Environmental Engineering
Arthur Taute on tendering and procurement in Africa
Knowledge Swarming using mobile knowledge mentoring – the emergence of the ubiquitous Cyber Sage

BACKGROUND
We stand at the dawn of what is unquestionably the greatest revolution in human learning, communication and collaboration – at a time of tsunami-like transformational forces on both a local and global playing field.

The Knowledge Swarms and Experiential Hives™ model, introduced in Civil Engineering (June 2016), shows that a whole new approach to learning and development is urgently needed in the engineering and construction sector.

The accelerating emergence and convergence of the countless learning and collaboration technologies available, coupled with a rapidly changing new world of work, as described by the Gartner Watchlist Report (2010), and the coming of age of the millennial managers and their fluid approach to both career and capability enhancement, presents a scarce and critical skills, knowledge sharing and learning challenge never experienced before.

Describing the modern learner as “overwhelmed, distracted and impatient”, the research by industry leaders Bersin by Deloitte (2015) indicates that the modern learner will both require and demand a whole new way of empowerment and enablement, through combinations of short, continuous, highly-engaging and experience-rewarding learning techniques and technologies – anywhere and anytime.

In a world where the workforce is increasingly made up of very diverse employee profiles, including differences not only in age and gender, but also changing cultural norms and values, pervasive historical belief systems, disparate educational backgrounds, highly individualised learning styles, behavioural characteristics and other potential societal learning dividers, the quest to build the true learning organisation becomes an even greater challenge.

Generational differences alone, as described by Dittman (2005), account for a large element of the disconnect between the young, ambitious and highly aspirant graduates of today and their more experienced and arguably more measured, senior managers and subject matter experts.

The unacceptably high incidence of predictable, repetitive and increasingly costly mistakes across the engineering and construction sectors alone indicates that the long-cherished traditional and

This is Part 2 in the Knowledge Swarms and Experiential Hives™ series of articles on a nation-building solution to address the scarce and critical skills and knowledge crisis in the engineering and construction sector. Part 1 appeared in Civil Engineering June 2016 pp 53–58.
Theoretical models of teaching, learning and knowledge sharing, with a historical focus and over-reliance on a systems and training-oriented approach to knowledge identification, gathering, capturing, packaging, sharing and transfer, have proven to be, in the main, ineffective and unsustainable – both locally and globally.

A radical change is needed to address the learning disconnect, questionable impact and difficulty in quantifying the return on investment of current learning and training modalities, as identified by various industry experts and authors, such as Bersin (2014) and the American Management Association (2010).

Indeed, our own Minister of Higher Education and Training, Dr Blade Nzimande, told guests at a Department of Labour Employment Equity and Transformation Indaba gala dinner on 18 April 2013 that “South Africa has spent R57 billion over the past ten years through the Sector Education and Training Authorities (SETAs) in various training programmes, but the country does not have much to show for this investment.”

The success or failure of the true nation-building potential of South Africa’s visionary National Development Plan (NDP), masterminded by our previous Minister in the Presidency: National Planning Commission, Trevor Manuel, will rest almost entirely on our ability to effectively empower and enable the current and future generations of young and highly aspirant managers, technical specialists and employees across the entire engineering, construction, mining and manufacturing sectors.

But experience has proven that what worked for the Baby Boomers, will not work going forward. Not only is the time to learn, to practice, to assimilate the necessary feedback and to perfect the learning, no longer available, the demand is to do it all completely differently anyway.

The latest neurosciences and learning research by authors such as Carey (2014), Rizzolatti and Laila (2004), and Quiroga (2012) shows that episodic and experiential learning is unquestionably more important than the historical focus on semantic, systems and rule-based training, which the old ways of work chased with such massive, misguided and poor return-on-investment results. Scarce and critical skills and knowledge are not acquired through formalised and structured training interventions alone, they are gained and synthesised on an almost daily basis, in multiple combinations and associations, and the need to ask, or know, or share in a real-time environment is essential to accelerated, integrated human learning and development.

However, until recently, organisational constraints such as sustainable human engagement, logistics, internal capability and capacity, strained budgets, time pressure and distance separation – even with the best blended e-learning and virtual or ‘flipped’ classroom technologies available – continued to frustrate and impede our ability to offer a new way of learning and sharing.

And then smartphones came along and with it mobile learning emerged. With mobile learning comes the promise of mobile mentoring and quite literally, 24/7 access to knowledge on tap, offering a metaphorical, always open knowledge pub for the insatiably thirsty.

