Learning Modalities and Delivery Systems for Officer Professional Development Period 3: Literature Review

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Learning Modalities and Delivery Systems for Officer Professional Development Period 3: Literature Review

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Abstract

This report explores the in-class, distance and blended learning delivery systems to identify their strengths and limitations, with regards to their effectiveness to deliver learning that could be applied to Developmental Period 3 (DP3) courses. Because the typical DP3 level student is an officer at a graduate level, particular focus is placed on adult learning at a graduate level in the military setting. The report begins by reviewing influential adult learning theories in order to identify what kind of learning is best suited for an adult population in terms of student characteristics (i.e., self-directed learner), instructional design methodologies, and external influences that affect student learning outside of the formal curriculum. Understanding adult learning can then be applied to educational practices and instructional design to develop more effective and engaging course content, especially when using technology as a primary mode of learning delivery. A review of in-class, distance and blended delivery systems highlight that learner characteristics and needs are the same; however they need to be implemented in slightly different ways. For example, delivering content through a combination of text, images, and video, serves to support different learning modalities. In addition, communication and sense of belonging is fundamental for any learning delivery system and must be carefully designed for maximum effectiveness in distance learning. Providing assessment and feedback remains fundamental both in terms of helping consolidate learning and as a means to obtain qualification. The report concludes with a review of the two learning delivery systems currently offered by the Joint Command and Staff Programme (JCSP) – residential learning (RESID; in-class) and distance learning (DL; online), to identify how educational best practices can be applied to increase student engagement, especially in a distance learning setting. While the JCSP DL greatly benefits from residential periods where students can engage with each other in person, other instructional methodologies can be introduced to enhance student engagement in a distance setting. Some examples include incorporating simulations to help solve complex problems and develop deeper levels of learning, introducing social media platforms to encourage student networking and informal learning, and incorporating videoconferencing or live chats to support real time communication and engagement.

Executive Summary

This report explores the different learning delivery systems. in particular in-class and distance learning, to identify their strengths and limitations with regards to their effectiveness to deliver graduate level learning that could be applied to Developmental Period 3 (DP3) courses. Of particular interest was the need to identify the differences in delivery between the Joint Command and Staff Programme (JCSP) – Residential Learning (RESID; in-class) and Distance Learning (DL; online) to identify how educational best practices can be applied to increase student engagement, especially in a distance learning setting.

Adult Learning Theories and Educational Practices

The report begins by a review of the dominant learning theories used in adult education and instructional design. Particular focus is placed on constructivist learning theories that emphasize the need for adults to be self-directed and internally motivated (e.g., Holmes & Abington-Cooper, 2000; Knowles, 1980). With self-directed learning, the role of the teacher is not to directly impart knowledge onto the student, but rather to serve as a facilitator or coach to support the student in self-directed inquiry. This method is supported by Knowles theory of andragogy, or adult learning, which has emerged as the dominant framework for teaching adults in the past 40 years (e.g., Beder & Carrea, 1988; Lawson, 1997; Merriam & Brockett, 1997; Pratt, 1998; Rachal, 2002).

Another dominant learning framework is Bloom's taxonomy. Bloom's taxonomy is one of the most commonly cited and widely applied theories of learning (e.g., Byrnes, 2001; Forehand, 2012; Wruck, 2011) as it provides a hierarchy of acquiring knowledge and skills in a way that can be used by educators to classify learning and develop objectives. Bloom's taxonomy has been extensively applied in adult learning and instructional design especially to identify how learners acquire deeper levels of learning (e.g., applying, analyzing, evaluating and creating; e.g., Boyd & Murphy, 2002; Chyung, 2003; Halawi, McCarthy, & Pires. 2009; Joyce & Weil, 1996; Vidakovic, Bevis, & Alexander, 2003; Wong & Wong, 1998).

Other learning theories have sought to include individual characteristics (i.e., learning modalities; Barbe, Swassing, Dunn & Dunn, 1985, as cited in Guild & Garger, 1998), multiple intelligences (Gardiner, 1985), and learning styles (Kolb, 1984), as factors that influence learning. Theories that emphasize personality characteristics are less common in adult instructional design (Guild & Garger, 1998) because of their focus on the differences between learners rather than similarities.

Finally, Yang (2003) attempted to incorporate environmental factors into a theory of holistic learning by defining three indivisible facets that influence learning: explicit, implicit and emancipatory. Explicit learning is formal learning gained through instruction and curriculum components. Implicit learning is gained through is the accumulation of knowledge, skill, attitudes and insights from daily experiences and exposure to the environment (Coombs & Ahmed, 1974), essentially what *we already bring to the table*. Emancipatory learning is affective and reflects how our values and beliefs impact the way we process and encode learning. Simons (2009) also introduced a holistic framework of learning where he tried to capture many different facets of learning. Simons acknowledges the need for formal learning (curriculum and instructional based), but also recognises that there are other types of hidden learning that adults bring to the curriculum through non-formal, self-directed and incidental learning. These types of learning modalities are gained through informal discussions with peers, self-directed leaning and personal experience. Through his dissertation, Simons tries to capture the different ways we obtain learning by

explicitly including sources of hidden learning as part of a *Professional Studies* course curriculum, through discussions, visits, social capacities and professional ideologies.

