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# TACIT KNOWLEDGE ACQUISITION AND DISSEMINATION IN DISTANCE LEARNING

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## Introduction

The current era is governed by the knowledge-based economy which has affected many aspects of our life including the type of instruction or training to invest in and receive as well as recruitment processes and employment. This stems from the recognition of the place of knowledge and technology in modern economies (OECD, 1996). In the words of Jashapara (2011, p.10):

*“...economic success is increasingly based upon the effective utilisation of intangible assets such as knowledge, skills and innovative potential as the key resource for competitive advantage. The term ‘knowledge economy’ is used to describe this emerging economic structure”.*

Nowadays, recruitment is essentially based upon practical knowledge (*know-how*) or experiential knowledge assessment. This change impacts the choice of the mode of education since any individual expects as a return of investment to gain the right skills and expertise that will ease him or her to secure a job. Recently, the National Apprenticeship Service (NAS) has reported an increase in demand of up to 32% for apprenticeship programs in the United Kingdom (NAS, 2014). This suggests that acquiring hands-on skills and tacit knowledge is now highly valued by learners. Moreover, apprentices seem more appealing to employers as mentioned in the same report.

Among available modes of instruction, online education or e-learning is emerging due to its flexibility, ubiquity, mobility, cost-effectiveness, and many other benefits. Furthermore, the advent of web 2.0 technology has sped up its growth giving tremendous support to establish a comfortable and efficient environment to enhance individual learning experiences and satisfaction. However, looking at the transferral and sharing of tacit knowledge or experiential knowledge in an online learning environment, there is a plethora of critics arguing that the lack of face-to-face contacts, to rely on information communication and technology (ICT) tools, cannot lead to effective transfer of tacit knowledge. Conversely, many studies contest and provide counterexamples that the development of technology innately set in abeyance plausible challenges and weaknesses of indirect contacts. In fact, Foray and Steinmueller (2003, p.316) asserted:

*“The next generations of ICTs will enable efficient storage and long distance transfer of a greater variety of knowledge (including knowledge that has previously been regarded as “inherently tacit”). This will serve to reduce the differences in marginal costs of storing/transferring codified and tacit knowledge respectively”.*

Additionally, some researchers claim that online environment is more appropriate to externalise and share personal tacit knowledge online as it involves good preparation, reflection and selection of what to use to illustrate to novices (Yi, 2006; Warschauer, 1997). Hence, (Davies & Graff, 2005) concluded that learner performance can be improved online provided that the level of interaction among participants is dynamic and of a high quality.

This paper aims at reviewing the state of art on tacit knowledge acquisition and dissemination in distance learning. Hence, the structure of the paper is as follows. Firstly, an overview of tacit knowledge is provided in to understand what it represents and how it can be transferred. Following that, tacit knowledge dissemination in online learning environments is examined. The final section focuses on tacit knowledge testing in online learning where major concerns lie in order to bridge the gaps identified.

## **Tacit Knowledge Overview**

The role and capacity of the technology to facilitate and support knowledge sharing in virtual meetings with no face-to-face contacts has always been contentious. However, the new development of the technology for virtual learning has received a lot of hype. McClintock (1999) wrote in the educators manifesto entitled renewing the progressive bond with posterity through the social construction of digital learning communities:

*“Digital technologies are for education as iron and steel girders, reinforced concrete, plate glass, elevators, central heating and air conditioning were for architecture. Digital technologies set in abeyance significant, long-lasting limits on educational activity”*

It is undeniable that digital technologies have reinforced and enhanced virtual learning communities, a metaphor of communities of practice (CoP) enabling participants to network, to share experience and personal knowledge, and to discuss on best practices in the common domain of interest. It is then argued that tacit knowledge transference takes place in such conditions. So, what is tacit knowledge exactly?

