. Legal concepts	4,29	15. Forecasting	4,26
16. Detecting fraud	1,38	16. Negotiating	4,29	16. Tax updates	4,26
17. Negotiating	1,35	17. Forecasting	4,28	17. Ethics	4,24
18. Contracting	1,25	18. Detecting fraud	4,23	18. Contracting	4,21
19. Sales	1,21	19. Legal updates	4,23	19. Legal concepts	4,19

20. Environmental analysis	1,19	20. Tax updates	4,20	20. Negotiating	4,15
Other:					
Health and safety, earned value management, project controls, project management, anti-corruption and bribery, procurement, postgraduate diploma in business management - <i>effective because of access to other learners and facilitators</i>					
Professional development - <i>effective because the content was step by step although there was no access to a facilitator</i>					
Corporate e-learning - <i>least effective - no control of content received, time limits competing with job performance, no access to facilitator</i>					
Other, not ranked in terms of usefulness:					
Kolbe Conative Index; project management; photography; German; logistic, transport economics; strategic management, human resources					

Usefulness of tools

Business school participants found calculators and problem-solving frameworks much more useful than accountancy practitioners, while both found e-mail reminders and web links useful. Neither group thought much of simulations, ranking them at 14th place out of 17.

Being able to test application of new skills was more important to the accountancy group than the business school group, which may speak more to why the accountancy group is studying – acquiring new skills (see Motivation, Table 20) – than to what business school participants seek from their studies.

TABLE 27: PERCEIVED USEFULNESS OF TOOLS

If the following tools were used, how useful were they? *Only those applicable ranked.*

Usefulness ranking derived from five-point Likert scale rating: 1 = useless, 2 = not very useful, 3 = a bit useful, 4 = useful, 5 = very useful

Accountancy Professionals		Ranking Business School		Combined ranking*	
1. Text	4,55	Text	4,61	Calculators	4,43
2. Knowledge self-test, autofeedback	4,44	Calculators	4,53	Problem-solving frameworks	4,29
3. Concept self-test, autofeedback	4,30	Web links	4,50	Simulators	4,18
4. Video	4,10	Video	4,36	Web links	4,45
5. E-mail reminders	3,95	E-mail reminders	4,36	Text	4,59
6. Audio	3,82	Concept self-test, autofeedback	4,33	Audio	4,30
7. Test your application of new skills	3,77	Problem-solving frameworks	4,32	Video	4,42
8. Web links	3,70	Knowledge self-test, autofeedback	4,31	Blogs	4,08
9. Knowledge test, instructor feedback	3,43	Knowledge test, instructor feedback	4,31	E-mail reminders	4,44
10. Experts available online	3,15	Audio	4,23	Knowledge self-test, autofeedback	4,45
11. Concept test, instructor feedback	2,95	Test application of new skills	4,21	Knowledge test, instructor feedback	4,38
12. Calculators	2,81	Concept test, instructor feedback	4,17	Concept self-test, autofeedback	4,41
13. Problem-solving frameworks	2,81	Blogs	4,14	Concept test, instructor feedback	4,30
14. Simulators	2,53	Simulators	4,11	Test your application of new skills	4,28
15. Peer discussion via social network	2,30	Experts available online	4,06	Experts available online	4,02
16. Blogs	2,17	Peer discussion via social network	3,82	Peer discussion via social network	3,66
17. Peer discussion, course platform	1,00	Peer discussion, course platform	3,72	Peer discussion, course platform	3,42

* While the order of ranking is generally similar between groups, the marked disparities in the rating levels suggest that the perceived usefulness of tools is more greatly appreciated by one group than the other. Further exploration would be needed to accurately identify the overarching trend of a combined ranking.

Usefulness of activities

Reading, problem-solving, multiple choice quizzes and case studies topped the activity rankings for both groups. Simulations, discussed again as exercises rather than tools, ranked more than halfway down the list for both groups. Accountancy professionals rated them slightly more than “not very useful” and business students as a little more than “a bit useful” – in both cases less useful than projects and quizzes requiring short answers.

TABLE 28: PERCEIVED USEFULNESS OF ACTIVITIES

What kind of exercises did your programme use and how relevant did you find them in terms of your work? Only those applicable rated. Usefulness ranking derived from five-point Likert scale: 1 = useless, 2 = not very useful, 3 = a bit useful, 4 = useful, 5 = very useful

Accountancy Professionals		Ranking Business School		Combined ranking	
1. Reading	3,21	Reading	4,57	Reading	3,43
2. Problem-solving exercise	3,06	Multiple-choice quiz	4,48	Problem-solving exercise	3,30
3. Case study	2,96	Case study	4,45	Project	3,29
4. Multiple-choice quiz	2,89	Problem-solving exercise	4,21	Case study	3,09
5. Project	2,81	Quiz requiring short written answers	3,94	Multiple-choice quiz	2,89
6. Quiz requiring s' written answers	2,70	Project	3,43	Quiz requiring short written answers	2,82
7. Simulation	2,33	Simulation	3,41	Simulation	2,68
8. Match objects or phrases	1,85	Match objects or phrases	2,89	Journalling or blogging	2,10
9. Information hunt	1,79	Information hunt	2,62	Information hunt	2,00
10. Journalling or blogging	1,56	Games	1,93	Match objects or phrases	2,00
11. Games	1,18	Journalling or blogging	1,83	Games	1,37

* While the order of ranking is generally similar between groups, the marked disparities in the rating levels suggest that the perceived usefulness of activities is more greatly appreciated by one group than the other. Further exploration would be needed to accurately identify the overarching trend of a combined ranking.

M-learners were also asked how relevant, easy or difficult they found some exercises, and why. Difficulty in completing some exercises was reported by 35% of the group.

The greatest difficulty was perceived in the newness of studying online, which ranked alongside the newness of concepts being introduced (8% of both groups reporting); time pressure (5%); instructions tedious or not clear (4%); wanted person to consult (4%); self-motivation difficult (2%); disconnect between course content and exercises (2%); multiple choice quiz distractors too similar (1%); and out of habit of studying (1%).

Enjoyability and usefulness of m-learning programmes

Participants were asked to rate a set of statements about the enjoyability and usefulness of the m-learning courses they did.

Participants across the board agreed first and foremost that “my m-learning course/s had improved my knowledge and understanding of the topics studied”.

Next, accountancy professionals agreed that they would do more m-learning courses, while business school participants said they were equipped to apply what they had learnt, and were better equipped to solve problems and analyse issues in the field studied.

The next-greatest agreement among accountancy professionals was that their courses had provided sufficient depth of understanding, and that they were equipped to apply what they had learnt. The lowest – but still positive – ratings were given to the statements “the course was fun” and “the course did not feel like hard work”. (The accountancy group reported slightly less fun, at 3,71, than the student body, at 3,85.)

TABLE 29: ENJOYABILITY AND USEFULNESS OF M-LEARNING USED

Statements rated for enjoyability and usefulness on a five-point Likert scale where 1 = strongly disagree and 5 = strongly agree

Accountancy Professionals		Ranking Business School		Combined ranking	
It improved my knowledge of the topics studied.	4,59	It improved my understanding of the topics studied.	4,62	It improved my knowledge of the topics studied.	4,60
It improved my understanding of the topics studied.	4,55	It improved my knowledge of the topics studied.	4,61	It improved my understanding of the topics studied.	4,59
I will do more m-learning programmes.	4,50	I am equipped to apply what I have learnt.	4,50	I will do more m-learning programmes.	4,43
The course provided sufficient depth of understanding for me.	4,36	I am now better equipped to solve problems in the field studied.	4,50	I am equipped to apply what I have learnt.	4,41
I am equipped to apply what I have learnt.	4,27	I am now better equipped to analyse issues in the field studied.	4,47	I am now better equipped to solve problems in the field studied.	4,38
I found the programme credible.	4,23	The programme provided links to further material of interest.	4,44	The course provided sufficient depth of understanding for me.	4,37
I have used what I learnt.	4,23	I enjoyed doing the programme via m-learning.	4,41	I am now better equipped to analyse issues in the field studied.	4,36
I enjoyed doing the programme via m-learning.	4,22	I will do more m-learning programmes.	4,39	I enjoyed doing the programme via m-learning.	4,33
I am now better equipped to analyse issues in the field studied.	4,19	The course provided sufficient depth of understanding for me.	4,38	I found the programme credible.	4,27
I am now better equipped to solve problems in the field studied.	4,19	I learnt new ways of doing things.	4,35	The programme provided links to further material of interest.	4,25
I learnt new ways of doing things.	4,09	I found the programme credible.	4,29	I learnt new ways of doing things.	4,25
The programme provided links to further material of interest.	3,95	The learning made me feel more confident.	4,29	I have used what I learnt.	4,20
The learning made me feel more confident.	3,91	I have used what I learnt.	4,19	The learning made me feel more confident.	4,13
The programme did not feel like hard work.	3,73	The course was fun.	3,94	The course was fun.	3,85
The course was fun.	3,71	The programme did not feel like hard work.	3,67	The programme did not feel like hard work.	3,69

M-learning participants were also asked, in open-ended questions, what they liked most and least about the m-learning they did, and what they found most and least useful. Related

answers were grouped and coded (convenience factors included anytime access/control over time, not having to lug extra documents around, instant, flexibility, can take it with you).

Liked most (62% of m-learners offered answers): the top factor mentioned was convenience (42% of total sample), followed by choice (12%), working at own pace (7%), contact with others (6%), interesting or challenging (4%), instant feedback (2%); not having to sit through redundant material, inexpensive, being able to work alone, creates optimism, relevant, automated reminders, and being able to track own progress were also mentioned.

Liked least: Different aspects of isolation were least liked (8%), including not being able to argue points with anyone; lack of face-to-face interaction (5%), though related, was assessed separately. Next greatest bugbears of m-learning were the need for connectivity, which was often poor and impaired the learning experience, and poor learning design (both 7%). Lack of printed material 4% was followed by lack of peer interaction and student contributions; not being able to benchmark performance against their peers (2%); and then lack of verification and of hand-holding, paucity of deadlines forcing one to get on with the course, only being able to study if there was power available, and the addictiveness of m-learning (1% each). Six percent said there was nothing they did not like.

Found most useful: Convenience (13%), working at own pace (4%); video tutorials and the availability of a lecturer, and variety in material were next on the list at 2%, followed by choice, feedback provided by quizzes, feedback from a lecturer, visibility of progress, access to knowledge, quizzes, access to templates, and practicality of material (1%). Four percent felt this question not pertinent to themselves. Three percent did not reply.

Found least useful: Eleven percent of participants reported that this question was irrelevant. Five percent complained that their interface was clunky, or worked imperfectly; 2% complained about spam and portal forums. One percent each missed live interaction, complained about the need for memory sticks, the difficulty of solving problems solo, having to work in groups, a lack of summary of results, and that data was costly.

On online collaboration: Thirty-three percent participated in m-learning that did not involve collaborative exercises; 41% had access to an online forum; and for 5%, forum participation was compulsory.

Certificate received on completion of the course: Sixty percent of m-learners received a certificate at the end of the course; 18% said they had not.

Concepts emerging from Group 2 and 3's open-ended responses

Axial coding of open-ended answers echoed the ratings and statistical analysis: m-learning's chief appeal lay in its availability and convenience.

The same factors contributed to ease or difficulty of use – the thoughtfulness of course construction, the degree to which a student was taken out of his or her comfort zone, the foundation required – or delivered – to cope with a subject, a liking or loathing for working in isolation, discipline, and time management.

When it came to enjoyability, the levels of convenience, independence and engagement afforded by the course were the things people liked most *or* least. Design, platform and administrative issues – “I couldn't go back to view my scores”, “prefer printed material that I can mark up”; “no electricity, no learning”; “administration ... not as streamlined as it could be”; “chat room – you need to read fast” – spoiled the experience for some. However, design was not mentioned by those who enjoyed their courses. The implication here is that good design is invisible, while poor design can ruin everything.

Factors contributing to or detracting from usefulness were convenience (again); affordances (ability to test comprehension immediately, access to tools, research and professional organisations), content nature (practicality, informativeness, contemporariness, smooth delivery), degree of independence required, and administration.

TABLE 30: PARTICIPANT VIEW

Open code	Categories	Properties
Reasons for choosing m-learning	Appeal	Availability
		Convenience
		Pricing
		Mandatory
Usability	Ease	Course construction
		Comfort zones
		Strong foundation
		Isolation
		Habit
		Time
	Difficulty	Comfort zones
		Course construction
		Isolation
		Time
Enjoyability	Liked most	Habit
		Lack of foundation
		Convenience
		Independence
	Liked least	Engagement
		Pricing
		Independence
		Design
Usefulness	Most useful	Convenience
		Affordances
		Content
		Independence
		Administration
	Least useful	Convenience
		Administration
		Independence
		Affordances
		Content

Statistical analysis of data from Groups 2 and 3

Pearson two-tailed correlations were run to assess whether there were significant relationships between perceptions of known others, m-learning participants' organisations and own beliefs about learning, device preferences, and ownership; perceptions of the security of one's studies in cyberspace; the usefulness of the topics studied, activities and tools provided, perceptions about tradeoffs between cost and quality of m-learning; and the enjoyability and experience of m-learning.

Correlations at the 0,000 to 0.01 level of confidence (2-tailed) α – ie 99% confident that the relationship can be explained by factors other than random chance – were interpreted as significant, as described in Statistics Help for Students (2008). As many of the correlations came in at 0,001, 0,000 was assumed to be a number smaller than 0,001 but not equal to 0 where a relationship was indicated by the r factor.

Correlations at the 0,000 to 0.05 level of confidence (2-tailed) α – ie 95% confident that the relationship can be explained by factors other than random chance – were regarded as significant, but less significant than correlations at the 0,000 to 0.01 level of confidence.

R values of 0,5 to 1 were interpreted as indicating a strong relationship between variables, while r values of 0 to 0,499 were interpreted as indicating a weak relationship between variables.

Usefulness of the total experience: Strong and significant relationships were noted here with the usefulness of the topic studied ($r = 0,897$, $p < 0,000$); the usefulness of tools on offer ($r = 0,862$, $p < 0,000$); usefulness of the activities ($r = 0,883$, $p < 0,000$); motivation ($r = 0,711$, $p < 0,001$); perceptions of control ($r = 0,634$, $p < 0,006$); and personal beliefs ($r = 0,573$, $p < 0,008$).

No significant relationships were indicated between total usefulness and device preference or ownership, and perceptions of known others' beliefs, organisational beliefs, value for money, security or enjoyability.

Preference for feeling in control: Strong and significant relationships were indicated between wanting to feel in control of one's studies and perceptions of security in the cyberspace setup ($r = 0,704$, $p < 0,000$); m-learning usefulness in total ($r = 0,634$, $p < 0,006$); enjoyability ($r = 0,625$, $p < 0,000$); motivation ($r = 0,585$, $p < 0,000$); and the usefulness of tools provided ($r = 0,518$, $p < 0,002$).

A weaker but still significant relationship was indicated between wanting to feel in control of one's studies and perceptions of value and quality of the course done being in alignment ($r = 0,408$, $p < 0,005$), and perceptions about organisational beliefs ($r = 0,291$, $p < 0,036$).

No significant relationship was indicated between a preference for being in control and device preferences; perceptions of the beliefs of known others, one's self or in total; or the perceptions of the usefulness of studies and of the exercises they employed.

A negative but insignificant r -value was noted when trying to establish whether there was a relationship between a preference for being in control and owning a mobile device.

Motivation: Four factors were indicated to be strongly and significantly related to motivation: general usefulness of the m-learning undertaken ($r = 0,711$, $p < 0,001$); usefulness of the topic being studied ($r = 0,600$, $p < 0,001$); feeling in control of studies ($r = 0,585$, $p < 0,000$); and perceptions of cyber security ($r = 0,522$, $p < 0,000$).

The following factors indicated weaker but still significant relationships with motivation: enjoyability ($r = 0,494$, $p < 0,001$); the usefulness of the tools offered ($r = 0,478$, $p < 0,003$); perceived organisational support for learning ($r = 0,465$, $p < 0,000$); the usefulness of activities provided ($r = 0,434$, $p < 0,024$); known others' perceived beliefs ($r = 0,333$, $p < 0,015$); and own beliefs ($r = 0,330$, $p < 0,016$).

No significant relationship was indicated between motivation and participants' device ownership or preferences, perceptions about m-learning in general, or perceptions pertaining to value for money.

Enjoyability: Strong and significant relationships were indicated between the enjoyment of a course and feeling secure in its cyber environment ($r = 0,669$, $p < 0,000$); feeling in control of one's learning ($r = 0,625$, $p < 0,000$); perceptions quality of training in relation to its cost ($r = 0,629$, $p < 0,000$); and the usefulness of tools encountered ($r = 0,574$, $p < 0,000$).

Weaker but still significant relationships were indicated between enjoyability and motivation ($r = 0,494$, $p < 0,001$); and perceptions of supportive organisational beliefs about learning ($r = 0,485$, $p < 0,001$); own beliefs about m-learning ($r = 0,345$, $p < 0,018$); and perceptions of known others' beliefs about m-learning ($r = 0,291$, $p < 0,048$).

No significant relationships were indicated between enjoyability and device preferences; the perceived beliefs of others, or own beliefs; the usefulness of the topic studied, the activities undertaken, or the usefulness of m-learning in general.

A negative but insignificant r -value was noted when trying to establish whether there was a relationship between enjoyability and owning a mobile device.