AN INTRODUCTION TO MOBILE MENTORING AND THE EMERGENCE OF THE UBIQUITOUS CYBER SAGE

Mobile mentoring presents the game-changing gift and opportunity of the

The learning revolution – the statistics:

- Only 10% of learning comes from classical training.
- Up to 20% comes from vicarious learning through others.
- As much as 70% comes from experiential, episodic, in-the-moment learning.
- An estimated 38% of the global workforce uses mobile devices – smartphones and tablets.
- An estimated 12% of all learning content is already available in mobile.
- 77% of global respondents confirm looking for learning on their mobile devices every day.
- As much as 25% of our working days are spent commuting – an ideal mobile learning opportunity.
- Mobile learning is 3 x more effective with a mentor’s guidance.

The modern learner wants:

- To be untethered from a single location and grouping.
- To be enabled with in-the-moment, on-the-job, on-demand learning.
- To be given opportunities to participate in collaborative, social learning.
- To be empowered with ability to self-select multiple sources of learning.
- Ability to experience instant gratification and feedback on own contributions.
- Increased peer status, fun, gamification and competitive, reward-based progress.
- Hyper-connectivity and multiple device / multiple source learning options.
- Collaboration in social learning and knowledge networks – strength of weak ties.
- Ability to ‘swarm’ on common knowledge needs – equal access to expert networks.
- Connections and associations to make sense and meaning out of complexity.
- To build exponential value creation by adding to the work of the collaborative

The modern employer must provide:

- Meaningful interaction and engagement through relevant, on-demand, customised and personalised ‘push’ technology learning opportunities.
- Appropriate response to trends and weak signals embedded in the mega data analytics – intelligent, meaningful response and pro-active, timeous feedback.

According to Bersin by Deloitte, the modern learner is: Overwhelmed, Distracted and Impatient.

The modern learner (based on the research and infographic of Bersin by Deloitte)
knowledge mentor or what could be termed, the ubiquitous Cyber Sage. It provides, for the first time ever, the ability to connect those who have the knowledge and experiential wisdom, with those who need it, and enables and empowers them to collaborate on common knowledge needs, goals and interests on an almost global level – on demand.

The value of this magnificent convergence of multiple technological and communication capabilities, coupled with a far greater neuro-scientific understanding of truly effective human learning and memory formation, promises to unlock the real development potential of our future generations by connecting the entire knowledge mentoring value chain proposed in the Knowledge Swarms and Experiential Hives™ model.

The almost magical value proposition of potentially connecting the available distributed cognition of the entire engineering and construction sector through Mobile Knowledge Mentoring™ and other new ways of learning, borne out in the research statistics of multiple industry leaders such as Bersin by Deloitte (2014, 2015), Overton and Dixon (2016), and Penfold (2016), to name just a few, are almost as compelling as cash flow is to business continuity in tough times.

The multi-cultural and multi-generational modern learner, and by implication in this article, the modern Engineering and Construction Knowledge Mentor and Knowledge Mentee (E & C KMens), have a learning profile and potential like no other generation before them, which will completely dominate and dictate how they communicate, cooperate and collaborate with one another.

Mobile knowledge mentoring and access to an on-demand Cyber Sage and extended knowledge network almost uniquely address all the challenges of large group learning and development and, more importantly, the needs and expectations of the modern learner, and thus the E & C KMens:

According to Bersin by Deloitte (2014/5), the historically overwhelmed, distracted and impatient mentee demands a learning environment that is unhindered, on demand, collaborative and empowering.

Smartphones have created confusion as to what represents information and what constitutes knowledge. So a peer-reviewed filtration process is essential in complex and knowledge-intensive environments, such as the engineering and construction sector.

All learning and knowledge mentoring will need to be granular in nature, consisting of short, sharp, inspirational, high-impact knowledge nuggets and not chunked into lengthy and boring training modules and workshops – context over content is the new learning mantra. Anywhere-anytime learning and mentoring for E & C KMens will be the game changer for empowering and enabling the high-performance learning organisation of the future. This will be a critical success factor for the NDP.

The observed employee patterns of the Y-Generation and the on-going research by authors such as Dittman (2005) and Codrington (2011) into the imminent arrival of the Z-Generation indicate that two conclusive absolutes will permeate the new employee cultural fabric – individualised flexibility and mobility, coupled with mobile social connectivity. Any learning or mentoring that does not cater for these dynamics will be discarded, irrespective of corporate policy and protocols.

The modern learner and mentee is generally a proven, highly-collaborative and accomplished computer and online gamer – witness the success of the global cyber-gaming platform such as World of Warcraft, which is now a multi-billion dollar business and a
celebrated and respected gaming cult. Therefore, the concept of ‘echo trust’ as described by Burt (2001) is intrinsic in their DNA. For example, if Mentor A assists Mente B, and Mente B knows Mente C, then Mente C will trust and accept advice from Mentor A, even if they have never met. This is due to the association-based perception of trust developed within collaborative groups focused on common goals.