## **Tacit Knowledge Defined**

The literature on knowledge management widely agrees that there is two kind of knowledge: *explicit knowledge* and *tacit knowledge*. Explicit knowledge refers to knowledge that has been articulated and written down. For example, knowledge published in books, guidelines, manuals, journals, databases, and so forth. On the contrary, tacit knowledge has received the greatest attention in view of the volume of related studies (Busch, 2008). It refers to knowledge that resides in an individual’s head in forms of experience, know-how, rule of thumb, insight, expertise, and so on. Tacit knowledge is that part of knowledge that is widely embodied in individuals (Küpers, 2005), but not able to be readily expressed. It is expertise or soft skills, as opposed to as explicit knowledge. According to Casonato & Harris (1999):

*“Tacit knowledge is the personal knowledge residing within the mind, behaviour and perceptions of individuals. Tacit knowledge includes skills, experiences, insight, intuition and judgment, it is typically shared through discussion, stories, analogies and person-to-person interaction; therefore, it is difficult to capture or represent in explicit form. Because individuals continually add personal knowledge, which changes behaviour and perceptions, tacit knowledge is by definition uncapped.”*

Tacit knowledge can be found in everyday discussions, face-to-face informal meetings, and presentations. Unlike explicit knowledge, tacit knowledge is more dependent to its human carrier (Grutter et al. 1999 quoted by Panahi, Watson & Partridge, 2012). It plays a vital role in improving individual and organizational productivity as well as competitive advantage. For instance, it is perceived as an important asset in improving the quality of work, decision making, organisational learning, productivity, competitiveness, accuracy of task performance, producing goods, customer service, and it saves time for individuals and organisations (Haldin-Herrgard, 2000; Selamat & Choudrie, 2004). In the new knowledge-based economy, tacit knowledge is a strategic resource that needs to be created, captured, stored, and disseminated among individuals within an organisation or learning community.

Traditionally, articulated knowledge is acquired through formal education, writing, books, rule-sets, legal code, and so forth whereas tacit knowledge is acquired either through the “intimate” relationship between a “*master*” and an “*apprentice*” or through learned experience over time. Tacit knowledge is usually transferred orally, by way of examples, sight, storytelling, and metaphors. For instance, apprenticeship refers to both the knowledge transfer process from an expert or senior person and the concurrent acquisition of knowledge by a novice or junior person within a given domain.

Historically, the tacit knowledge concept originates from Polanyi’s (1966) popular statement, “*we know more than we can tell*” from which the author coined the term “tacit knowledge”. Following Polanyi’s work, there have been debates on the definition, conceptualisation and articulation of tacit knowledge from philosophy view and organisational point of view. This paper focuses on the organisational view supporting the articulation of tacit knowledge by Nonaka (1994), Nonaka and Takeuchi (1995), Nonaka et al. (2000) that are seminal studies presenting a practical model to convert tacit knowledge to an explicit form.

### ***Tacit Knowledge Conversion Process: The SECI Model***

The main goal of implementing knowledge management in an organisation is to convert tacit knowledge into an explicit form and encourage dissemination amongst employees (Woelk & Agarwal, 2002). To fulfil this goal, Nonaka (1994) and his colleagues (1995, 2000) presented the SECI matrix of tacit knowledge conversion that has been widely adopted in the literature.

The SECI matrix consists of four modes of knowledge conversion. They are:

1. *Socialisation* (from tacit knowledge to tacit knowledge) involves empathising, sharing and interacting.
2. *Externalisation* (from tacit knowledge to explicit knowledge) entails articulating, communicating through examples, stories, metaphors, etc.
3. *Combination* (from explicit knowledge to explicit knowledge) that merges all explicit or codified knowledge that’s connecting, assembling and disseminating.
4. *Internalisation* (from explicit knowledge to tacit knowledge) means embodying, experimenting and sharing results. Those four modes and the evolving spiral movement of knowledge through the SECI are depicted in Figure 1.

According to authors, the SECI model could be seen as the engine supporting the process of creating and managing knowledge. Furthermore, Nonaka et al. (2000) emphasized that the process could be more effective by considering and involving two other elements, which have to interact all together dynamically and organically. They are: i) “Ba”: the shared context (place) in which knowledge is shared, created and utilised; ii) knowledge assets: the inputs, outputs and moderators (leadership) in the process.