Usefulness of tools: Strong and significant relationships were indicated between usefulness of tools provided in m-learning and general usefulness ($r = 0,862$, $p < 0,000$); enjoyability ($r = 0,574$, $p < 0,000$); perceptions of control ($r = 0,518$, $p < 0,002$); and usefulness of studies ($r = 0,503$, $p < 0,007$).

Weaker but still significant relationships were indicated between the usefulness of tools and motivation ($r = 0,478$, $p < 0,003$); and personal beliefs ($r = 0,423$, $p < 0,007$).

No significant relationship was noted between the usefulness of tools provided and the perceptions of known others, organisations or general perceptions of m-learning; the usefulness of exercises provided; the relationship between cost and quality; or security.

A negative but insignificant r -value was noted here for devices owned.

Usefulness of studies: Strong and significant relationships were indicated between the usefulness of studies and total experience of m-learning ($r = 0,897$, $p < 0,000$); the usefulness of activities ($r = 0,674$, $p < 0,001$); motivation ($r = 0,600$, $p < 0,001$); and the usefulness of tools encountered ($r = 0,503$, $p < 0,007$).

No significant relationship was indicated between the perceived usefulness of studies and: device preference, devices owned, perceptions of known others' organisational or own beliefs, or perceptions about control, cost versus quality, security or enjoyability.

Perception of security in the cyber learning environment: Strong and significant relationships were indicated between feeling secure in a cyber course environment and feeling in control of one's learning ($r = 0,704$, $p < 0,000$); motivation ($r = 0,522$, $p < 0,000$); the enjoyability of m-learning ($r = 0,485$, $p < 0,001$); and the perceptions of the quality of training, given its cost ($r = 0,424$, $p < 0,005$).

No significant relationships were indicated between perceptions of security and device preferences; the perceived beliefs of others, one's organisation, or own beliefs; the usefulness of the topic studied, the activities undertaken, tools provided, or the usefulness of the course in general.

A negative but insignificant r -value was noted when trying to establish whether there was a relationship between perceptions of security of studies in cyberspace and owning a mobile device.

Usefulness of exercises (activities) provided: Strong and significant relationships were indicated between the usefulness of activities provided and the usefulness of the total

experience ($r = 0,883$, $p < 0,000$); perceptions of the usefulness of topics studied ($r = 0,874$, $p < 0,001$); and the tools provided ($r = 0,788$, $p < 0,000$).

Weaker but still significant relationships were indicated between the usefulness of activities provided and perceptions of control ($r = 0,488$, $p < 0,013$), motivation ($r = 0,434$, $p < 0,024$), and personal beliefs ($r = 0,404$, $p < 0,03$).

A negative r -value – though not significant – was noted with regard to the usefulness of exercises and device ownership.

Personal beliefs: Strong and significant relationships were indicated between personal beliefs about learning and the usefulness of m-learning ($r = 0,573$, $p < 0,008$), and total perceptions about m-learning ($r = 0,512$, $p < 0,000$).

Weaker but still significant relationships were indicated between personal beliefs and the usefulness of tools supplied ($r = 0,423$, $p < 0,007$); the usefulness of activities supplied ($r = 0,403$, $p < 0,03$), enjoyability ($r = 0,345$, $p < 0,018$), motivation ($r = 0,330$, $p < 0,016$), known others' beliefs ($r = 0,309$, $p < 0,006$), and device preferences ($r = 0,260$, $p < 0,021$).

No significant relationship was indicated between personal beliefs and perceptions of organisational beliefs; the usefulness of topics studied, perceptions of control, value for money or security issues.

A negative r -value – though not significant – was noted on the relationship between personal beliefs and devices owned.

Cost versus quality: A strong and significant relationship was indicated between the perception of cost versus quality and enjoyability ($r=0,629$, $p < 0,000$).

Weaker but still significant relationships were indicated between perceptions relating to cost and quality and a preference for feeling in control ($r = 0,408$, $p < 0,005$); and perceived security of the course environment ($r = 0,424$, $p < 0,005$).

No significant relationships were indicated between perceptions of cost and quality and device preferences; perceptions about learning and m-learning (personal, known others, organisational or in general); motivation; or the usefulness of the topic studied, exercises and tools provided, or usefulness of m-learning in general.

A negative but insignificant r -value was noted when trying to establish whether there was a relationship between value for money and owning a mobile device.

Total perception: Statistical analysis indicated a strong and significant relationship between combined perception of m-learning and personal beliefs about m-learning ($r = 0,512$, $p < 0,000$).

Weaker but still significant relationships were indicated between total perceptions of m-learning and attitudes towards cost and quality ($r = 0,394$, $p < 0,026$); perceptions of others' beliefs ($r = 0,386$, $p < 0,005$); perceptions about organisational beliefs ($r = 0,292$, $p < 0,038$), and device preferences ($r = 0,289$, $p < 0,04$).

No significant relationship was indicated between total perceptions about m-learning, motivation; the usefulness of tools, studies or m-learning in general; control; security; or enjoyability.

A negative r -value – though not significant – was noted on the relationship between total perceptions about m-learning and the usefulness of activities.

Perceptions of others' beliefs: Significant but weak relationships were indicated between perceptions of others' beliefs and perceptions of organisational beliefs ($r = 0,373$, $p < 0,001$), personal beliefs about m-learning ($r = 0,309$, $p < 0,006$); and motivation ($r = 0,333$, $p < 0,015$); quality against cost ($r = 0,350$, $p < 0,015$); device preferences ($r = 0,240$, $p < 0,034$); and enjoyability ($r = 0,291$, $p < 0,048$).

No significant relationship was indicated between others' perceived beliefs and usefulness of tools, activities or studies or usefulness in general; control; and security.

Perceptions about one's organisation's beliefs: The analysis indicated weak, though significant, relationships between perceptions of organisational beliefs and motivation ($r = 0,465$, $p < 0,000$), enjoyability ($r = 0,485$, $p < 0,001$), perceptions of known others' beliefs ($r = 0,373$, $p < 0,001$), total perceptions about m-learning ($r = 0,292$, $p < 0,038$), and feeling in control of one's learning ($r = 0,291$, $p < 0,036$).

No significant relationship was indicated between participants' perceptions of organisational beliefs and device preference, own beliefs; usefulness of tools, exercises, topic studied and usefulness of m-learning in total; security; or perceptions about cost and quality.

Device preferences: Weak but significant relationships were indicated between device preferences was and device ownership ($r = 0,363$, $p < 0,001$); total perceptions about m-learning ($r = 0,289$, $p < 0,04$); personal beliefs about m-learning ($r = 0,260$, $p < 0,021$); and perceptions about others' beliefs about m-learning ($r = 0,240$, $p < 0,034$).

No significant relationship was indicated between participants' perceptions of organisational beliefs; motivation; usefulness of tools, activities or studies or the usefulness in general, control, value for money, security or enjoyability.

Devices owned: Only one weak, but significant relationship was indicated here, and that was with device preferences ($r = 0,363$, $p < 0,001$).

No significant relationship was indicated between device ownership and motivation; usefulness of studies; and usefulness in general.

Negative r -values – though not significant – were noted for the relationship between devices owned and perceptions of others' beliefs about m-learning; own perceptions about m-learning; perceptions of organisational attitudes towards m-learning; and perceptions about m-learning in general; usefulness of tools and activities; control, value for money, security and enjoyability.

Discussion – Group 1

This section **discusses** the findings that emerged from the talent directors at two large firms that employ accountants.

Attitudes towards, beliefs about, perceptions, expectations, uptake and experience of m-learning from an organisational perspective

Both organisations' human resource managers had a pragmatic view of training: while both wanted the best for their staff, training needed to be the most fit-for-purpose.

Digital training was considered fit for purpose when it came to compliance training, because it was possible to monitor uptake and measure results for reporting purposes.

Collaborative learning was highly valued by both organisations, which believed strongly in knowledge sharing. Both had both formal and informal mechanisms in place to encourage this.

Cost had become “a huge driving force” for Company 1. And while it provided all sorts of tools for staff to use that eliminated the need for formal training, the unsettled issue of who should pay for data used to access training – company or staff, who were expected to do the training in their own time, rather than dedicated work time – seemed to be undermining its audio training project.

Do mobile device preferences and usage patterns influence the uptake of development programmes delivered by mobile device?

Both organisations took a pragmatic approach to training, using whatever means of delivery were at hand. It was not clear in the case of Company 1 – which ensured that its staff were well connected – whether any preferences at play. Company 2 expected staff to use whatever was available.

What m-learning activities are perceived as most effective for development, and why?

Company 1's talent manager voiced a preference for curated audio content and for digital collaboration as training delivery mechanisms, as both were portable and could be accessed

while his highly mobile staff travelled – which, as consultants, was something that occupied a great deal of their time.

With the curated content – recordings of business book extracts, white papers and related material – staff could choose what to listen to to build their knowledge base, and when and where to listen to it.

Unlike the audio abstracts, learning that emerged through communities of practice was not structured, but was highly regarded as it provided a lifeline for staff in the field. There was no evidence to demonstrate that one was more effective than the other, but the audio abstracts were regarded as particularly convenient and useful, particularly where accompanied by quizzes, which required people to recall and apply what they had heard.

Company 2, which encouraged collaboration and mentoring alongside compliance training and other development, did voice a preference for any one particular m-learning activity as more effective than another.

Discussion – Groups 2 and 3

Accountancy professionals and business school students' attitudes towards, beliefs about, perceptions, expectations, uptake and experience of m-learning

This section **discusses** the findings collected in this regard from accountancy professionals and business school students, and attempts to explain them in order to answer the three subquestions underpinning this study.

Beliefs and perceptions

We will start with beliefs and perceptions, as these are not necessarily strictly anchored, changing according to habitus and exposure to new ideas, and sometimes stemming from narrow exposure to an entity or situation.

Perception is an awareness, understanding or interpretation of a thing (Oxford, 2015). The “thing” is sensed; the stimulus (or stimuli) are analysed by the brain and interpreted in relation to what is already known or recognised, in part or as a whole. “What you know is what you see” (Stanford, 2006, p85).

Belief is a firmly held opinion that something is true, whether there is proof of it or not (Oxford, 2015).

Both beliefs and perceptions contribute to habitus (Bourdieu, 1989), which in turn can shape attitudes (Davis & Ajzen, 2002).

Participants' perceptions of known others' beliefs and attitudes towards m-learning appeared to be largely in line with their own beliefs (they felt strongly that it was convenient, and less costly than accessing learning in another way). In addition, their strongly held perception of their own organisations was that they were supportive of learning (“my organisation believes that learning is essential to the business”, “that speed of access and ease of uptake are important”, and “in helping personnel train at their own convenience” and on demand). However, they leaned towards feeling it was only a bit important for the organisation to believe they should use m-learning, and overall did not feel others' opinions mattered much.

Accountancy professionals cared markedly less than the business school group about others' opinions, particularly those of their families. (I would speculate that this might be

attributable to their entrenched professional status and a certain confidence in the world, which business students might not yet have achieved.)

Nonetheless, statistical analysis inferred that known others' perceptions about m-learning and organisational support had a weak but significant relationship with motivation (though it did not find one between personal beliefs and perceived organisational beliefs) (Appendix 3).

So (at risk of stating the obvious) any organisation wanting to shift towards m-learning – perhaps like Company 1, wanting to “removed the excuse for not training”, or like Company 2, seeking to take advantage of risk-free exposure of staff to new situations – would be well served by cultivating a supportive habitus for it by demonstrating support at organisational level as well as among staff. This could be encouraged by taking note and adopting course construction with participants' preferences, likes and dislikes in mind.

Expectations and experience

Study participants largely expected m-learning to be convenient, and found that it was.

They expressed a competitive streak, expecting to earn A's on a course and liking the idea of being able to benchmark their progress against others.

Working alone was much more highly rated than studying with others. Those who enjoyed m-learning expressed a preference for working independently and without interruption, feeling in control of their learning, being able to go over work until they were happy with it, to skip parts they felt they did not need, and to reassure themselves with immediate (automated) feedback (Appendix 3) or, in some instances, remote instructor feedback.

The very same affordances made some m-learners feel isolated and unsupported. Aspects of isolation mentioned included not being able to argue points with anyone, students not exchanging information; misunderstandings arising from lack of face-to-face communication; and feelings of abandonment – “instructors leaving everything to the learner instead of being there assisting wherever and whenever necessary”. In addition, “certain concepts are more easily understood when being taught, as opposed to self-learning”. The lack of instant access “made asking questions more tedious”; a lack of self-motivation was noted.

However, one participant pointed out: “Lack of face to face interaction means working through problems takes longer, arguably with a(n) end result of a better understanding of the issues.”

Others disliked working in groups.

Clearly, m-learning is not for everyone – it is likely best suited to people who have the tenacity to be able to figure out problems on their own, and are disciplined enough to get on with what is required without peer pressure or being coddled, are self-motivated. (The aspect of social constructivism will be discussed when we tackle what m-learning activities are perceived as most effective for development, and why.)

Other aspects of m-learning regarded as convenient included not having to travel to class, participate in learning activities at a set time, or lug books around. Those who enjoyed m-learning also mentioned the cerebral stimulation it provided, its inexpensiveness, the optimism it engendered, and the usefulness of receiving automated reminders and being able to track their own progress.

Among the factors liked least, besides the aspects of isolation already discussed, were the need for connectivity, which was often poor and impaired the learning experience; poor learning design; a lack of printed material; not being able to benchmark performance against their peers (that competitive streak again), and then a lack of verification, a paucity of deadlines forcing one to get on with the course, and a reliance on electricity to be able to study.

Poor design and administration were noted by participants, but good design and administration were not. The implication here is that good design is invisible, while poor design can ruin everything.

Motivation

Darmah (n.d) describes motivation as “the combination of effort and desire in achieving goals”, or “an inner drive, impulse, emotion or desire that moves one to particular action”. Ahl (2006), after spending 10 pages trying to pin down what motivation *is*, suggests that it is more useful to study what it *does*. He views it as an instrument of power, a “disguised instrument for direction and control”. Motivation can be intrinsic – driven by the enjoyment of the thing itself (Kaplan, 2010) to “experience a sense of competence and self actualisation”, the “inherent tendency to seek out novelty and challenges, to extend and exercise one’s capacities, to explore and to learn” (Ryan and Deci, 2000) – or extrinsic – driven by external reward (Kaplan, 2010). Extrinsic reward is dangerous in that it is hard to perpetuate (Kaplan) and can undermine intrinsic motivation (Ryan and Deci, 2000). “Choice and self-direction enhance intrinsic motivation because they allow people a greater feeling of autonomy” (Ryan and Deci, 2000).

Motivation is key to self-directed learning (Garrison, 1997, in Martin *et al*, 2013), and is maximised when students “feel confident, have a sense of control over their learning, and ... consider the learning activities to be meaningful and relevant” (Seifert and O’Keefe, 2001, cited by Martin *et al*, 2013). Sixty-five percent of students canvassed in the study by Martin *et al* reported feeling motivated by activities, particularly practical and real-world tasks, and by interesting and relevant content. Their key motivator was mobility. Their top demotivators were activities they considered not relevant, teaching styles, discussion activities and groupwork, which “tends to lead off target and bores me”, “I prefer focusing on my own work and getting it sorted out in my mind”; “I don’t care what Joe Bloggs thinks. He’s probably wrong.” This study concluded that the main motivators for m-learning were mobility and productivity.

The most highly ranked motives for participating in training, for both accountancy professionals and business school students who participated in the study, were to expand their knowledge base, then to learn new skills, and holding the belief that learning should be a lifelong process.

That was followed by a need to stay up to date in their fields; a need to improve what they did; and only after that a need to comply with professional requirements to acquire CPD points. The lesser importance of collecting CPD points seems to be supported by the fact that only about 60% of those who had done m-learning expected to earn certificates through their m-learning courses, and again by the institutional observation (Company 2) that when people did earn certificates, they did not bother to collect them. It is assumed, then, that those who did not receive certificates knew that there would not be a certificate for finishing some courses, which seems to back up the broad assertion that expanding personal skills and one’s knowledge base as part of a lifelong process were indeed more important than acquiring a certificate.

Business school students’ slightly greater regard for collecting continuous professional development (CPD) points was interesting, given that accountancy professionals need them to maintain professional registration. The accountancy professionals put self-improvement way ahead of a desire to accrue CPD points. While the need for self-improvement was to a large degree echoed by the business school participants, “doing what is expected of me” was more important to accountancy professionals than business school students, to whom a change of professional focus and improving chances of promotion were slightly more important.

These responses could be interpreted in several ways: accountancy professionals might by now be accustomed to having to acquire CPD points (this has been a professional requirement since 2009 [Saica, 2013]), and self-improvement might be part of the culture in the dynamic field of accountancy. It certainly is in the US, where the Accounting Education Change Commission seeks to “make ‘learning to learn’ a priority in the accounting classroom (Becker, 2011). Accountants might be more dutiful or aware of what is expected of them than business school students – “to do what is expected of me” ranks eighth on the list of accountancy professionals’ motivators; this is at the bottom of the list for business school students. Business school students might be in professions that require CPD points, other than accounting, and which might not have required the collection for CPD points for as long as accounting. Business school students might also by nature be more ambitious (not only wanting to improve themselves but also slightly more attuned to wanting to improve their chances of promotion – the latter seemingly the least important issue on participating accountancy professionals’ minds).