- Developing real trust for effective learning and knowledge mentoring in multi-cultural and multi-generational companies and communities is no mean feat. Researchers Bergh et al (2011) and Seyfried (2014) have shown the critical nature of trust-based learning and the micro-mechanisms and processes that are required to build trust over time. Mobile mentoring almost uniquely offers the social learning and engagement platform to demonstrate and build commitment, companionship, competence and capability. Furthermore, the research also indicates that social learning and network collaboration both drive and foster powerful human experiences of increased cognitive and emotional connectivity amongst the knowledge networks, and would thus drive the social cohesion agenda so critical to our nation-building needs – on all levels of interpretation.

- The modern learner and mentee is far more concerned about social cohesion than their predecessors, as indicated by Tovey and Atlee (2008). If given an opportunity to uplift a community or colleague, they will generally do so without hesitation. Mobile learning, and mobile apps in particular, provide the most spectacular global opportunity to ‘share the love’ with the unemployed graduates and youth of the world – thereby enhancing employability and potential job creation, through ubiquitous on-demand access to appropriately enabled knowledge networks.

- Derryberry (2008) and Muntean (2011) have demonstrated the effectiveness of building trust and the important association-based echo trust relationships, through introducing gaming and play into the learning space. Mobile learning and mentoring provide an ideal platform to achieve this in an on-demand model. Almost magically, just as societal norms demand it, mobile learning and mentoring offer and unlock the essential ingredients of game-based learning, recognition and reward through:
  - Participation, peer status and incentivisation
  - Gamification and funification with instant gratification
  - Progression and advancement for valued contribution
  - General peer-to-peer and non-destructive competitiveness.

For the first time, this offers the modern learner and E & C KMens the ability to communicate, cooperate and collaborate at the highest levels of commitment and self-volunteered engagement possible.

- Literally thousands of collective years of profound knowledge, strategic relationships and experiential wisdom are lost to the South African engineering and construction sector each year with the retirement and/or retrenchment of the scarce and critical skills and knowledge-rich Baby Boomers and X-Generation. This could instead be mobilised through mobile mentoring in almost an instant, for the collective benefit of our nation. This will be dealt with in more detail in a subsequent article on ‘Second Life Careers and the Cyber Sage’ which forms part of the comprehensive Knowledge Swarms and Experiential Hives™ model.

- Mobile mentoring and on-demand learning offer the massive potential of the mini-MOOC, where massive open online courses (MOOCs) can be granulated into ‘mobile mentoring moments’ – giving instantaneous and ubiquitous just-in-time learning and mentoring opportunities to millions, including the unemployed and disabled – thus offering the beleaguered engineering and construction sector a magnificent opportunity to contribute significantly to the Amended B-BBEE Codes of Practice, using mandatory spend. This major benefit of mobile mentoring will be covered in more detail in a subsequent article on the ‘M4S Integr8ed B-BBEE Socio-Skills Optimisation model’, which also forms an integral part of the Knowledge Swarms and Experiential Hives™ model.

- The increasing turbulence in a world of work constrained by the apparent compression of time, as well as our crowded and centralised infrastructural limitations and the associated logistical challenges, begs for a much better solution. Mobile knowledge mentoring, which involves both on-demand (synchronous) and a-synchronous gathering, sharing and exchange, offers a unique dematerialisation and disintermediation solution – where instant access to the trusted knowledge network is far more valuable than simply being present at a desk, or glazing over in yet another meeting. Indeed, instant access to the trusted common knowledge network will potentially cut billions of wasted SA rands out of the old overstrained and unsustainable system.

- The modern learner and mentee, irrespective of culture and country, has

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<th>Paradigm</th>
<th>Current (Managing standards)</th>
<th>Future (Empowering personalisation)</th>
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<td>Based on</td>
<td>• Rank and rules</td>
<td>• Relationship and trust</td>
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<tr>
<td>Purpose</td>
<td>• Training through content</td>
<td>• Transforming through context</td>
</tr>
<tr>
<td>Priority</td>
<td>• Business requirements</td>
<td>• Learner expectations</td>
</tr>
<tr>
<td>Ownership</td>
<td>• HR / L and D</td>
<td>• Management and staff</td>
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<tr>
<td>Modality</td>
<td>• Formal training</td>
<td>• Informal, on-demand learning</td>
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<tr>
<td>Delivery</td>
<td>• Pushed content</td>
<td>• Pulled meaning</td>
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<td>• Compliance</td>
<td>• Enriching experience</td>
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<td>Data value</td>
<td>• Tracking and reporting</td>
<td>• Trends and decision-making</td>
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<td>When</td>
<td>• Ad hoc – driven by others</td>
<td>• Ubiquitous – driven by need</td>
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The modern learner and the mobile paradigm