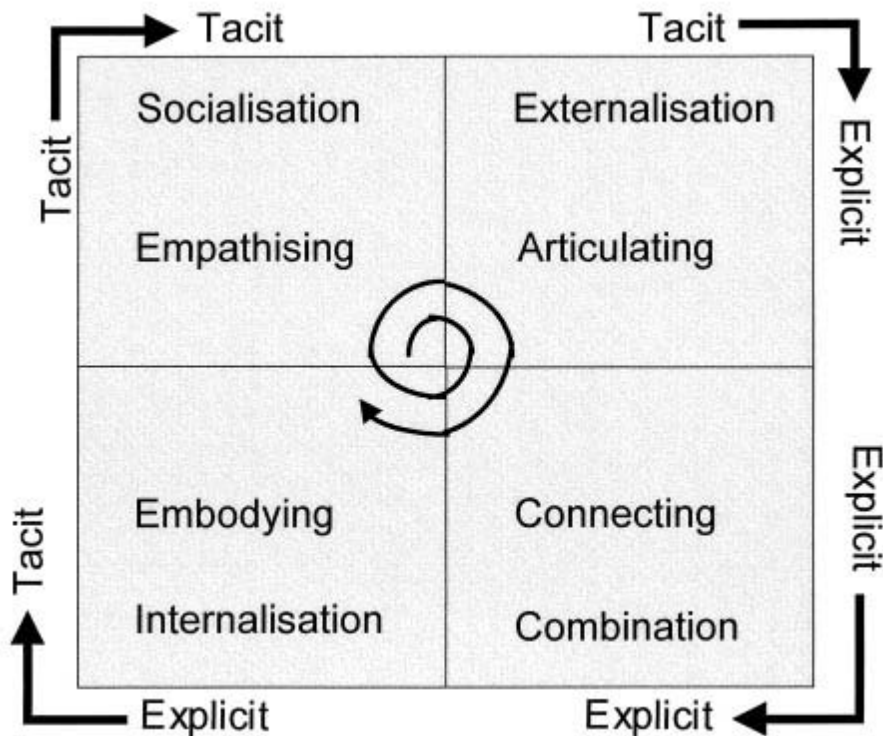


Figure 1. The SECI process (source: Nonaka et al. 2000, p.12)

The Nonaka and Takeuchi's model is commonly applied in theory and practice. It provides practical mechanisms to transform and share tacit knowledge that seem applicable in virtual environments and online distance learning in particular where major concerns lie.

### Tacit Knowledge Dissemination in Online Distance Learning

Generally, communication in online distance education can be synchronous or asynchronous. However, regardless of the chosen mode of communication, online distance education typifies indirect contacts and heavily relies on information and communication technology (ICT) as the backbone of learning and teachings process.

The use of ICT to support the externalisation and sharing of tacit knowledge in an online environment is contentious. Opponents claim that ICT tools are too limited to support tacit knowledge sharing. Instead, ICT tools support codified knowledge rather than tacit knowledge (Haldin-Herrgard, 2000; Hislop, 2001 quoted in Panahi et al., 2012). Researchers emphasise that apprenticeship, mentoring, face-to-face meetings and chatting, direct observation, storytelling, learning-by-doing or learning-by-using, are the only effective ways to externalise and pass on experiential or tacit knowledge (Smith, 2000 quoted in Busch, 2008). This argument aligns with the information richness pioneered by Daft and Lengel (1986) suggesting that the wealth of communication cues, gestures and tone of the voice in a face-to-face session can augment interaction and understanding. Additionally, Hansen et al. (1999) state that the use of ICT can have disruptive effects since it will resort to the use of emails and phone calls which will lose all kinds of body language and may be desynchronised. Busch (2008) studied tacit knowledge diffusion in three different types of organisations (according to the size and structure) and concluded that using phones and emails result to less transfer of tacit knowledge.