What is clear is that both groups desire self-improvement, and that this appears to be more important than collecting CPD points. More investigation is required to understand whether this is a product of the CPD process, attributable to study participants’ intrinsic nature – or simply a product of people’s “inherent tendency to seek out novelty and challenges, to extend and exercise one’s capacities, to explore and to learn” (Ryan and Deci, 2000).

Need to feel in control

Strong and significant relationships were indicated between preferences for feeling in control of one’s studies and perceptions of security in the cyberspace setup (Appendix 3). This again echoed Ryan and Deci on the link between a sense of autonomy enhancing intrinsic motivation.

A weaker but still significant relationship was indicated between wanting to feel in control of one’s studies and perceptions of value and quality of the course done being in alignment, and perceptions about organisational beliefs (Appendix 3).

Convenience – the freedom to study when and where they wished – topped the rankings as a motivator to use m-learning for all participants in this section of the study, closely followed by being able to work at their own pace. Again, being master of one’s own timetable would give one a sense of autonomy, helping to feel that one was in control of one’s learning.

While business school participants ranked being in control of their learning more highly than studying alone, studying alone was a marked preference for the accountancy professionals. Both found it easy to pick up the programme and learn wherever they were.

Counterintuitively, anytime access made a few more participants a little more disciplined about the time they spent studying than vice versa. In addition to liking studying alone, participants voiced a slight preference for not studying with others. This emerged in ranking their preferences and again in the coding of open-ended answers.

These findings have significant ramifications for accredited higher education in South Africa, where education authorities expect synchronous social constructivist elements in accredited distance learning because the technology exists to provide them.

While social constructivism is useful in constructing a shared understanding, not everyone wants a shared understanding, or to lose the sense of control they have over their own timetable by having to participate in something at an appointed hour.

Cost and quality

Overall, survey participants reported feeling that their m-learning was as good as face-to-face training, and this, along with the convenience of being able to study in their own time – for which they were prepared to pay slightly more for than face-to-face training if it meant they did not have to travel – made up for not having immediate feedback from peers or tutors in a classroom setting.

This was supported by the statistical analysis, which indicated a strong and significant relationship between perceptions of the quality m-learning offered and enjoyability. Weaker but still significant relationships were indicated between perceptions relating to cost and quality and a preference for feeling in control, and perceived security of the course environment.

Again, this may have ramifications for accredited higher education in South Africa, where education authorities expect to see synchronous social elements in accredited distance learning.

Do mobile device preferences and usage patterns influence the uptake by accountancy professionals and business school students of development programmes delivered by mobile device?

With total uptake of m-learning across the study group at 30%, 61% interested in it but not having tried it, and only 9% expressly not interested, it is anticipated – as at the time of the survey m-learning in South Africa had barely begun – that uptake is likely to expand as more relevant and pertinent m-learning is made available.

The survey data inferred that uptake of m-learning was likely to be greater among people who had a somewhat greater propensity to take part in training in general. In this regard.

The largest participant group, by organisational hierarchy, who had tried m-learning, self-identified as top management (33%) – a group likely to have less time than others to attend physical classes, have a greater need for compliance training, or more keenly feel the need to keep abreast of change in order to be able to guide their organisations.

While the largest participant group by sector was from the services sector – to be expected given the sample group – the next largest concentration of participants in this study who had experience m-learning were from the education sector. This echoes, on a smaller scale, the uptake of HarvardX and MITX moocs (massive open online courses), where 39% of participants (Ho *et al*, 2015) were from the education sector. Ho and his colleagues deduced that teachers using moocs were likely to be looking for content that they could use in their own classrooms; there might be a similar trend here.

Likert scale ratings showed that proportionally more of those who had experienced m-learning reported access to mobile devices, inferring that the likelihood of m-learning uptake increases in proportion to access to mobile devices.

The ratings also showed markedly more frequent use of a range of mobile device affordances among those who had participated in m-learning across all activities investigated than among those who had not participated. Those who had participated in m-learning often used them to play games (25% vs 17% of those who had not participated); record voice (26% vs 15%); record videos (31% vs 24%); take photographs (61% vs 48%); work on documents (65% vs 42%); transmit documents (68% vs 46%); communicate on social networks (71% vs 60%); check work documents (73% vs 48%); set alarms and reminders (82% vs 73%); search the internet (89% vs 78%); and send or receive e-mail (94% vs 79%).

So while those who participated in m-learning had greater access to mobile devices and used them more for every likely purpose than the broader group of survey participants, it

was not clear whether m-learning participants' mobile device preferences and usage patterns influenced their uptake of development programmes delivered by mobile device.

It would seem reasonable, however, to conclude that those who are more at home with technology simply have a greater propensity to use it, and that if m-learning is to be adopted, it would be in the interests of both organisation and staff to ensure learners are as comfortable with technology as possible.

What m-learning activities are perceived by accountancy professionals and business school students' as most effective for development, and why?

Given that participants ranked the most important outcomes from their m-learning as (in order) improved knowledge and understanding of the topics studied; confidence in being able to apply their learning, and feeling better equipped to analyse issues in their fields of study, it seems congruent that concept and knowledge self-testing with automated feedback was ranked as the most useful activity participants had encountered in m-learning.

Digital assessments such as multiple-choice questions partially address the requirement of Kolb's learning cycle in that they require one to "do" in order to concretise learning, and answering a question goes some way towards that. Concept and knowledge self-testing with automated feedback were regarded by both groups as more useful than concept and knowledge testing with instructor feedback, which for practical reasons was inevitably delayed. This infers that immediacy of the feedback is more important than personalised but delayed feedback, and points to a need to allow students to demonstrate to themselves that they are competent, or where they need to do more work.

Having experts available online appeared to be regarded by both groups as only marginally more useful than instructor feedback, which for practical reasons is inevitably delayed.

Business school participants found calculators and problem-solving frameworks much more useful than accountancy practitioners did. Both found e-mail reminders and web links useful.

Being able to test application of new skills was more important to the accountancy group than the business school group, which may speak more to why the accountancy group is studying – acquiring new skills – and their slightly stronger emphasis on lifelong learning. Despite participants' voiced need to test application of new skills, the human resource executives' belief that m-learning would allow learners to practice in a safe space, and the widely held perception that simulations help concretise learning, neither group thought much of simulations (ranked 14th out of 17), which was surprising given that they should test application of knowledge. However, this finding is limited in that the study did not explore the kind of simulations participants might have encountered, and participants might not have been exposed to particularly useful ones.

Despite the multiplicity of media available for content delivery, text remained top of the rankings both as a tool and a medium of delivery, followed by video, and then audio.

Given the popularity of moocs – 1,7-million people participated in the HarvardX and MITx moocs in 2013 and 2014 (Ho *et al*, 2015) – which are frequently delivered as videotaped lectures, accompanied by quizzes to test learning, and peer discussion online – it would not be remiss to expect that video should be more popular than text, as video permits the nesting of cues to simultaneously engage different centres of cognition (audio and visual), enhancing the synthesis, retention and retrieval of ideas. However, text can be scanned and reread more efficiently than video. It might also be that m-learners who participated in this study are pressed for time, and find text a more efficient means through which to absorb information, as they can hop to what they need and reiterate what they don't pick up first time more easily with text than with video. In addition, while video is a useful delivery medium in first-world countries like the US, where internet connectivity is free or very cheap, this is not the case in South Africa, where the cost of data required to watch videos or livestreaming is high, and this may be off-putting to learners. Many organisations – particularly large financial institutions – restrict bandwidth, which means students who are reliant on office facilities are barred from accessing audiovisual material over office internet. It is also possible that the videos delivered to the m-learners who participated in this study were not particularly good, so were less popular than text. These aspects of delivery might be worth further exploration.

Peer discussion and blogs were perceived across the group as among the least useful tools. While peer discussion is useful from a social constructivist perspective, one cannot be sure that one's peers are on the right track, and it is possible that social construction can lead to a highly subjective or otherwise flawed outcome, which hypothetically is less likely if the construction of knowledge is guided by an expert.

Participants across the board agreed first and foremost that “my m-learning course/s had improved my knowledge and understanding of the topics studied”.

Next, accountancy professionals agreed that they would do more m-learning courses, implying that they were motivated by the m-learning they had already done, while business school participants said they were equipped to apply what they had learnt, and were better equipped to solve problems and analyse issues in the field studied.

The next-broadest agreement was that their courses had provided sufficient depth of understanding, and that they were equipped to apply what they had learnt. The lowest – but still positive – ratings were given to the statements “the course was fun” and “the course did not feel like hard work”. (The accountancy group reported slightly less fun, at 3,71, than the student body, at 3,85.)

Accountancy professionals ranked tax and legal updates, courses on accounting or auditing principles, financial management and legal updates as the most useful m-learning they had done in comparison to courses delivered by other means.

Business school participants ranked business management, financial management, reporting principles and business analytics as the most useful m-courses they had done compared with courses delivered by other means. Tax updates appeared on their list, but at the bottom. Their rankings here were generally much higher than accountancy professionals' rankings. It is possible that updates are more useful to accountancy professionals as their professional registration binds them to keeping up with change, whereas business school participants may be learning for the first time, so *everything* is useful to them, and they do not yet have a great deal to update.

Overall financial and business management, sector-specific regulations, reporting principles and sales courses were perceived as the top five topics in m-learning compared with courses delivered by other means.

The study solicited open-ended answers to why participants found activities easy or difficult. Of those who found the exercises in their online studies easy (48% of the group reporting), 11% attributed this to being comfortable with the technology; 7% to their programmes being well designed, researched or credible; 6% to the availability of reference material ("providing all that was needed") or to having prior knowledge of the field studied; 4% to the course being pitched at the right level and to activities being relevant to their personal circumstances; and 1% each to course affordances, multiple-choice questions being easy to answer, effort put in, and to not being interrupted by other students.

These open-ended responses raise more questions than answers; the things that made this group's studies easy might have gone unnoticed, such as the affordances mentioned by one person – easy to edit own answers to questions, and to find references in material), or uninterrupted solitude permitting students to continue whereas in class they might have had to wait for laggards to catch up. In addition, as programmes were varied, they would have had a variety of experiences.

One participant pointed out that it was hard for instructors "to cover all skills levels, so basics do need to be thoroughly covered as well". The takeaway from this could be that course designers should state up front the prior learning required for a particular programme, or that basics should be offered but in such a way as not to bore those who already have sufficient prior learning to support new concepts being introduced. Given that online course

production is expensive, it might be more prudent to design to specific knowledge than to try to scaffold for all skills levels in one course.

Open ended answers listed convenience, working at own pace, video tutorials and the availability of a lecturer, variety in material, choice, feedback provided by quizzes, feedback from a lecturer, visibility of progress, access to knowledge, quizzes, access to templates, and practicality of material as useful.

Clunky interfaces were least useful, followed by spam and portal forums, the difficulty of solving problems solo, having to work in groups, and not having a summary of results.

Some students disliked the lack of printed material; others were used to putting everything down on paper first. This is not an unusual problem: different tactics are required for digital learning, as the kinetic aspects of capturing information are different for each medium.

Axial coding of open-ended answers echoed the ratings and statistical analysis:

m-learning appealed because of its availability, convenience and, to a lesser degree, cost effectiveness.

The same factors contributed to ease or difficulty of use – the thoughtfulness of course construction, the degree to which a student was taken out of his or her comfort zone, the foundation required – or delivered – to cope with a subject, a liking or loathing for working in isolation, discipline, and time management.

Themes emerging from the research

Major themes, Group 1

The major themes identified in the interviews with human resource directors, using axial coding (Appendices 1 and 2), and ranked in order of inferred importance, were:

- A focus on compliance at industry and organisational level to avoid cost of noncompliance;
- While there are multiple challenges, the most pressing are cost, capacity and globalisation;
- While convenience is key, individuals are expected to adapt to take advantage of what is offered;
- The technological proliferation of collaborative channels makes it hard to keep track of discussions; in addition, organisational culture is to network face to face;
- Training must be fit for purpose, closely monitored, give access to experts, and preferably be accessible “on the go”;
- Quality of training, developing critical competences, who pays for data, and organisational security appear to be more important than training cost or certification.

Minor Themes, Group 1

- Device preferences do not appear to influence m-learning uptake; and
- Training “doesn’t have to be fancy, just fit for purpose”.

Unexpected Themes, Group 1

- Age seems to have little bearing on uptake, and gender even less; and
- Organisations focus on industry certification and regulatory compliance but individuals do not (“they don’t collect their certificates”).

But ... what matters to individuals?

Major Themes, Groups 2 And 3

The major themes identified in the interviews with human resource directors, using axial coding (Appendices 1 and 2), and ranked in order of inferred importance, were:

- Convenience is paramount
- Motivation is closely linked with feeling in control
- Many factors influence motivation, which has a strong bearing on success. Motivation is strongly and significantly influenced by the usefulness of courses undertaken; by feeling in control of studies; by perceptions of cyber security and, to a lesser extent, by enjoyment, the usefulness of affordances offered, perceived organisational support for learning, and known others' and own perceived beliefs.
- M-learners mostly prefer studying alone
- Independence is valued, but isolation is not
- Good design and administration are invisible, but poor design and poor administration can ruin everything

Minor Themes, Groups 2 and 3

- Peer discussion and blogs were perceived as among the least useful tools across the combined group
- M-learning is not for everyone, particularly people who need social interaction
- In a country with unreliable infrastructure, power and connectivity are real issues when it comes to m-learning
- A supportive habitus is useful

Surprising themes, Groups 2 and 3

- Collecting CPD points is not a prime motivator for learning
- Participants' preference for text rather than audio or video
- Anytime access made a few participants a little more disciplined about the time they spent studying than vice versa
- Lack of face-to-face interaction means "working through problems takes longer, arguably with a(n) end result of a better understanding of the issues".

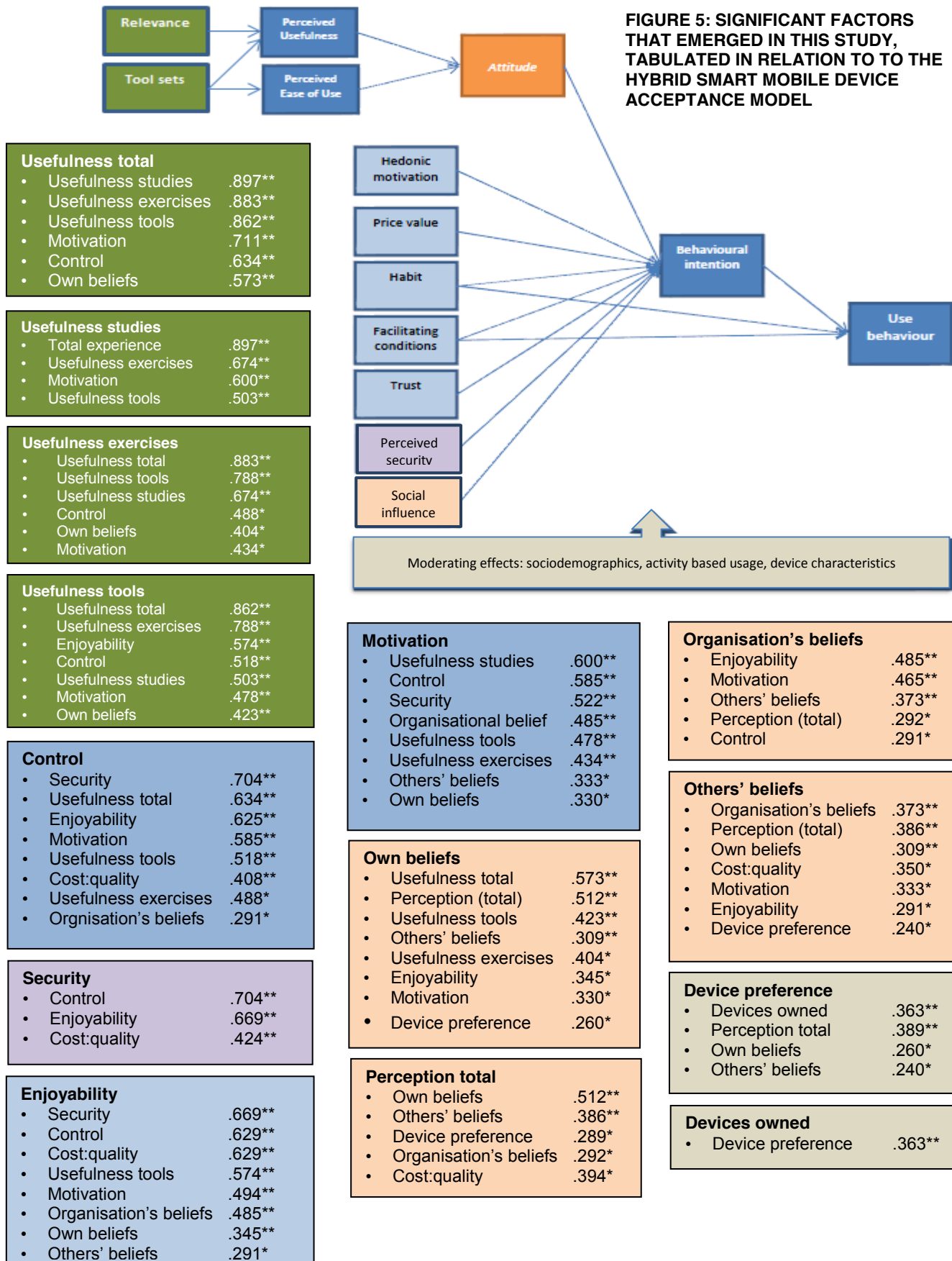
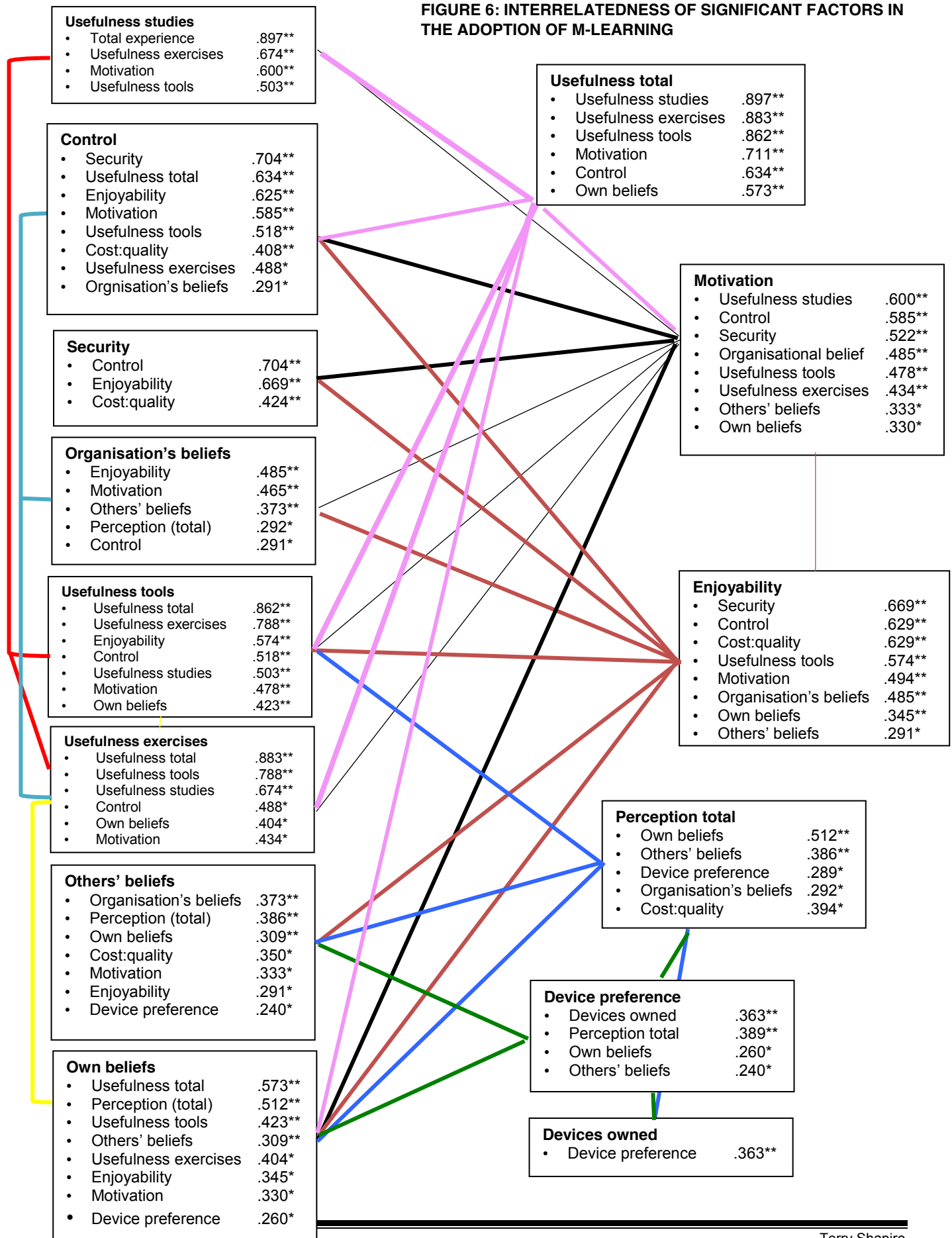