60 August 2016 Civil Engineering
grown up in an era of instant swarming through social media. Examples such as the Arab Spring and other global political upheavals, spontaneous international product boycotting, toll road objections, nation building and wholly mobilised community initiatives such as massive public drought alleviation projects, prove the power and nature of societal swarming in response to complex or subtle changes in a cultural belief space or societal need. Authors Falkvinge (2013), Iacoban et al. (2003) and Miller (2007) have identified the need to understand and address these complex societal swarming algorithms, in order to fully unlock the power and potential of the swarm, and these triggers can be built into mobile mentoring and learning. Mobile learning and mobile mentoring technologies provide the ideal platform to enable this – where there is often an urgent in-the-moment need for engineering and construction knowledge or wisdom on-demand, or where the posting of a profound new safety or supplier insight, for example, acts as the quorum sensor to instantly change large-scale group behaviours and opinions.

The power of social networks, as described by Cross and Parker (2004), and the significant unlockable value contained in the work by Granovetter (1973) on the strength of weak ties, present a knowledge communication, cooperation and collaboration opportunity like nothing ever experienced before in our entire human history. Mobile mentoring and access to the wisdom of the trusted, yet possibly mostly unknown, mobile knowledge mentors, and the concept of the Cyber Sage, will accelerate learning and development at an unprecedented pace across the globe. The ability to tap into the knowledge and experience of a friend of a friend, almost on-demand, represents a level of distributed cognition never dreamt of before.

Mobile knowledge mentoring provides an opportunity, for those who wish to benefit from participation in the NDP, to demonstrate explicit commitment by sponsoring learning and knowledge mentoring initiatives and individuals — including the unemployed and disabled — in true nation building through Knowledge Mentoring™. This will move the historical focus from the tick-box-style content and competency approach, to the critical context and capability space so essential to our nation-building needs.

Critical knowledge transfer through the engagement-enhancing, experientially attractive and ubiquitous nature of these modern learning enablers in the online learning and gamification space, with technologies such as Axiom™” and exciting new mobile mentoring solutions such as myKnowledgeMentor™ and myMentorAccelerator™, are producing a whole new business and learning behaviour seldom seen in previous generations. The modern learner will, without question, gladly invest their own time and money in improving their own mobile learning experience – if one gives them the option. Research by Bersin by Deloitte indicates that this level of personal investment increases even further if it is associated with some sort of recognition, reward or professional credit. Mobile learning offers the most exciting solution for on-demand, full-process Professional Registration Support Mentoring, as well as Continuing Professional Development monitoring, and even the attainment of a Professional Knowledge Mentoring designation – all enabled and empowered via mobile mentoring applications.
CONCLUSION AND A NEW WAY FORWARD

Knowledge Swarms and Experiential Hives™, enabled through mobile learning and mobile mentoring applications, represents a whole new world where a company, community or country can start to leverage its hard-won heritage in terms of the collective national engineering and construction knowledge and experiential wisdom base. This model for nation building through Knowledge Mentoring™, while recognising the need for competitive advantage amongst organisations, also recognises the arguably greater need in our nation for enhanced social cohesion through collaborative critical knowledge sharing.

The entire value chain of our nation's engineering and construction sector's intellectual capital, from its retired or recently retrenched executives and skilled-knowledge-rich experts, through the layers of currently employed managers, technical personnel and operational staff, to the thousands of unemployed graduates and disabled employees, could be connected in Knowledge Swarms, and Common Knowledge Hives through mobile learning and mobile mentoring applications, for the benefit of our nation.

Mobile knowledge mentoring would alleviate our historical knee-jerk and needs-driven approach of relying on the dependable short-term solution of expats and outsiders, and the increasingly worrying tendency to import other non-English-speaking technical experts from Cuba and China on our major water infrastructure projects. Continually punishing ‘the past and the trivial few’ at the expense of empowering new entrants and ‘the critical many’, will simply perpetuate a very grave socio-political crime that will continue to set our engineering and construction youth back for yet another generation.

Mobilising our very own extensive engineering and construction intellectual capital, and the scarce and critical skills, knowledge, experiential wisdom and key relationships of the large numbers of potential knowledge mentors, and engaging them in collaborative relationships and knowledge mentoring programmes with the even larger numbers of aspirant young knowledge mentees, through on-demand, anywhere-anytime, mobile learning and mobile mentoring is, without question, the key to a far more successful, safe and sustainable future for us all.

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Civil Engineering August 2016 | 63

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