On the other hand, many researchers argue that means to share tacit knowledge cited by the previous schools are no longer suitable in the current digital era. They claim that the development of the technology provides potent tools to reinforce people interaction, collaboration and knowledge sharing initiatives. For instance, Panahi, Watson, & Partridge (2012, p.882) asserted: "...traditional mechanisms of tacit knowledge sharing, such as

*apprenticeship/mentoring, face-to-face meetings/chatting, direct observation, etc. is no longer cost effective and feasible in the new fast growing business models*". Hildrum (2009) also stated that: *"If ICTs are really inadequate as a means of diffusing tacit knowledge, it is peculiar that Cisco's extensive network of remote labs continue to exist and grow after eight years of operation. Although the knowledge shared in Cisco's remote labs represent a very small part of Cisco's total knowledge base, the experiences from remote labs still represent an important counterexample to the claim that face-to-face interactions are indispensable for interpersonal sharing of tacit knowledge"* (Hildrum, 2009, p.214). In fact, Cisco is the one the giant in computer networking, producing networking devices and training engineers how to use those tools via their e-learning platform.

In fact, the available technology such as social web tools, game simulators, 3D virtual world, innovative videos, etc. give better opportunities to an expert to illustrate, explain and demonstrate a particular skill or concept. On the other hand, novices or students have the opportunity to visualise, experience and apply the concept or skill. For instance IBM Innov8 2.0 is a game simulator with rigorous process that helps students to develop skills in business process management (BPM) required in the real world (IBM, 2010). Indeed, Venkitachalam & Busch (2012, p.365) acknowledged that:

*"... Advocates and critics suggest the influence of information technology in the KM domain support codified knowledge rather tacit knowledge. Yet, there is evidence in the current literature that presents the use of technologies and applications support the articulation and flow of tacit knowledge between individuals"*.

Tacit knowledge dissemination success is widely defined by the quality and strength of interaction amongst the knowledge holder and knowledge seeker. Yet, interaction among individuals has been recently enhanced with social networking tools, web conferencing, synchronous chat, wikis, etc. In fact, there are three type of interaction in online learning, learner-content, learner-learner and learner-instructor. Many studies provide evidence that only learner-learner and learner-instructor interactions are critical for learning effectiveness and student satisfaction (Sher, 2009; Chao, Hwu & Chang, 2011). Furthermore, Davies & Graff (2005) study revealed that students who failed in their online program tended to interact less frequently as opposed to students who achieved higher performance. Hrastinski (2009) advised: *"If we want to enhance online learning, we need to enhance online learner participation"*. Consequently, the most popular VLEs (Blackboard, Moodle) are now fitted with such collaborative tools and mechanisms but the challenge resides in the adoption of a good pedagogy and monitoring.

There are many examples in the literature that exhibit features in e-learning that improve learner participation and potentially performance improvement. Some studies emphasise effective transmission and acquisition of tacit knowledge such that (Yi, 2006; Hildrum, 2009; Falconer, 2006) with little empiric evidence and proof measuring the amount of tacit knowledge acquired. Indeed, Venkitachalam and Busch (2012, p.364) noted that the existing studies on tacit knowledge in certain topics are predominantly descriptive. Furthermore, researchers highlighted that fewer studies exist that are concerned with the flow of tacit knowledge among people. In fact, the lack of empirical studies on tacit knowledge is perhaps the main reason for the controversy in the field. Consequently, tacit knowledge dissemination in online learning environments suffers from the same lack of empirical evidence. For instance, arguments in Falconer (2006) on tacit knowledge sharing success in e-learning are the synthesis of purely descriptive evidences and therefore not conclusive on the effectiveness IT-mediated tacit knowledge sharing. Similarly, (Yi, 2006) argued that people disseminate their tacit knowledge effectively and efficiently in an online environment as they prepared well in advance to find out best cues, examples, and metaphors and analogies to illustrate the hidden knowledge. However, the researcher admitted the limitations of the measures and indicators used in her study as well as the inadequacy for generalisability. In

fact, she interviewed a small sample of people on the dissemination of tacit knowledge online, which do not give much insight on the nature and the kind of knowledge disseminated as well as tacit knowledge internalised by a knowledge seeker. Parallel to Yi (2006), Hildrum (2009) questioned only 11 participants and e-learning users who used ICT to interact with remote colleagues and the effectiveness of the interactions on their personal improvement and work performance. Although they argued and emphasised the positive contribution of the technology in tacit knowledge dissemination and retention, the nature of enquiry used by the researcher is not convincing enough to conclude that there is effective acquisition of tacit knowledge in e-learning despite the fact that his case study was based on a successful e-learning provider in the world (Cisco Systems, Inc).