FIGURE 6: INTERRELATEDNESS OF SIGNIFICANT FACTORS IN THE ADOPTION OF M-LEARNING



**FIGURE 7 (FOLLOWING PAGE): INTERRELATIONSHIPS BETWEEN KEY FACTORS
THAT CAN BE LEVERAGED IN M-LEARNING
FOR OPTIMAL PROFESSIONAL DEVELOPMENT**

Graphic drawn from project correlation data visualised in Gephi
With sincere and grateful thanks to Wayne Webb for his doggedness in getting the program to work

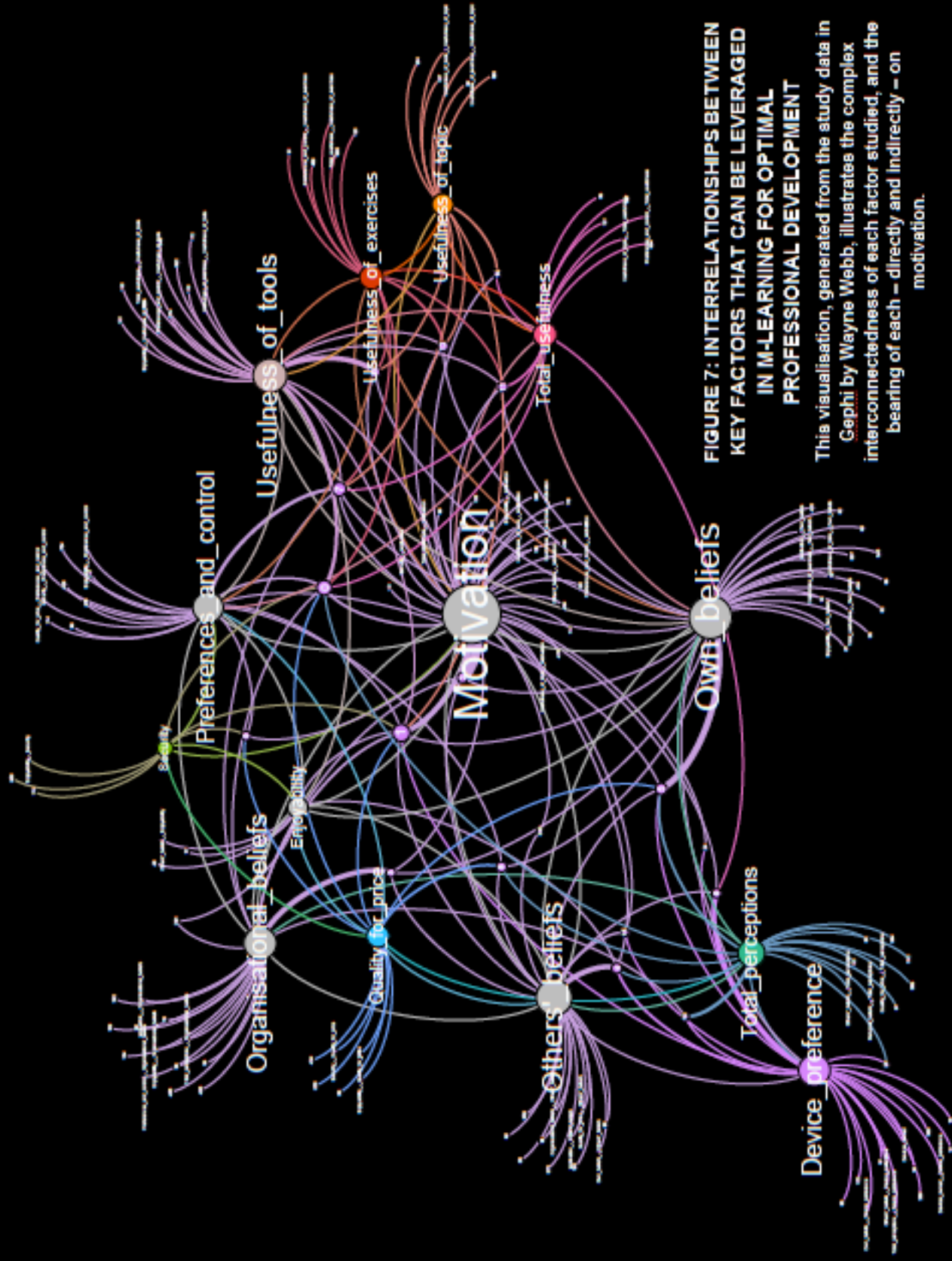


FIGURE 7: INTERRELATIONSHIPS BETWEEN KEY FACTORS THAT CAN BE LEVERAGED IN M-LEARNING FOR OPTIMAL PROFESSIONAL DEVELOPMENT

This visualisation, generated from the study data in Gephi by Wayne Webb, illustrates the complex interconnectedness of each factor studied, and the bearing of each – directly and indirectly – on motivation.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

Key factors

The key factors identified in this study that help or hinder m-learning are course **convenience** (learning any time, anywhere, own pace), **feelings of control** and **security**, a desire for **independence** (not to be confused with isolation), **organisational attitudes** towards learning, **individual attitudes** towards learning. How each of these factors is attended to in course presentation is likely to have a significant effect on **motivation**.

Mobile device preferences and ownership appeared to have little bearing on anything, though clearly those habituated to devices were more likely to use them to their fullest.

When it came to m-learning activities, reading and self testing of knowledge and concepts with immediate, automated feedback topped the list, trailed by video and then audio. Calculators, e-mail reminders and problem-solving frameworks topped the ranking of tools on offer.

Peer discussion through forums and social networks, blogs and having experts available online were least highly regarded, echoing the study by Martin *et al* (2013), which noted that mandatory social constructivist activities could serve as demotivators.

Axial coding of open-ended answers echoed the ratings and statistical analysis set out in the findings: m-learning appealed because of its availability, convenience and, to a lesser degree, cost effectiveness.

The strongest and most significant relationships implied by statistical analysis of the usefulness of m-learning were the usefulness (relevance) of the topic studied in the context of participants' environment, the usefulness of the affordances offered (tools and activities), motivation to study, perception of control of own learning, and personal beliefs about m-learning, vindicating the decision to add the dimensions of relevance and tool sets to Ally and Gardner's model.

Motivation appeared to be most strongly influenced by relevance and utility (general usefulness of m-learning and the topic studied) and participants' feeling that they were in control and in a secure cyber environment. Enjoyment (intrinsic reward), the usefulness of tools offered, perceived organisational support for learning, the usefulness of activities provided, others' perceived beliefs and, lastly, own beliefs, appeared to influence motivation. Extrinsic reward, such as the earning of certificates and CPD points, was much less important for this group.

The lower cost of m-learning, in comparison to face-to-face training was, for participants, a fair trade-off for not having experts on tap. For organisations, the cost factor was much more important, though they still placed great store in creating communities of practice.

The same factors contributed to ease or difficulty of use – the thoughtfulness of course construction, the degree to which a student was taken out of his or her comfort zone, the foundation required – or delivered – to cope with a subject, a liking or loathing for working independently, discipline, and time management.

When it came to enjoyability, the levels of convenience, independence and engagement afforded by the course were the things people liked most *or* least. Design, platform and administrative issues – “I couldn't go back to view my scores”, “prefer printed material that I can mark up”; “no electricity, no learning”; “administration ... not as streamlined as it could be”; “chat room – you need to read fast” – spoilt the experience for some. However, design was not mentioned by those who enjoyed their courses. The implication here is that good design is invisible, while imperfect design can ruin everything.

Factors contributing to or detracting from usefulness were convenience (again), affordances (being able to test comprehension immediately, links to useful tools, research and professional organisations), the nature of content (practicality, informativeness, availability of research, contemporariness, smooth delivery), degree of independence required, and administration.

Factors that make m-learning easy are self-explanatory: cogent content, carefully curated, and accessible from a single point at any time; the provision of an interruption-free environment; familiarity with technology; having a good foundation to build on; and a disciplined approach.

Barriers to usability include cognitive aspects: the need to know new ways of “learning” via screen and keyboard, as opposed to writing, where the *act* of writing helps embed ideas; and resentment about who pays for data. This last – how the cost of data required to leverage m-learning is covered – is a policy issue organisations have not yet settled. With work and life becoming more difficult to separate and increasing time and travel pressure, it would seem sensible for organisations to provide means to use “dead” time and after-hours access to training for staff.

Limitations and their implications

Lelliot *et al* (2000) – as noted in Chapter 2 – may well be right when they say that the notion of an able, networked society is seductive. Participants in this study were accounting

professionals and business school students, a relatively homogenous group in that their profession requires particular traits such as perseverance, conscientiousness and independence (Harris, 1972). (Seipel (n.d.), in a study on perfectionism among accountants, cited several studies which found that conscientiousness measured higher among accountants than among other professionals (Levy, Richardson, Lounsbury, Stewart, Gibson and Drost, 2011; Perlow and Copp, 2004). Bealing *et al* (2006) noted that these traits constituted a form of self selection for accountants.)

Because of that, the findings of this study are not generalisable to the broader population of South Africans. Nonetheless, the study provides a useful framework that points to factors that can be leveraged in professional education.

The implications for m-learning design – bearing in mind organisations’ key needs for compliance, staying competitive and watching cost – are that m-learning should be provided in an environment that is convenient above all else, and which makes professional students feel secure and in control of their studies; and that it is (though this should be obvious) relevant, useful and enjoyable.

In addition, attention must be paid both to design and administration. This cannot be repeated too loudly: good design is invisible, while poor design can ruin everything.

Using these findings to optimise professional development in the workplace

- Make course foundation requirements explicit (foundation levels could be tested ahead of participation, and students steered towards the means to meet them);
- Permit choice in terms of study time and logistics, what to skip, what to repeat;
- Provide content that can be consumed on the go;
- If there must be social aspects (groupwork, synchronous requirements, lecturer availability), make them as flexible as possible.
- If streaming classes, permit students to choose whether to participate in the stream or watch a recording later;
- Provide access to social construction but do not force participation in it;
- From a theoretical perspective, adopt more of a cognitive constructivist approach, providing:
 - Self-testing mechanisms that give instant feedback;
 - Means to track and benchmark participants’ progress against their peers;
 - Access to useful tools, research and organisations;
 - Activities in context; and

- Ensure practical application.
- Minimise the data load (and therefore cost) of material; and
- Provide an alternative for students who want physical material, such as a single-print, nonshareable printable pdf;
- Make course presentation seamless and intuitive so that cognitive capacity is not wasted trying to figure out how to use it, and minimise cognitive load by “chunking” concepts and examples – clustering four (Jones, 2002) to seven (Miller, 1956) strongly associated ideas, making it easier to hold them in working memory, and nesting clusters within one another.
- Note that course administration and site maintenance (not to be conflated) are as important as course content and presentation, and if poor, may overshadow the learning experience. Consider student convenience when setting up logistics (timing and activity types and requirements, particularly across time zones; server downtime; course and link maintenance). Construct administrative messaging clearly and concisely, and keep it to a minimum;
- Provide means to encourage and inculcate motivation and discipline. Even the most organised professionals appreciate a cyber nanny, so automate the chivvying with electronic reminders, a study tracker that marks progress, and a regular (but not overwhelming) supply of useful information and productivity tips.

Tackling the major themes from an organisational perspective

- **To fulfil compliance requirements:** Make it as easy as possible for staff to comply – provide anywhere, anytime access; use peer pressure and performance management to encourage compliance; and automate chivvying and compliance monitoring.
- **To meet the challenges of cost, capacity and globalisation:** Digitise compliance training; extend international videoconference learning initiatives where possible; vet online facilitators' communication skills; build feedback into online training; and outsource where internal capacity is limited.
- **Convenience of access:** Ensure audio options are available for mobile consumption; provide anywhere, anytime access; create physical learning centres if personal technology is not available.

- **Proliferation of channels:** Curate content on a standardised platform housing responsive collaboration tools (not just repositories) across territories; use peer pressure to encourage adoption of this platform; link it to industry training initiatives.
- **Ensuring fitness for purpose:** Cater for specific competences; adopt technology – virtual books, audio, videoconferencing, online training, and automate tracking – to alleviate capacity issues.
- **Tackle hygiene factors** – who pays for what, security and quality – by instituting a clear and fair policy on who pays for what; isolate virtual training mechanisms from business processes so that security cannot be breached; and monitor and follow up on post-training feedback.

Areas for further study

Areas for further study that emerged during this project include quantifying whether, and if so, how, keyboard skills affect note-taking, and therefore study, in comparison with writing; how to set policy on who pays for what when both company and individual benefit from m-learning, as well as policy-setting on company bandwidth consumption with regard to learning programmes; the investigation of a mechanism or standard for educational videos that would make it easier for organisations to differentiate educational video material from other video material, and permit it to be accessed via corporate bandwidth; and whether poor video quality or poor bandwidth access are the reason students still prefer text to video.

Ultimately, willpower – the exclusion of which from Utaut drew criticism from Bagozzi – was not explored in this study, though barriers to enjoyment of study were raised. Reliable tactics to help students overcome obstacles to learning, and to resist temptation and maintain effort in m-learning, would provide valuable input into this framework.

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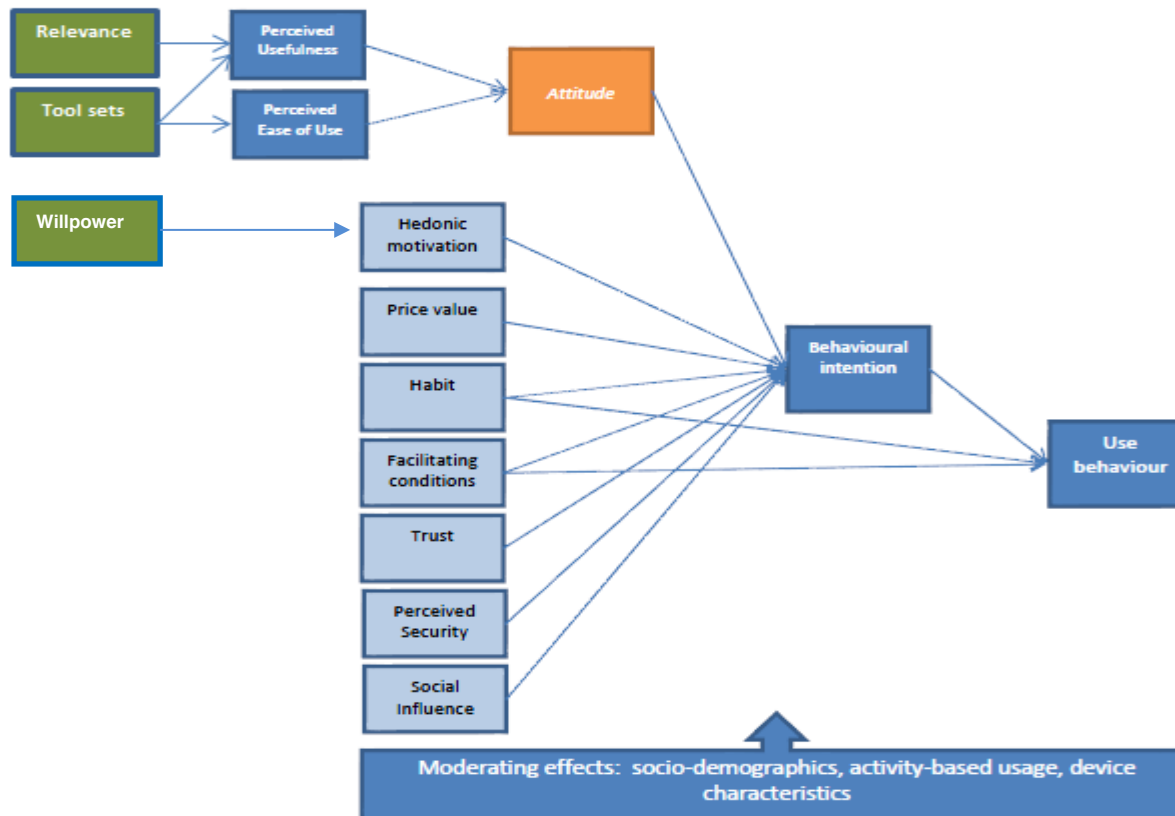
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RESOURCES

- Organisations requiring proof of continuous professional development for professional registration:
- Accountancy bodies: www.saica.co.za and www.saipa.co.za
 - Health Professions Council of South Africa www.hpcsa.co.za
 - Engineering Council of South Africa www.ecsa.co.za.
 - Property Owners Association, SA <http://www.sapoa.org.za>
- Meraka Institute: http://www.meraka.org.za/ICTed_projects.htm
- National Planning Commission – The Presidency (2011) National Development Plan – Vision for 2030 <http://www.info.gov.za/view/DownloadFileAction?id = 154423> Retrieved June 11 2012, 16h06.
- Shuttleworth Foundation: <http://www.shuttleworthfoundation.org>

APPENDIX 1: RESEARCH INSTRUMENT CONSTRUCTS



The research instruments used in this study were based on an extended version of Ally and Gardiner's Hybrid Smart Mobile Device Acceptance Model (blue and orange blocks, left), which built on Utaut2 to explore the moderating influence of device characteristics and usage on acceptance of smart mobile devices. The additional constructs were required to explore what, when using technology, assisted in the construction of meaning, and might therefore constitute a key factor in the adoption of m-learning among professionals. These constructs were **relevance** and **tool sets** (green blocks, far right). A third construct was added to take into account Bagozzi's criticism of Utaut2, not addressed in Ally and Gardiner's model; this was **willpower** (bottom green block, far left).

- More details about the constructs on p28;
- The construct-and-question matrix follows.

* Asterisks mark the study author's additions to Ally and Gardiner's table of construct definitions.

CONSTRUCT	DEFINITION	TEST QUESTIONS	QUESTION TYPE
CONSTRUCTS SHAPING ATTITUDE (origin - Theory of Reasoned Action, incorporated into Utaut2): An individual's positive or negative feeling about performing the target behaviour (Fishbein and Ajzen 1975), shaped by perceived usefulness, and perceived ease of use. It is hypothesised that these in turn are shaped by the relevance of study problems presented; the context in which they are presented; the level of complexity with which they are presented; the tool sets provided; and perception of the outcomes experienced.			
Perceived Usefulness (origin - the Technology Acceptance Model)	The degree to which an innovation is perceived as being better than its precursor (Moore and Benbasat 1991)	What have you studied using m-learning, and how useful have you found it in comparison to courses delivered by other means? (Rate only those that are applicable.)	Likert-type scale
* Relevance (based on cognitive constructivism constructs)	Perceived degree of: Meaningfulness of problems, cases, projects or questions presented in material; Meaningfulness of contexts presented; Complexity presented Relevance of setting to own context	What kind of exercises did your programme use and how relevant did you find them in terms of your work? (rate only those that are applicable)	Likert-type scale
		Degree of relevance	
		If you found some exercises difficult/easy, why do you think this was so?	Likert-type scale
		What kind of exercises did your programme use and how relevant did you find them in terms of your work? (rate only those that are applicable)	Open-ended question Likert-type scale
Perceived ease of use (origin - Technology Acceptance Model)	The degree to which an innovation is perceived as being difficult to use (Moore and Benbasat 1991)	How difficult did you find doing a course via m-learning in comparison to other study options?	Likert-type scale

* Tool sets (origin - <i>cognitive constructivism constructs</i>)	Access to and degree of usefulness of tools to: - Manipulate aspects of problem (calculators, thinking frameworks, simulators) - Search for information - Collaborate (quality of discourse?) - Reflect - Gauge achievement	If the following tools were used, how useful were they? (rate only those that are applicable) - Calculators - Frameworks for thinking through problems - Simulators - Web links - Calculators - Text - Audio - Video - Blogs - E-mail reminders - Knowledge self-testing, automated feedback - Knowledge testing, instructor feedback - Concept self-testing, automated feedback - Concept testing, instructor feedback - Test your application of new skills - Experts available online - Peer discussion through social networking forums (Facebook, Twitter) - Peer discussion on course platforms (Moodle, Blackboard, etc) - Other – please state	Likert-type scale
* Perceived outcome (origin - cognitive constructivism)	Perceived degree of change in - Knowledge - Comprehension - Application - Analysis, synthesis and evaluation	The programme improved my knowledge of the topics studied. The programme improved my understanding of the topics studied. I am equipped to apply what I have learnt. I am now better equipped to analyse issues in the field studied. I am now better equipped to solve problems in the field studied.	Likert-type scale
CONSTRUCTS SHAPING BEHAVIOURAL INTENTION (origin - Technology Acceptance Model):			

"The strength of one's intention to perform a specified behaviour" (Fishbein and Ajzen 1975, p. 288), influenced by perceptions of enjoyment, cost, habit, facilitating conditions, trust, perceptions of security and social influence. It is in addition hypothesised that willpower and planning affect hedonic motivation.			
Hedonic motivation (origin - Utaut2)	The fun or pleasure derived from using a technology (Brown and Venkatesh 2005) and the extent to which the activity of using the computer (technology) is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated (Davis et al. 1992)	Mark the following statements according to your experience: I enjoyed doing the programme via m-learning. I like to stay up to date with new practices. I like to stay up to date with changes in my professional environment. I look for ways to improve what I do. I was expected to do this programme. I expect to earn "A"s on a course. We could benchmark our progress against others in this course. I like to benchmark my progress against others'. I thought m-learning would be convenient. M-learning was convenient. I like to study alone. I like to study with others. I like being able to work on the programme at my own pace. I was in control of my learning on this programme. The programme did not feel like hard work. I enjoyed doing the programme via m-learning. I did this programme because I needed CPD points. I would have tried this learning programme even if I did not need CPD points. I found it easy to pick up the programme and learn wherever I was. I found I could work on the programme only in a quiet place. I found the programme credible. The programme improved my knowledge of the topics studied. The programme improved my understanding of the topics studied. I am equipped to apply what I have learnt. I am now better equipped to analyse issues in the field studied. I am now better equipped to solve problems in the field studied. I learnt new ways of doing things. I have used what I learnt.	Likert-type scale (Five points, strongly disagree to strongly agree)

		The learning made me feel more confident. I will do more m-learning programmes.	
* Willpower (based on Bagozzi's criticism of Utaut)	The kind of obstacles individuals face and the strategies employed to: Overcome these obstacles Resist temptations Maintain effort and willpower Adjust action Plan	Drawn from Muilenburg, L.Y., Berge, Z.L. (2005) Student Barriers to Online Learning: A factor analytic study. Distance Education Vol. 26(1). pp. 29–48. Retrieved from https://pantherfile.uwm.edu/simonec/public/Motivation%20retention%20articles/Articles/Muilenberg_StudentBarriersToOnlineLearning.pdf t 16h40 on January 4 2014. Student barriers to online learning: administrative issues, social interaction, academic skills, technical skills, learner motivation, time and support for studies, cost and access to the Internet, and technical problems. Independent variables that significantly affected student ratings of these barrier factors: gender, age, ethnicity, type of learning institution, self-rating of online learning skills, effectiveness of learning online, online learning enjoyment, prejudicial treatment intraditional classes, and the number of online courses completed. Social networking Social life Romance Loneliness Poor living conditions Household chores Children Parents	Obstacles explored in open-ended questions; strategies to overcome them not pursued
Price value (origin - Utaut2)	The consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them (Dodds et al. 1991)	Being able to study when I wanted to: Was better than having to attend lectures at set times. Made me less disciplined about the time I spent studying. Made me more disciplined about the time I spent studying. The lower cost and convenience of m-learning balanced not having: Immediate feedback from a lecturer on hand. Immediate input from fellow learners in a physical classroom. The quality of the course I did bettered the quality of face-to-face training.	

		The money would have been better spent on face-to-face training I would be happy to pay more for a course that: - Saves me time travelling - Permits me to study when I wish - The quality of the course I did bettered the quality of face-to-face training. - The cheaper cost of m-learning was a fair trade-off for the benefits of face-to-face training.	
Habit (origin - Utaut2)	The extent to which people tend to perform behaviours automatically because of learning (Limayem et al. 2007).	Use of mobile device other than for learning Experience with mobile device for learning, and usefulness of course taken	Likert-type scale + open ended Multiple choice, Likert-type scale
Facilitating conditions (origin - Utaut)	Consumers' perceptions of the resources and support available to perform a behaviour (Brown and Venkatesh 2005; Venkatesh <i>et al</i> , 2003)	Devices available through employer Devices available privately	Multiple choice Multiple choice
Trust (origin - Hybridised Model)	Perception of reliability of device and service, and a safe and secure environment, and how these might influence a user's behavioural intentions (Ally and Gardiner, 2012)	My device (laptop/iPad/smartphone etc) provided reliable access to the course My internet connection was reliable I felt my personal information was secure I felt the work I did on the course was secure It was easy to use the tools provided I used all the tools provided These factors influenced the way I studied by: (open answer)	Likert-type scale + open-ended
Perceived Security (origin - Hybridised Model)	Perception of security of smart mobile device determined not only by technical security measures, but by users' "feeling of control of the interactive system" (Ally and Gardiner, 2012).	Shares answers from Trust section	Likert-type scale + open-ended
Social influence	The individual's internalization of the	Social network using technology to study	Likert-type scale

(origin - Utaut)	reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situations (Thompson et al, 1991); The degree to which an individual perceives that important others believe he or she should use the new system (Venkatesh et al, 2003)	Source of course Organisational beliefs	
MODERATING EFFECTS			
Sociodemo-graphics (origin - Utaut2)	Individual's age, gender, experience * Context	Age Sex Highest level of education Organisation size Organisation type Industry Mobility – business travel Experience with technology Range of experience of training platforms	Select range Select one Select one Select one Select one Select one Select range Likert-type scale Multiple choice

APPENDIX 2: INTERVIEW GUIDE



INTERVIEW GUIDE FOR HUMAN RESOURCE DIRECTORS

Masters research project: How can m-learning best be leveraged by professionals in South Africa?

School of Education

Supervisor: Professor Ian Moll

Researcher: Terry Shapiro
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Organisational demographics

Date of interview:

Organisation code: _____
Company size code: _____
Nature of business code: _____
Number of sites in SA: _____
Local operations only ☐
National operations ☐
International operations ☐

Background to research

This study involves an online survey of two accounting bodies' members to explore their learning requirements and preferences, experiences of, attitudes towards and beliefs about m-learning programmes to master key work-related issues in South Africa's accounting sector. This interview, which we should complete in half an hour to an hour, is one of 10 planned with human resources directors of large companies in South Africa to gauge beliefs about, attitudes towards and adoption of m-learning at organisation level.

Conditions of interview

You will not be advantaged or disadvantaged in any way by giving this interview, and may withdraw from the study at any time. There are no foreseeable risks in participating in this study. The participants will not be paid for this study.

The names of all research participants and identity of your company will be kept confidential at all times and in all academic writing about the study. Your individual privacy will be maintained in all published and written data resulting from the study.

All research data will be destroyed within 3-5 years of completion of the project.

Questions

1. Before we discuss how you approach training, please briefly describe your organisational culture and outlook.
2. Do you expect personnel to keep professional continuous development training up of their own accord, or do you have a programme in place to help them keep this up?
3. What kind of professional development training does your organisation require personnel to do?
4. What outcomes do you require from this?
 - How important is certification? Or is it sufficient to deliver just-in-time training?
 - Which is more important to the organisation? And to personnel?
5. What format does this training take – face to face (lectures, seminars, workshops); webcasts or seminars online; courses online; courses on CD or intranet; mobile devices, any other medium?
6. Which of these do you find better suited to what kind of training and why?
7. How do you weigh the cost of using one format against another, or does it not matter if you feel that the training is right?

If using m-learning:

8. What subjects are you covering using m-learning?
9. What age range has adopted this medium most readily, or does age make no difference?
10. Have more men or women adopted it?
11. Why did you choose this medium?
12. Could it be more useful to you used in conjunction with another training platform?
13. Do you know of other SA employers (by sector or name) who are using m-learning?
 - And if so, who? (are they competitors?)
14. To what extent is it developed in-house, and how much outsourced?
 - What is the availability of development skills?
15. In what situations and for what learning levels do you feel it is most *appropriate*?
16. In what situations and for what learning levels do you feel it is most *effective*?
17. What m-learning *activities* do you feel are most effective?
18. Are your staff using mobile devices to do tests on the material learnt on mobile devices, or is this tested on a different platform?
19. How has m-learning been received by your staff?
 - What is the uptake of m-learning?
20. What percentage of staff have what kind of devices at their disposal?
 - Are they personal devices, or supplied by the organisation?
 - How do staff feel about using their own devices for m-learning?
 - Are there any issues about the cost of connectivity, and if so, how are they being dealt with?
21. What do you think motivates people to use m-learning?
22. What do you feel motivates people to complete courses using it?
23. How are you tracking activity, if at all?
24. How do you feel it might it be more helpful?
25. What collaborative activity is there in your m-learning programmes?

- Do in-house communities of practice exist, or could this form a springboard for them?
 - Does your organisation actively encourage them?
26. How much of the activity is online and how much offline?
27. Do you find m-learning credible? What is the organisational view of this?
28. Do your staff feel m-learning is credible?
29. How does it compare with PC-based learning? What do you feel are the advantages and disadvantages? And what do staff feel are advantages and disadvantages?

If not using m-learning:

30. Would or has your organisation considered using m-learning?
31. What subjects do you feel you could cover using m-learning?
32. Do you develop your training in house? And if so, would you expect to develop m-learning in-house or to outsource it?
33. In what situations and for what learning levels do you feel it would be most *appropriate*?
34. In what situations and for what learning levels do you feel it would be most *effective*?
35. What m-learning *activities* do you feel would be most effective?
36. Would you expect staff to obtain certification for this kind of training?
37. Would you expect staff using m-learning to use their devices to do tests on the material learnt on their devices, or do you envisage this being tested on a different platform?
38. Would you expect them to pay for connectivity themselves, or would the company contribute to this?
39. What would make m-learning viable for your organisation?
40. Do you know what kind of devices your personnel have?
41. Would the organisation consider supplying mobile devices for learning?
42. What do you think would motivate people to adopt m-learning?
43. What do you think might be a barrier to them adopting m-learning?
44. Would tracking their m-learning activity be important to the organisation?
45. Does your organisation actively encourage communities of practice?
- Do you envisage this providing a platform for a community of practice?
46. Do you think m-learning is credible?
47. Have you tested the idea of m-learning with your personnel?
- If so, how do they feel about the possibility of adopting it?
 - Do they feel it is credible?
48. What advantages do you think it might hold?
49. What disadvantages do you think there might be?

APPENDIX 3: ONLINE QUESTIONNAIRE

Optimising Digital Learning For Professional Development

I would like to invite you to participate in this survey, which seeks to establish how best mobile devices can be leveraged in professional skills development. I am carrying out this research as a Masters student in the School of Education at the University of the Witwatersrand.