In a nutshell, many examples in the literature claimed that ICTs enable and facilitate tacit knowledge dissemination in online distance learning but they do not evaluate the amount of tacit knowledge received from individual perspectives. So, that raises the questions? How can we measure the effectiveness of tacit knowledge dissemination? And what does tacit knowledge testing involve?

### **Testing Tacit Knowledge Acquired in Online Distance Learning**

In order to justify online learning effectiveness and learner performance, some studies use academic or intelligence tests which are not meant to measure tacit knowledge (*know-how* or *practical knowledge*) according to Somech and Bogler (1999, p.605). Researchers argue that academic tests measure academic intelligence (*know-what* or explicit knowledge) and posited that measuring tacit knowledge is not intelligence test in disguise and another approach should be considered. Therefore, Sternberg and his colleagues invented popular tacit knowledge measurement for management skills. The test consists of evaluating participants on day-to-day issues faced by professionals in a particular domain and comparing respondents' answers with domain experts. The test is a questionnaire: called *tacit knowledge inventory* for a domain that respondents have to rate, using a Likert scale, to reveal their tacit knowledge score. This is a successful and widely adopted instrument among many tacit knowledge testing instruments developed by the Sternberg and his colleagues including measurements for Military Leadership, Sales, Teaching, etc.

Despite the existing methods and proven tools for testing tacit knowledge, it can be noticed that those who strongly argue that tacit knowledge can be transferred either face-to-face or virtually do not take the time to measure the amount of tacit knowledge acquired. In addition to the psychologists' approaches that focus only on individual *know-how*, Busch (2008) provided a triangulated approach to test tacit knowledge and its diffusion which is almost overlooked in the tacit knowledge research. Busch's methodology gives means to test individual tacit knowledge from both quantitative (following psychologists' approach) and qualitative (using Formal Concept Analysis theory) angles, and to assess the diffusion of tacit knowledge among people in an organization or learning community. Thus a major gap in tacit knowledge in e-learning research is the lack of empirical evaluation of tacit knowledge and its flow among online learners and tutors. Engaging into tacit knowledge testing research in online learning is then crucial to clarify the adequacy and usefulness of the learning mode as Özdemir (2008, p.554) warned that:

*"If 'traditional e-learning' environments are insufficient for tacit-knowledge transfer and creation, there is a potential danger for the next generations. While they may gain codified knowledge anywhere and anytime, they will probably be devoid of the knowledge hidden within their master (teacher) or peers"*

### **Conclusion**

In a knowledge economy, people are interested in skill-based courses where they can quickly gain practical knowledge and hands-on skills to secure a job and perform better. The

growing rate of apprenticeship programs in the United Kingdom is evidence of the trend and raises concerns about the effectiveness of online learning environments as a medium to disseminate tacit knowledge.

Although many studies argue that online learning systems and processes have been enhanced with technologies that strengthen interaction and collaboration among participants in order to improve tacit knowledge acquisition and dissemination, none have actually attempted to measure online learner tacit knowledge acquisition when tacit knowledge is regarded as the main indicator to ascertain the “*real*” level of expertise or practical knowledge of an individual. The lack of testing online learner tacit knowledge acquisition and dissemination does not give enough evidence to justify the positive role claimed by ICTs advocates. This observation concurs with (Stark, Lassiter & Kuemper, 2013) suggestions that more empirical evidence on learner performance in e-learning tacit knowledge dissemination is needed and highlights the importance of the Panahi et al. (2013) question on “*How and to what extent are social web tools effective in facilitating tacit knowledge sharing?*” In a nutshell, more empirical studies measuring the effectiveness of on-line tacit knowledge dissemination is vital to shed the light on this long-lasting debate.

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