The responses gathered in this study will be analysed for patterns that indicate the situations, learning topics and other issues important for professionals to get the most out of mobile devices - whether tablet, cellphone, laptop or any other kind of mobile device - for learning purposes. I hope this research, which you are invited to participate in as a member of a professional association, will ultimately contribute to helping professionals like yourself master key work-related issues more conveniently and cost effectively through mobile learning (m-learning). I would like to explore your learning requirements and preferences, and your experiences of, attitudes towards and beliefs about m-learning, whether you have used it or not.

The survey should not take more than 15 to 20 minutes to complete. I would be very grateful for your input.

Sincerely

Terry Shapiro
School of Education
University of the Witwatersrand
terryshap@gmail.com
084 514-7844

***Before you continue, please confirm that you consent to the use of data you provide in this research project.**

☐ I consent to use of the information collected in this questionnaire in your academic study. I know my information will be kept confidential, and destroyed three to five years after the completion of this project. I know that I don't have to answer all the questions and can decide to stop answering this questionnaire at any time.

☐ I would prefer not to participate in this study.

SECTION ONE: DEMOGRAPHIC INFORMATION, TRAVEL AND EQUIPMENT

- Where you see ☒, select the option that fits you best.
- Where you see ☐, select all the options that apply to you.
- Where you are given multiple options, select the one closest to what you believe, feel or have observed.
- Where you see * next to a question it must be answered so that you can be channelled to the section relevant to your personal context. Let's begin with some details about you.

Name:

Organisation:

City/town:

Country:

Your job title

[Open-ended responses coded into Top Leadership, Senior Management, Middle Manager, Junior Manager, Professional, Administrator]

Age

18-25 / 26-35 / 36-49 / 50-65 / Older than 65

Gender

Male / Female

Highest level of education completed

Matric/Diploma/Undergrad/Honours/Masters/Doctorate/Professional qualification/
Other (please specify)

Organisation size by staff numbers

1-5 / 6-15 / 16-35 / 36-50 / 51-100 / 101-250 / 250-1000 / 1001 or more

Organisation type

Private business / Government / NGO / Academic / Other

Sector

[Drop-down list drawn from Department of Trade and Industry]

I travel for work outside the office:

Daily/Weekly/Monthly/Several times a year/Annually/Every few years/Never

Locally
Nationally
Internationally

If I am away from the office it is for:

Never/Sometimes/Often

One day at a time
Up to a week at a time
Week or more at a time

The following mobile devices are available to me through my office:

Laptop/notebook
PC
Tablet (iPad, Galaxy etc)
Mobile phone
None
Other (please specify)

I own the following mobile devices:

Laptop/notebook
PC
Tablet (iPad, Galaxy etc)
Mobile phone
None
Other (please specify)

I use my mobile device to:

Never/Sometimes/Often

Send and or receive e-mail

Search the internet
Social networking
Play games
Take photographs
Record videos
Record voice
Work on documents
Transmit documents
Check work documents
Set alarms and reminders
Other (please specify)

SECTION TWO: LIFELONG LEARNING

This section explores your reasons for training.

I participate in training because I want:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

CPD points
My learning to be a lifelong process
To refresh my skills
To learn new skills
To expand my knowledge base
To stay up to date with developments in my field
To improve what I do
To improve my chances of promotion
To change my professional focus
To do what is expected of me
Other (please specify)

I know people who have participated in e-learning using a mobile device.

Yes / No

The following people I know have participated in e-learning using a mobile device ("self" comes up a little further on):

Friends
Family
Colleagues in my workplace
Colleagues and acquaintances at other organisations

Colleagues and acquaintances in other countries

People I know who participated in m-learning (e-learning using a mobile device) used it because:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

It was a novelty
It was convenient because they could work on it anywhere in spare moments
They preferred it over another means to access a particular course
It was the only way the course was offered
It was cheaper than accessing a course another way
They travel a lot and need it as reference material out of the office
Other (please specify)

How important is it to you that the following believe you should use m-learning?

Not at all/A little/Somewhat/Fairly/Very

Family member
Friend outside my organisation
Client/s
Colleague
Line manager
Organisation

My organisation believes:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

That learning is essential to the business
In delivering learning on demand
In helping personnel train at their own convenience
That m-learning is cost-efficient
That speed of access and ease of uptake are important
Other (please specify)

I have participated in training through:

Face-to-face events (lectures, seminars, workshops)
Webcasts or seminars online
Courses online

Courses on CD
Programmes downloaded on my PC or mobile device
Other (please specify)

When it comes to training using a mobile device....

[Question splits according to category]

- ☐ This is something I have done
- ☐ I have not participated in training using a mobile device, but am interested in it.
- ☐ I am not interested in training using a mobile device.

... because....

[For those who reply I am not interested... to Question 21]

I would rather be trained by a person.
I cannot imagine trying to study using a mobile device.
My mobile device is my personal property and I do not use it for work.
My mobile device is my for my leisure, and I prefer not to use it for work.
Other (please specify)

What prompted you to try using a mobile device in your learning programme?

[Open-ended responses solicited]

What kind of course or learning have you done via mobile device?

[Open-ended responses solicited]

What kind of mobile device have you used for m-learning?

Laptop/notebook
PC
Tablet (iPad, Galaxy etc)
Mobile phone
None
Other (please specify)

Did the courses that permitted you to use a mobile device use:

Only a mobile device
A mobile device combined with face-to-face teaching
A mobile device combined with online learning

A mobile device, combined with online learning and face-to-face training

What have you studied using m-learning, and how useful have you found it in comparison to courses delivered by other means? (Rate only those that are applicable.)

Not applicable / Useless / Not very useful / A bit useful / Useful / Very useful

Ethics
Accounting or auditing principles
Business analytics
Business management
Communication skills
Contracting
Detecting fraud
Environmental analysis
Financial management
Forecasting
Legal concepts
Legal updates
Marketing
Negotiating
Reporting principles
Risk management
Sales
Sector-specific regulations
Small business issues
Tax updates
Other (please specify)

If the following tools were used, how useful were they?

Useless / Not very useful / A bit useful / Useful / Very useful

Calculators
Problem-solving frameworks
Simulators
Web links
Text
Audio
Video
Blogs
E-mail reminders
Knowledge self-testing, automated feedback
Knowledge testing, instructor feedback
Concept self-testing, automated feedback
Concept testing, instructor feedback
Test your application of new skills
Experts available online
Peer discussion through social networking forums (Facebook, Twitter etc)

Peer discussion through course platforms (Moodle, Blackboard, Sakai etc)
Other (please specify)

What kind of exercises did your programme use and how relevant did you find them in terms of your work? Rate only those that are applicable.

Irrelevant / Not very relevant / Somewhat relevant / Fairly relevant / Very relevant

Reading
Quizzes with multiple-choice questions
Quizzes requiring short written answers
Problem-solving exercises
Case studies
Projects
Simulations
Games
Journalling or blogging
Information hunt
Dragging and matching objects or phrases
Other (please specify)

How difficult did you find doing a course via m-learning in comparison to other study options?

Very difficult / Somewhat difficult / Neither hard nor easy/Somewhat easy/Very easy

Initially
In the end

If you found some exercises difficult: Why do you think this was so?

[Open-ended responses solicited]

If you found some exercises easy: Why do you think this was so?

[Open-ended responses solicited]

What did you like most about the m-learning you did, and why?

[Open-ended responses solicited]

What did you like least about the m-learning you did, and why?

[Open-ended responses solicited]

What did you find most useful? Why?

[Open-ended responses solicited]

What did you find least useful? Why?

[Open-ended responses solicited]

How much of your programme activity (reading, writing, other activities) was carried out online, and how much was offline (lectures, learning tasks etc)?

All / Most / About half / Some / None

Online

Offline

Did your m-learning involve any collaborative exercises?

Yes, we had a forum in which we could communicate with other participants if we wanted to

Yes, we had to participate in a forum

No

Did you expect a certificate or other formal recognition on completion of the course?

Yes / No

SECTION THREE:

[Those who have done m-learning]

HOW YOU FELT ABOUT THE PROGRAM

Motivation, preferences, control, enjoyability, usefulness, security

Motivation: mark the following statements according to your experience:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

- I like to stay up to date with new practices.
- I like to stay up to date with changes in my professional environment.
- I look for ways to improve what I do.
- I was expected to do this programme.
- I did this programme because I needed CPD points.
- I would have tried this learning programme even if I did not need CPD points.

Expectations - mark the following statements according to your experience:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

- I expect to earn "A"s on a course.
- I like to benchmark my progress against others'.
- We could benchmark our progress against others in this course.
- I thought m-learning would be convenient.
- M-learning was convenient.

Preferences and control - mark the following statements according to your experience:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

- I like to study alone.
- I like to study with others.
- I like being able to work on the programme at my own pace.
- I was in control of my learning on this programme.
- I found it easy to pick up the programme and learn wherever I was.
- I found I could work on the programme only in a quiet place.
- Being able to study when and where I wanted to was better than having to go to lectures at set times.
- Anytime access made me less disciplined about the time I spent studying.
- Anytime access made me more disciplined about the time I spent studying.

Enjoyability and usefulness - mark the following statements according to your experience:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

I enjoyed doing the programme via m-learning.
The programme did not feel like hard work.
The course was fun.
I found the programme credible.
It improved my knowledge of the topics studied.
It improved my understanding of the topics studied.
The course provided sufficient depth of understanding for me.
The programme provided links to further material of interest.
I am equipped to apply what I have learnt.
I am now better equipped to analyse issues in the field studied.
I am now better equipped to solve problems in the field studied.
I learnt new ways of doing things.
The learning made me feel more confident.
I have used what I learnt.
I will do more m-learning programmes.

Cost and quality factors - mark the following statements according to your experience:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

The lower cost of m-learning balanced not having immediate feedback from a lecturer on hand.
Lower cost compensated for not having immediate input from fellow learners in a physical classroom.
The convenience of m-learning balanced not having immediate feedback from a lecturer on hand.
Convenience compensated for not having immediate input from fellow learners in a physical classroom.
I would pay more for a course that saves me time travelling.
I would pay more for a course that permits me to study when I wish.
The quality of the course I did was as good as face-to-face training.
The cheaper cost of m-learning was a fair trade-off for the benefits of face-to-face training.

Security: My training was accessed....

Online via a website
Offline via an application or programme downloaded on my mobile device

Accessing my training via a website, I felt that....

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

My device (laptop/iPad/smartphone etc) provided reliable access to the course
My internet connection was reliable
My personal information was secure
The work I did on the course was secure

It was easy to use the tools provided
I used all the tools provided
These factors influenced the way I studied by.... [Open-ended responses solicited]

With the programme downloaded on my mobile device, I felt....

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

My device (laptop/iPad/smartphone etc) provided reliable access to the course
My personal information was secure
The work I did on the course was secure
It was easy to use the tools provided
I used all the tools provided
These factors influenced the way I studied by....

Course completion: I....

Completed the course / Have not completed the course

... because....

I am still busy with it
I did not have time
I was not enjoying it
I had other priorities
It was not what I needed
It was not as convenient as I thought it would be
Other (please specify)

SECTION THREE:

[Those who have not done m-learning]:

WHAT WOULD YOU WANT OR EXPECT FROM MOBILE LEARNING?

What would prompt you to try m-learning?

[Open-ended responses solicited]

What kind of mobile device would you prefer to use for m-learning?

Mobile phone (not a smart phone)
Smart phone
Tablet
Laptop
Other (please specify)

Would you expect your course to be delivered using:

Only a mobile device
A mobile device combined with face-to-face teaching
A mobile device combined with online learning

How useful do you think you might find the following mobile learning (m-learning) programmes?

Useless / Not very useful / A bit useful / Useful / Very useful

Ethics
Accounting or auditing principles
Business analytics
Business management
Communication skills
Contracting
Detecting fraud
Environmental analysis
Financial management
Forecasting
Legal concepts
Legal updates
Marketing
Negotiating

Reporting principles
Risk management
Sales
Sector-specific regulations
Small business issues
Tax updates
Other (please specify)

Which of the following tools would you expect to find in an m-learning course, and how useful do you think they would be?

Useless / Not very useful / A bit useful / Useful / Very useful

Calculators
Problem-solving frameworks
Simulators
Web links
Text
Audio
Video
Blogs
E-mail reminders
Knowledge self-testing, automated feedback
Knowledge testing, instructor feedback
Concept self-testing, automated feedback
Concept testing, instructor feedback
Test your application of new skills
Experts available online
Peer discussion through social networking forums (Facebook, Twitter etc)
Peer discussion through course platforms (Moodle, Blackboard, Sakai etc)
Other (please specify)

What kind of exercises would you expect your m-learning programme to use?

Reading
Quizzes with multiple-choice questions
Quizzes requiring short written answers
Problem-solving exercises
Case studies
Projects
Simulations
Games
Journalling or blogging
Information hunt
Dragging and matching objects or phrases
Other (please specify)

What kind of collaboration would you expect?

A forum in which we could communicate with other participants if we wanted to
Communication with a lecturer
No collaboration

Would you expect a certificate or other formal recognition on completion of the course?

Yes / No

Expectations:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

I expect to earn "A"s on a course.
I like to benchmark my progress against others'.
I think m-learning will be convenient.

Preferences and control:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

I like to study alone.
I like to study with others.
I like being able to work on a programme at my own pace.
I like to be in control of my learning.
I would like to be able to pick up a programme and learn wherever I am.
I think I could work on a programme only in a quiet place.
I would rather study when and where I want to than go to lectures at set times.
Anytime access would make me less disciplined about the time I spent studying.
Anytime access would make me more disciplined about the time I spent studying.

Cost and quality factors:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

The lower cost of m-learning would balance not having immediate feedback from a lecturer on hand.
Lower cost would compensate for not having immediate input from fellow learners in a physical classroom.
The convenience of m-learning would balance not having immediate feedback from a lecturer on hand.
Convenience would compensate for not having immediate input from fellow learners in a physical classroom.

I would pay more for a course that saves me time travelling.
I would pay more for a course that permits me to study when I wish.
I would expect the quality of the course I did to be as good as face-to-face training.
The cheaper cost of m-learning is a fair trade-off for the benefits of face-to-face training.

Security:

Strongly disagree/Disagree/Don't know/Agree/Strongly Agree

My device (laptop/iPad/smartphone etc) would provide reliable access to the course
My internet connection would be reliable
My personal information would be secure
The work I did on the course would be secure

THANK YOU!

[On completion]

Your participation in this survey is much appreciated and will, I hope, contribute to improving m-learning for professionals.

If you would be prepared to be interviewed about your experience with mobile learning in addition to completing this survey, please enter your contact details.

E-mail address:

Phone number:

SORRY TO SEE YOU GO....

[For anyone who hits Exit during the survey:]

Your opinion would have been very useful.

- ☐ I'm changing my mind - I'd like to do the survey. [Goes back to survey]
- ☐ Thanks, but no thanks.

APPENDIX 4: AXIAL CODING OF INTERVIEWS WITH ORGANISATIONAL TALENT HEADS

COMPANY 1					
Open code	Categories	Properties	Examples of participants' words	Selective code	Analysis
Compliance	Individual	Compliance failure	When people are delinquent because of the big financial impact on them they come up with all sorts of excuses like they were based on the client site or were too busy travelling...	Noncompliance costly	Make it as easy as possible to comply - anywhere, anytime access
	Organisational	Compliance requirement	... but the long and the short of it is we've removed the excuses. You actually can't do it in the traffic because there's a quiz at the end of it, but you could listen to the content; If I'm an analyst working in (our) strategy segment there are a whole lot of courses that I will have to do in that year in order to build industry; they get pushed very heavily; huge focus on structured learning, internships and accredited training because of BEE skills development requirement changes; There's a whole industry certification process with courses in order for you to be certified.		
Challenges	Industry level	Compliance	Need for compliance (regulatory and competitive).	Cost, capacity and globalisation	Digitise compliance training; broaden reach of international videoconferencing; vet online facilitators' communication skills; build feedback into online training
	Organisational	Cost	Cost of data - going to have to develop a policy about who pays for what; can't afford to fly everyone to St Charles every year; the cost on 3G is astronomical. We are going to ramp to about 400 000 employees globally by 2020 from about 280 000 now so we can't afford our training costs to go up with the number of employees; got to run a business case to give contractors access to learning.		
		Capacity	Building skills at the pace required; range of specialisations; competitors doing a lot of innovative		

Open code	Categories	Properties	Examples of participants' words	Selective code	Analysis
			things; we have mature training hubs in India and the US; struggle to get world-class faculty. Efficiency of network. Need for "dynamic" learning.		
		International	International classes can be hard to follow - quite a lot gets lost in translation.		
Convenience	Organisational	Ease of access	Provide wifi in the office, can download anything any time; someone downloaded 6000 abstracts - his intent was to listen to them while he was travelling through Africa. Audio most effective.	Convenience is key but individuals need to adapt to take advantage of what is offered	Ensure audio options available for mobile consumption; provide anywhere, anytime access
		Urgency	Building skills at the pace required; training on the go.		
	Individual	Ease of access	Download as many abstracts as you like; people download hugely on the (office) wifi; can follow communities of practice on your phone.		
		Mobility	Can listen to the compliance training on the road.		
		Changing habit	Substitute; I find it (audio) by far the most helpful thing for me 'cos I get so sick and tired of listening to the ... radio.		
Communities	Organisational	Collaboration	Big focus on working collaboratively; have a knowledge exchange; have a collaboration tool we use for sharing ideas and learning ... anyone who sees my question can answer or refer me to an expert; you can set up a community of practice on Yammer; my boss set up a group for all her mentees on Yammer; use circles in G+; a lot of people are sharing things on LinkedIn so much that I can't keep track of it; streaming; videoconferencing.	Hard to keep track of plethora of collaborative channels and discussions	Curate content; provide standard collaboration tools across territories and use peer pressure to encourage adoption; link to industry training initiatives
		Global view	Employees globally; diverse, multicultural, multicountry view.		
		Industry skills	It's also important that we build industry skills.		

Training	Individual	Sharing	Easy to send things to team; all our Ip is saved onto the KX (knowledge exchange) so it can be reused. But it's not a dynamic way of learning; app on phone takes us to the collaboration stream - anyone in the organisation can answer or refer me to an expert.	Must have access to experts, preferably "on the go"	Technology - virtual books, audio, videoconferencing, online training
		Channel clutter	The number of streams is a problem ... there's so much that keeping track of it is quite hard.		
		Demographics	There's definitely a generation divide; adoption is definitely generational; you've got to cater for all generations.		
	Informal	Access	it's not (all) formal learning; On GetAbstract (condensed business books, available in audio and text): available to all staff and you can download as many as you want.		
		Communities of practice	Refer me to an expert.		
		Own devices	Everyone uses laptops; most have personal devices.		
	Formal	Specialised	Core training driven by talent segment; important to build industry expertise; heavy focus on industry certification; global; on the go; curated content; developed globally and then customised; on a huge drive to formalise learner-ships; as you start getting ready to be a consultant you start specialising and then what we try and do is get you to work in a particular industry; you have to be doing it.		
		Capacity	[Struggle to get world-class faculty]; videoconferencing; classrooms connect virtually; can leverage best faculty from across the world.		
		Needs	Highly interactive training delivered everywhere; contact; more formal content converted.		

Attitude	Organisation	Competitive	Want best; essentially a knowledge organisation.	Want best but cost - in terms of time and money - an issue to staff and organisation, so need to compromise	M-learning appropriate to everybody
		Who pays	At MD level I think their bills are paid. (And the plebs must pay their own.)		
		Cost	A huge driving force; can't afford to send everyone overseas anymore; big focus on cutting cost of travel; If you think of the world of work in the future, they don't want us in the office. There's a cost to having us in the office. We are being encouraged to work from home. There's definitely a shift to cut down on office space. People are not even going to work so much from home; they're going to work on the move, and they are going to have to learn on the move. Learning time at a premium - on average we budget 80 hours a year.		
		Policy	Data is expensive - going to have to develop a policy about who pays for what. We've had instances where people have been flying from here to Chicago and they've had ethics courses due and they've used their 3g dongles to download the courses and ended up with data bills of - I'm not joking - R30000 to R40000. It's happened more than once.		
		Appropriateness	M-learning is appropriate to everybody.		
		Solutions	Videoconferencing to cut costs. We are going to decrease training in the regional centres by 65% and increase virtual training by 600%. The cost saving over five years is huge - 40% per person.		
	Individuals	Who pays	Cost of data of more concern than "how cool is this".		
		Efficiency	Learning time at a premium.		
		Demographics	Adoption definitely generational.		

COMPANY 2					
Open code	Categories	Properties	Examples of participants' words	Selective code	Analysis
Compliance	Industry	Professional association	Saica's got lots of rules. We keep records because Saica audits us ... it is very highly regulated ... it puts pressure on everyone to comply.	Focus on compliance at industry and organisational level	Use peer pressure, performance management, and automate compliance monitoring
	Organisation	Approach	Everyone's got to go through compliance training. We are quite conservative. Very much focused on what is right. Put pressure on people to comply. Support sending them on things that will give them CPD points.		
Challenges	Professional body	Professional requirements	They allow you to be out of the country for 6 months of the three years of your articles, and that's a difficult one because we do a lot of work in Africa, or do a rotation in the UK.	Multiple challenges	Outsource where internal capacity is limited; seek technology that will not breach security requirements
	Individual	Traits	One part of the organisation is "cut-throat", driven by results. We don't want people to be arrogant but you do get people bordering on overly confident.		
	Organisation	Capacity Security	We don't have strong design capability; we do use quite a lot of vendors for executive leadership programmes. Focus on stopping fraud and corruption; They wouldn't allow graduates to ... access networks from home.		
Convenience	Organisation	Ease of access	Not everyone has access to a computer.	Ease of access not guaranteed	Create physical learning centres
Communities	Organisation	Collaboration	Lots of teams work with Sharepoint; you want them to connect with each other, so we do prefer to have them face to face; we do IFRAS updates ourselves, internal training, very technical, and they invite all our qualified CAs. It's a whole community; got to make sure you service the graduates well; there's constant movement (across the organisation); we invite the trainees to all our activities.	Organisation prefers face-to-face networking	Consider introducing video-conferencing and providing more responsive collaboration tools than Sharepoint (which is a repository).

	Individual	Demographics	Some people who are older do enjoy it as well. Younger people just click and get it done; haven't seen any gender preferences.		
Training	Informal	Fit for purpose	If it has to be communicated across the bank it's not going to be fancy.... If its for execs across Africa we might zjhooj it up a bit. Some needs to be face-to-face.	Training must be fit for purpose and closely monitored	Training need not be fancy, but specific competences must be catered for and tracking should be automated
	Formal	Capacity	Broad range of training; we use quite a lot of vendors; we have lots of learning facilities [in the three main centres of South Africa] ... and people have computers there.... We do lfras updates ourselves ... it's very technical ... and invite the whole community; if we roll out a new policy we'll use e and make it compulsory – we have to track whether they have read and understood the policy. There is a test at the end so we can check whether they have read it.		
		Monitoring	We keep track of the training they need to do.		
		Specific competencies	Competencies the chartered accountants need to sign off.		
		Training pushed to people	If we want to roll out our new performance assessment policy we'll use e and make it compulsory – we have to track whether they have read and understood the policy. There is a test at the end so we can check whether they have read it.		
		Simulations	Our e-learning is very strong in the investment bank.		
		Continuous professional development	We do have internal ways of trying to keep them updated; the bank does support sending them on things that will give them CPD points. The audit firms also do free updates for clients on CPD.		
Attitudes	Organisation	Security	Wouldn't allow graduates to access network (from outside).	Quality, critical competences and organisational security seem more important than training cost or status (certification)	Ensure feedback is monitored and followed up
		Range	Focusing on more critical things.		
		Cost	We pay fees to keep people's CPD points updated, and for conferences; tend to throw money at the graduate programme; data costs nursed.		
	Individual	Quality	Concerned about feedback.		
		Status	Don't collect certificates.		
		Uptake	People use what's available.		

COMPANY DATA AGGREGATED AND CODED

Open code	Categories	Properties	Examples of participants' words	Selective code	Analysis
Compliance	Industry	Professional association	[Co1] Saica's got lots of rules; [Co2] highly regulated; We keep records because Saica audits us ... it is very highly regulated ... it puts pressure on everyone to comply.	Focus on compliance at industry and organisational level to avoid cost of noncompliance	Make it as easy as possible to comply - anywhere, anytime access; use peer pressure, performance management, and automate compliance monitoring
	Individual	Compliance failure	[Co 1] When people are delinquent because of the big financial impact on them they come up with all sorts of excuses like they were based on the client site or were too busy travelling...		
	Organisational	Compliance requirement	[Co 1] ... but the long and the short of it is we've removed the excuses. You actually can't do it in the traffic because there's a quiz at the end of it, but you could listen to the content; If I'm an analyst working in (our) strategy segment there are a whole lot of courses that I will have to do in that year in order to build industry; they get pushed very heavy; huge focus on structured learning, internships and accredited training because of BEE skills development requirement changes; There's a whole industry certification process with courses in order for you to be certified. [Co 2] Everyone's got to go through compliance training; we are quite conservative; put pressure on people to comply; support sending them on things that will give them CPD points.		

Challenges	Industry level	Compliance	[Co 1] Need for compliance (regulatory and competitive). [Co 2] They allow you to be out of the country for 6 months of the three years of your articles, and that's a difficult one because we do a lot of work in Africa, or do a rotation in the UK.	Multiple challenges include cost, capacity and globalisation	Digitise compliance training; broaden reach of international videoconferencing; vet online facilitators' communication skills; build feedback into online training; outsource where internal capacity is limited; seek technology that will not breach security requirements
	Organisational	Cost	[Co 1] Cost of data - going to have to develop a policy about who pays for what; can't afford to fly everyone to St Charles every year; the cost on 3G is astronomical. We are going to ramp to about 400 000 employees globally by 2020 from about 280 000 now so we can't afford our training costs to go up with the number of employees; got to run a business case to give contractors access to learning.		
		Capacity	[Co1] Building skills at the pace required; range of specialisations; competitors doing a lot of innovative things; we have mature training hubs in India and the US; struggle to get world-class faculty. Efficiency of network. Need for "dynamic" learning. [[Co 2] We don't have strong design capability; we do use quite a lot of vendors for executive leadership programmes.		
		International	[Co 1] International classes can be hard to follow - quite a lot gets lost in translation.		
		Security	[Co 2] Focus on stopping fraud and corruption; They wouldn't allow graduates to ... access networks from home.		
	Individual	Traits	One part of the organisation is "cutthroat", driven by results. We don't want people to be arrogant but you do get people bordering on overly confident.		

Convenience	Organisational	Ease of access	[Co 1] Provide wifi in the office, can download anything any time; someone downloaded 6000 abstracts - his intent was to listen to them while he was travelling through Africa. Audio most effective. [Co 2] Not everyone has access to a computer.	Convenience is key but individuals need to adapt to take advantage of what is offered	Ensure audio options available for mobile consumption; provide anywhere, anytime access; create physical learning centres if personal technology is not available
		Urgency	[Co 1] Building skills at the pace required; training on the go.		
	Individual	Ease of access	[Co 1] Download as many abstracts as you like; people download hugely on the (office) wifi; can follow communities of practice on your phone.		
		Mobility	[Co 1] Can listen to the compliance training on the road.		
		Changing habit	[Co 1] Substitute; I find it (audio) by far the most helpful thing for me 'cos I get so sick and tired of listening to the ... radio.		
Communities	Organisational	Collaboration	[Co 1] Big focus on working collaboratively; have a knowledge exchange; have a collaboration tool we use for sharing ideas and learning ... anyone who sees my question can answer or refer me to an expert; you can set up a community of practice on Yammer; my boss set up a group for all her mentees on Yammer; use circles in G+; a lot of people are sharing things on LinkedIn; so much that I can't keep track of it; streaming; videoconferencing. [Co 2] Lots of teams work with Sharepoint; you want them to connect with each other, so we do prefer to have them face to face. There's constant movement (across the organisation); we invite the trainees to all our activities.	Hard to keep track of plethora of collaborative channels and discussions; organisational culture is to network face to face	Curate content; provide standard collaboration tools across territories and use peer pressure to encourage adoption; link to industry training initiatives; If happy with face-to-face don't change it; might consider the value of introducing videoconferencing and providing a more responsive collaboration tool than Sharepoint, which is essentially
		Global view	[Co 1] Employees globally; diverse, multicultural, multicountry view.		
		Industry skills	[Co 1] It's also important that we build industry skills. [Co 2] We do IFRAS updates ourselves, internal training, very technical, and they invite all our qualified CAs. It's a whole community. Got to make sure you service the graduates as well.		

a document repository.

Individual	Sharing		[Co 1] Easy to send things to team; all our IP is saved onto the KX (knowledge exchange) so it can be reused. But it's not a dynamic way of learning; app on phone takes us to the collaboration stream - anyone in the organisation can answer or refer me to an expert.		
		Channel clutter	[Co 1] The number of streams is a problem ... there's so much that keeping track of it is quite hard.		
		Demographics	[Co 1] There's definitely a generation divide; adoption is definitely generational; you've got to cater for all generations. [Co 2] Some people who are older do enjoy it as well. Younger people just click and get it done; haven't seen any gender preferences.		
	Informal	Type	[Co 2] It must be fit for purpose (whether formal or informal). If it has to be communicated across the bank it's not going to be fancy.... If it's for executives across Africa we might zjhooj it up a bit. Some needs to be face-to-face.		
		Access	[Co 1] It's not (all) formal learning; On GetAbstract (condensed business books, available in audio and text): available to all staff and you can download as many as you want.		
		Communities of practice	[Co 1] Refer me to an expert.		
		Own devices	[Co 1] Everyone uses laptops; most have personal devices.		
Training				Must be fit for purpose, closely monitored, give access to experts, preferably "on the go"	Training need not be fancy, but specific competences must be catered for and tracking should be automated; adopt technology - virtual books, audio, videoconferencing, online training - to alleviate capacity issues

Formal	Specialised	[Co 1] Core training driven by talent segment; important to build industry expertise; heavy focus on industry certification; global; on the go; curated content; developed globally and then customised; on a huge drive to formalise learnerships; as you start getting ready to be a consultant you start specialising and then what we try and do is get you to work in a particular industry; you have to be doing it. [Co 2] Which competences the chartered accountants need to sign off.
	Capacity	[Co 1] [Struggle to get world-class faculty]; videoconferencing; classrooms connect virtually; can leverage best faculty from across the world. [Co 2] Broad range of training; we use quite a lot of vendors; we have lots of learning facilities [in the three main centres of South Africa] ... and people have computers there.... We do lfras updates ourselves ... it's very technical ... and invite the whole community; if we roll out a new policy we'll use e and make it compulsory – we have to track whether they have read and understood the policy. There is a test at the end so we can check whether they have read it.
	Monitoring	[Co 2] We keep track of the training they need to do.
	Needs	[Co 1] Highly interactive training delivered everywhere; contact; more formal content converted.
	Training pushed to people	If we want to roll out our new performance assessment policy we'll use e and make it compulsory – we have to track whether they have read and understood the policy. There is a test at the end so we can check whether they have read it.
	Simulations	Our e-learning is very strong in the investment bank.
	Continuous professional development	We do have internal ways of trying to keep them updated; the bank does support sending them on things that will give them CPD points. The audit firms also do free updates for clients on CPD.

Attitude	Organisation	Competitive	[Co 1] Want best; essentially a knowledge organisation.	Quality, critical competences, who pays and organisational security seem more important than training cost or status (certification)	"Who pays" policy required. Feedback must be monitored and followed up.
		Who pays	[Co 1] At MD level I think their bills are paid. (And the plebs must pay their own.)		
		Cost	[Co 1] A huge driving force; can't afford to send everyone overseas anymore; big focus on cutting cost of travel; If you think of the world of work in the future, they don't want us in the office. There's a cost to having us in the office. We are being encouraged to work from home. There's definitely a shift to cut down on office space. People are not even going to work so much from home; they're going to work on the move, and they are going to have to learn on the move. Learning time at a premium - on average we budget 80 hours a year. [Co 2] We pay fees to keep people's CPD points updated, and for conferences; tend to throw money at the graduate programme; data costs nursed.		
		Policy	[Co 1] Data is expensive - going to have to develop a policy about who pays for what. We've had instances where people have been flying from here to Chicago and they've had ethics courses due and they've used their 3g dongles to download the courses and ended up with data bills of – I'm not joking – R30000 to R40000. It's happened more than once.		
		Appropriate-ness	[Co 1] M-learning is appropriate to everybody.		
		Security	[Co 2] Wouldn't allow graduates to access network (from outside).		
		Range	[Co 2] Focusing on more critical things.		
		Quality	[Co 2] Concerned about feedback.		
		Solutions	[Co 1] Videoconferencing to cut costs. We are going to decrease training in the regional centres by 65% and increase virtual training by 600%. The cost saving over five years is huge – 40% per person.		

Individuals	Who pays	[Co 1] Cost of data of more concern than "how cool is this".
	Efficiency	[Co 1] Learning time at a premium.
	Status	[Co 2] Don't collect certificates (infers they don't care about the status a qualification confers).
	Uptake	[Co 2] People use what's available (infers they do not have strong preferences; alternatively, this could be the organisational mindset).
	Demographics	[Co 1] There's definitely a generation divide; adoption is definitely generational; you've got to cater for all generations. [Co 2] Some people who are older do enjoy it as well. Younger people just click and get it done; haven't seen any gender preferences.

APPENDIX 5: AXIAL CODING OF OPEN ENDED RESPONSES FROM STUDENTS WHO PARTICIPATED IN ONLINE SURVEY

STUDENTS						
Open code	Categories	Properties	Multiple mentions	Examples of participants' words	Selective code	Analysis
REASONS FOR CHOOSING M-LEARNING	Appeal	Availability	30	I had the device available; offered by employer; use office laptop; my mobile device had the capacity to access the programme; prescribed textbooks were available online.	Mobility = convenience; flexible and portable; cost effective; cuts physical burden; sometimes mandatory	Attributes of m-learning that appeal to students are convenience (anytime, anywhere) and - as a lesser consideration - cost-effectiveness.
		Convenience	25	Can do it in my own time; can do it outside normal hours; saves time; efficient and effective, ease of access; having the course available all the time without having to carry books around; mobility = convenience; learn anywhere; allows flexibility around other commitments; can learn from anywhere; it is portable.		
		Pricing	5	Saves cost; inexpensive; often the most cost-effective solution; insufficient funds to study full-time;		
		Mandatory	3	It was the only option in a couple of cases; no other means; compliance courses mandatory; corporate-mandated e-learning.		
USABILITY	Ease	Course construction	18	Programme was well designed... user friendly; had enough/all the information required available ... which makes it easy to study on your own; content was self-explanatory; reference material always available; content well linked with questions	User friendly; clean construction, pitched at right level; self-	Factors that make m-learning easy are self-explanatory, cogent content, carefully curated, and

	Comfort zones	9	I knew something about that subject; comfortable with technology; it's simple to edit answers and refer to specific pages; gotten used to the way things were done; I work on my laptop all the time and it was mostly listening and reading; was already exposed to distance learning	contained; always on; uninterrupted; require specific mindset	accessible from single point at any time; the provision of an interruption-free environment; familiarity with technology; working from a good foundation; and a disciplined approach.
	Strong foundation	5	Pitched at a level that could be understood; hard for instructors to cater for all skill levels, so basics ... thoroughly covered; they were familiar topics; previous learning and experience; topics familiar		
	Isolation	1	No interruptions by others		
	Habit	2	Enough effort put in; good preparation and dedication; developed a personal approach and methodology		
	Time	1	Had enough time		
	Difficulty				
	Comfort zones	14	Used to writing and putting it down first on paper; not used to the platform; not used to studying online; newness of knowledge and concepts	Newness, sloppy course construction, content and administration; social construction required to grasp some concepts; online communication more tedious than face-to-face; need for motivation and	Barriers to usability include cognitive aspects: need to teach new ways of "learning" via screen and keyboard, as opposed to writing (kinetic); course presentation must be seamless and intuitive so that cognitive capacity is not wasted trying to figure out how to use it (explore cognitive load, number of
	Course construction	6	Lack of information/clarity on the module; no link between content and course exercises; distractors too similar; no thorough guidelines provided; lack of understanding; lack of initial orientation to the course design; inability to capture the concepts		
	Isolation	5	Lack of face to face interaction means working through problems takes longer, arguably with a end result of a better understanding of the issues; certain concepts are more easily understood when being taught, as opposed to self-learning; working in isolation means nobody to assist when unsure; self motivation lacking; mind motivation; asking questions a bit more tedious		

Time	4	Not enough time to study; limited time allowed to work on the exercise; reading and working at the same time; not really difficult but time management skills were lacking	discipline; lack of foundation	problems you can solve in a day, Miller's magical number seven). Course administration and site maintenance (not to be conflated) as important as course content in this respect. Identify aspects that benefit from social construction and compensate with online forums (possible if course is synchronous) and video (where course is asynchronous). Provide means to encourage and inculcate motivation and discipline (rewards); test foundation ahead of course entry so that students know where they stand before they begin, and know where they need to build. Find ways to support these needs.
Habit	1	Out of habit of studying - had not studied for more than 10 years		
Lack of foundation	1	Required more knowledge on my part		

ENJOYABILITY	Liked most	Convenience	51	Could choose when to do it; could do it in my own time, at home, wherever; when it suits me; easy; only had to do what I needed and didn't have to sit through a whole course and hear stuff I already knew; flexibility; without complicated logistics; save time and ink and writing work was removed; no documents to carry around; could re-do exercises; complete any time; don't have to carry physical books; it is instant; blogs and group discussions; on-the-go reading; easily accessible; dashboard view of my progress; automatic reminders	Convenience, social construction available if required; constant awareness of progress; independence; contemporary nature of content and broadening of horizons inspiring; reasonable pricing.	Permit choice in terms of study time and logistics, where what to skip, what to repeat; provide on-the-go content; make social aspects (groupwork, synchronous requirements, lecturer availability) as flexible as possible; provide instant feedback; keep content contemporary; automate the chivvying; keep courses affordable.
		Independence	10	Still able to contact instructor; learn to solve your own problems; to work on my own; able to make new friends online		
		Engagement	5	Learn instantly that your answer was correct; always in touch with contemporary case studies; challenging ... it prompted me to put in more effort into learning more about the subject matter; easy to practice; exposure to new systems; creates hope and faith		
		Pricing	1	Inexpensive		
	Liked least	Independence	17	Lack of face to face communication, students not exchanging information; isolated; lack of face-to-face communication created misunderstandings; instructors tend to leave everything to the learner's hands too much instead of being there assisting wherever and whenever necessary; addictive and isolating; working by myself; have never met my lecturers; most students don't contribute; when I was stuck during weekends ... no one could help	Lack of social construction; feelings of isolation; difficulty keeping up in chatroom; delayed feedback;	Provide forums and other contact mechanisms; peer benchmarking and automated individual progress reporting; find mechanisms to encourage self-discipline (or

		Design	10	Couldn't go back to view my scores; prefer printed textbooks; prefer printed material that I can mark up; no electricity, no learning; administration .. Not as streamlined as it could be; chat room - you need to read fast	reliance on availability of signal, data, bandwidth and power; limited period of access to material; progress not visible; preference for print; need for self-discipline.	automated chivvying); minimise data load of material; publicise technical requirements; lobby internet providers for better service; provide an alternative for students who want print (could provide licensed, one-time printable pdf at extra cost to deter unauthorised sharing).
		Convenience	8	Slow responses and poor bandwidth, causing pixellation and audio break-up; lack of immediate feedback; sometimes you don't keep your work materials and no longer have access after subscription; time to download - slow and frustrating; poor signal; delay in getting questions answered		
		Pricing	6	Internet is a must; demands internet all the time		
		Engagement	4	Not being able to ask questions or ... disagree; lack of deadlines and periodic assessment leads to temptation to allow other priorities to take precedence; when instructions aren't clear and it doesn't work as it should; confusion when you don't grasp something quickly;		
USEFULNESS	Most useful	Convenience	11	Doing it when and where I like; I work in remote places like Mongolia, where other forms of learning are not available; easy to use, burden of carrying books removed; ability to refer back to content to refresh knowledge; enjoyed working and studying concurrently; forced to manage time	Convenience (time, logistics, activities); forced discipline; quick or immediate feedback; video classes; peer benchmarking; access to useful tools, research and organisations; practical approach;	Put student convenience first when setting up logistics (timing and activity types and requirements); provide quick or immediate feedback; set up peer benchmarking mechanism; find ways to encourage discipline; provide class recordings as well as live webinars so that students can
		Affordances	11	Could go over work until I was comfortable, feedback on quizzes so you know where you went wrong; online assessments ... immediately test comprehension; video tutorials very easy to follow; could download text and go through it myself; could re-do ... exercises; quick feedback from lecturer; access to the web; video classes and blogs; to do research; checking out number of attempts to see if I am behind; ease of access; the student portal; links to tools, research and professional organisations		

	Content	6	A lot of research material available; practicality; informative	availability of research; contributing to CPD points	revisit them or catch up; provide access to useful tools, research and organisations; ensure practical application; give access to research; align with CPD requirements and provide point collection and display mechanisms for students.
	Independence	3	Ability to contact lecturer for clarity; quick feedback from lecturer resident in Ireland;		
	Administration	1	Can achieve CPD points		
Least useful	Convenience	7	Live webinars are offered at really inconvenient times if one is not in the US, but recorded ones could simply be done any time; having to use memory sticks	Timing of synchronous activity across territories; spam; site down time; timeouts on activities; sloppy course maintenance; spam;	Put student convenience first when setting up logistics (timing and activity types and requirements, server downtime, course and link maintenance); keep online discourse at a high enough level to not be spam; provide access to social construction but do not force it;
	Administration	5	Spam; server downtime	preference for or dislike of independence;	
	Independence	4	If there is a problem, it is difficult to solve by yourself; To be forced to work in groups. It diverts one's lifestyle and the planning, we are working and need satisfy family needs		
	Affordances	3	Portal forums; simulations, because you have to start again when they refresh; blogs, discussion forums; to be forced to work in groups; downloading and printing material time-consuming; no discussion with peers in some instances.		

Content	1	Links that don't work; clunky content	forced groupwork; work and family pressures; having to do own printing	minimise and clearly construct administrative messaging; build portal that enables student self-sufficiency; consider product format (ability to print and redistribute, bearing in mind intellectual issues, which will depend on organisational stance - buy, lease, lend or share - and partnership or supplier requirements).
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APPENDIX 6: CORRELATION TABLES

HAVE USED M-LEARNING TO STUDY			Device Preference	Devices Owned	Perception Total	Personal Belief: Others	Personal Belief: Organisation	Personal Belief: Self	Motivation: Experience	Usefulness Studies: Experience	Usefulness Tools: Experience	Usefulness Exercises: Experience	Usefulness Total: Experience	Preferences Control: Experience	Cost-Quality: Experience	Security: Experience	Enjoyability
Device preference	Pearson Correlation Sig. (2-tailed)	1	.363** ,001	.289* ,040	.240* ,034	.058 ,616	.260* ,021	.179 ,200	.262 ,170	.105 ,526	.086 ,656	.156 ,511	.197 ,162	.075 ,610	.088 ,565	.224 ,129	
Devices owned	Pearson Correlation Sig. (2-tailed)	.363** ,001	1	-.151 ,291	-.015 ,897	-.006 ,955	-.192 ,091	.066 ,638	.086 ,659	-.051 ,756	-.120 ,535	.082 ,731	-.110 ,436	-.179 ,224	-.213 ,161	-.091 ,544	
Total perceptions	Pearson Correlation Sig. (2-tailed)	.289* ,040	-.151 ,291	1	.386** ,005	.292* ,038	.512** ,000	.247 ,147	.122 ,642	.223 ,284	-.124 ,601	.115 ,723	.263 ,140	.394* ,026	.104 ,578	.334 ,061	
Personal belief: others	Pearson Correlation Sig. (2-tailed)	.240* ,034	-.015 ,897	.386** ,005	1	.373** ,001	.309** ,006	.333* ,015	.362 ,054	.217 ,185	.349 ,064	.327 ,160	.194 ,168	.350* ,015	.159 ,296	.291* ,048	
Personal belief: organisation	Pearson Correlation Sig. (2-tailed)	.058 ,616	-.006 ,955	.292* ,038	.373** ,001	1	.107 ,350	.465** ,000	.336 ,074	.263 ,106	.140 ,467	.333 ,151	.291* ,036	.270 ,063	.255 ,091	.485** ,001	
Personal belief: self	Pearson Correlation Sig. (2-tailed)	.260* ,021	-.192 ,091	.512** ,000	.309** ,006	.107 ,350	1	.330* ,016	.323 ,088	.423** ,007	.404* ,030	.573** ,008	.186 ,187	.253 ,083	.199 ,191	.345* ,018	
Motivation	Pearson Correlation Sig. (2-tailed)	.179 ,200	.066 ,638	.247 ,147	.333* ,015	.465** ,000	.330* ,016	1	.600** ,001	.478** ,003	.434* ,024	.711** ,001	.585** ,000	.288 ,053	.522** ,000	.494** ,001	
Usefulness of studies	Pearson Correlation Sig. (2-tailed)	.262 ,170	.086 ,659	.122 ,642	.362 ,054	.336 ,074	.323 ,088	.600** ,001	1	.503** ,007	.674** ,001	.897** ,000	.380 ,061	.197 ,336	.219 ,292	.271 ,191	
Usefulness of tools	Pearson Correlation Sig. (2-tailed)	.105 ,526	-.051 ,756	.223 ,284	.217 ,185	.263 ,106	.423** ,007	.478** ,003	.503** ,007	1	.788** ,000	.862** ,000	.518** ,002	.299 ,085	.313 ,076	.574** ,000	
Usefulness of exercises	Pearson Correlation Sig. (2-tailed)	.086 ,656	-.120 ,535	-.124 ,601	.349 ,064	.140 ,467	.404* ,030	.434* ,024	.674** ,001	.788** ,000	1	.883** ,000	.488* ,013	.325 ,113	.278 ,179	.368 ,070	
Total usefulness	Pearson Correlation Sig. (2-tailed)	.156 ,511	.082 ,731	.115 ,723	.327 ,160	.333 ,151	.573** ,008	.711** ,001	.897** ,000	.862** ,000	.883** ,000	1	.634** ,006	.371 ,129	.243 ,332	.449 ,071	
Preferences and expectations of control	Pearson Correlation Sig. (2-tailed)	.197 ,162	-.110 ,436	.263 ,140	.194 ,168	.291* ,036	.186 ,187	.585** ,000	.380 ,061	.518** ,002	.488 ,013	.634** ,006	1	.408** ,005	.704** ,000	.625** ,000	
Quality received for price	Pearson Correlation Sig. (2-tailed)	.075 ,610	-.179 ,224	.394* ,026	.350* ,015	.270 ,063	.253 ,083	.288 ,053	.197 ,336	.299 ,085	.325 ,113	.371 ,129	.408** ,005	1	.424** ,005	.629** ,000	
Security	Pearson Correlation Sig. (2-tailed)	.088 ,565	-.213 ,161	.104 ,578	.159 ,296	.255 ,091	.199 ,191	.522** ,000	.219 ,292	.313 ,076	.278 ,179	.243 ,332	.704** ,000	.424** ,005	1	.669** ,000	
Enjoyability	Pearson Correlation Sig. (2-tailed)	.224 ,129	-.091 ,544	.334 ,061	.291* ,048	.485** ,001	.345* ,018	.494** ,001	.271 ,191	.574** ,000	.368 ,070	.449 ,071	.625** ,000	.629** ,000	.669** ,000	1	

** . Correlation is significant at the 0.01 level of confidence (2-tailed) α – ie 99% confident that the relationship can be explained by factors other than random chance.

* . Correlation is significant at the 0.05 level of confidence (2-tailed) α – ie 95% confident that the relationship can be explained by factors other than random chance.

NO M-LEARNING EXPERIENCE BUT INTERESTED IN TRYING IT		Device Preference	Devices Owned	Perception Total	Personal Belief: Others	Personal Belief: Organisation	Personal Belief: Self	Usefulness Studies Expect	Usefulness Tools Expect	Usefulness Exercises Expect	Usefulness Total Expect	Preferences Control Expect	Cost-Quality Expect	Security Expect
Device preference	Pearson Correlation Sig. (2-tailed)	1	.197**	-.016	.136	.039	.177*	.107	.183	.326**	.199	.131	.138	.220**
			.008	.926	.067	.605	.017	.231	.058	.000	.053	.124	.108	.008
Devices owned	Pearson Correlation Sig. (2-tailed)	.197**	1	-.071	.041	.077	.076	-.056	.064	.093	.018	.020	.003	.218**
		.008		.685	.579	.301	.310	.533	.513	.214	.860	.816	.971	.008
Perception total	Pearson Correlation Sig. (2-tailed)	-.016	-.071	1	.374*	.527**	.446**	.147	.087	.416*	.219	.065	.404*	.419*
		.926	.685		.027	.001	.007	.493	.701	.014	.368	.751	.033	.027
Personal belief: others	Pearson Correlation Sig. (2-tailed)	.136	.041	.374*	1	.274**	.135	.049	.134	.162*	.126	-.053	-.003	.073
		.067	.579	.027		.000	.069	.581	.167	.029	.223	.533	.970	.380
Personal belief: organisation	Pearson Correlation Sig. (2-tailed)	.039	.077	.527**	.274**	1	.286**	.290**	-.009	.095	.250*	.052	-.030	.112
		.605	.301	.001	.000		.000	.001	.930	.204	.015	.541	.730	.178
Personal belief: self	Pearson Correlation Sig. (2-tailed)	.177*	.076	.446**	.135	.286**	1	.256**	.267**	.275**	.371**	.052	.053	.080
		.017	.310	.007	.069	.000		.004	.005	.000	.000	.541	.540	.335
Expected usefulness of studies	Pearson Correlation Sig. (2-tailed)	.107	-.056	.147	.049	.290**	.256**	1	.461**	.182*	.895**	.211*	.193*	.243**
		.231	.533	.493	.581	.001	.004		.000	.041	.000	.022	.037	.007
Expected usefulness of tools	Pearson Correlation Sig. (2-tailed)	.183	.064	.087	.134	-.009	.267**	.461**	1	.280**	.799**	.163	.183	.249*
		.058	.513	.701	.167	.930	.005	.000		.003	.000	.103	.064	.010
Expected usefulness of exercises	Pearson Correlation Sig. (2-tailed)	.326**	.093	.416*	.162*	.095	.275**	.182*	.280**	1	.322**	-.020	.083	.070
		.000	.214	.014	.029	.204	.000	.041	.003		.001	.815	.333	.400
Total expectations of usefulness	Pearson Correlation Sig. (2-tailed)	.199	.018	.219	.126	.250*	.371**	.895**	.799**	.322**	1	.249*	.163	.359**
		.053	.860	.368	.223	.015	.000	.000	.000	.001		.019	.125	.000
Preferences and expectations of control	Pearson Correlation Sig. (2-tailed)	.131	.020	.065	-.053	.052	.052	.211*	.163	-.020	.249*	1	.306**	.330**
		.124	.816	.751	.533	.541	.541	.022	.103	.815	.019		.000	.000
Expectations of quality for cost	Pearson Correlation Sig. (2-tailed)	.138	.003	.404*	-.003	-.030	.053	.193*	.183	.083	.163	.306**	1	.261**
		.108	.971	.033	.970	.730	.540	.037	.064	.333	.125	.000		.002
Expectations of security	Pearson Correlation Sig. (2-tailed)	.220**	.218**	.419*	.073	.112	.080	.243**	.249*	.070	.359**	.330**	.261**	1
		.008	.008	.027	.380	.178	.335	.007	.010	.400	.000	.000	.002	

** . Correlation is significant at the 0.01 level of confidence (2-tailed) α – ie 99% confident that the relationship can be explained by factors other than random chance.

* . Correlation is significant at the 0.05 level of confidence (2-tailed) α – ie 95% confident that the relationship can be explained by factors other than random chance.