While instructional designers commonly leverage andragogy and Bloom's taxonomy, it is far more common to see a combination of learning methodologies used.

Learning Delivery Systems

Today, there are three types of learning delivery systems commonly defined: in-class or face-to-face, distance learning (e.g., distance education, e-learning, online learning) and blended learning, most commonly defined as a combination of a face-to-face and distance education components. Face-to-face instruction allows for interaction with the teacher and students. Smaller class sizes or opportunities for group discussion are the biggest benefits of face-to-face instruction, especially at a graduate level. However, face-to-face learning delivery relies on the instructor's presence, has limited accessibility for remote students and is restrictive in terms of class scheduling (Scott, 2010).

A well-designed distance learning course can be reusable, access a much larger and geographically dispersed learner community (e.g., Scott, 2010; Sitzman, Kraiger, Stewart, & Wisher, 2009), and shift the role of the lecturer to one of facilitator of learning. A key benefit of distance learning is the unique opportunity offered to adult learners to pursue their studies and their training at their own pace (e.g., Eastmond, 1998; Gibbons & Wentworth, 2001; Scott, 2010). The biggest challenge with distance learning is the lack of face-to-face interaction with instructors and peers, which can have a significant effect on engagement with the course (Bersin, 2004). Distance education also has the potential to be more cost effective, although research is still inconclusive in this regard, as researchers has been unable to define the full impact that introducing technology enabled instruction has on faculty, students and support staff (e.g., Bowen, 2013; Bowen, Chingos, Lack, & Nygren, 2012; Neely & Tucker, 2010). This is due to the fact that the design, development, delivery and management of distance education is often distributed across several individuals and departments, making it more difficult to capture the true costs of distance learning delivery systems.

Blended learning can traverse the limitations of face-to-face learning by providing content that is accessible any time anywhere; while providing students with an opportunity to engage with each other and the instructor in a more personal face-to-face setting. An example of blended learning is the flipped classroom, where students are given lectures through online learning components such as videos, and in-class time is devoted to exercises, projects and/or discussions (EDUCAUSE, 2012).

Designing Effective and Engaging Courses

Research shows that, on the whole, there do not appear to be significant differences in student outcomes between in-class, distance and blended delivery systems (e.g., Bernard et al., 2004; Carey & Trick, 2013; Cummings, Foels, & Chaffin, 2013; Phipps & Merisotis, 1999; Russell, 1999; Sitzmann & Kraiger, 2006). However, it appears that the success of distance education is affected by two factors: individual associated factors, e.g., self-directedness and motivation (Piccoli, Ahmad, & Ives, 2001) and instructional factors, e.g., fit of technological medium to learning objective, that affect student learning (Halawi et al., 2009). Instructional design factors that emphasize rich content delivery, communication, community building and feedback can all be used to support engagement with the content and strengthen motivation and self-efficacy. Knowles, theory of andragogy or self-directed learning, is particularly relevant in the field of distance learning because of his emphasis on self-directed behaviour. In instructional design, terms such as adult-instruction, learner-centered or self-directed learning are often used instead of andragogy to define the characteristics of adult learners (Holmes & Abington-Cooper, 2000).

Content can be delivered in a variety of formats, from the very basic text and images, to video instruction, to multi-player games and simulations, all of which need to be carefully designed to serve a learning function. For example, games and simulations can be used to support collaboration, competition, problem solving and psychomotor skills (e.g., Bonk, 2000; 2005; Gilbaud, 2007; Tung, Huang, Keh, & Wai, 2009).

Another crucial component in distance learning course design is ability to communicate either asynchronously (e.g., through discussion forums, emails, postings, etc.) or synchronously (e.g., video conferences, live chats, etc.). Ability to communicate with the instructor and peers helps build learning communities and supports information exchanges. With the rise of social networking (e.g., Facebook, Twitter), researchers have also focussed their attention on understanding how students can leverage these tools for informal learning in order to add richness of personal experience and informal information exchanges to their formal learning requirements (e.g., Ellison, Steinfield, & Lampe, 2007; Selwyn, 2007). Research has shown that, whether formally sanctioned or not, students will leverage Facebook to share notes, schedule meetings, network with peers and alumni from across the world and share experiences with each other (e.g., Dabbagh & Kitsantas, 2012; Madge, Meek, Wellens, & Hooley, 2009). Massive online open courses (MOOCs) can also serve as a strong networking and communication tool, although they have been criticized for being *too massive* making communication difficult to manage (Chamberlin & Parish, 2011). While learners do not yet use MOOCs as their primary education (i.e., to obtain a degree), they may use MOOCs to supplement their existing knowledge especially of required for work or school. The discussion forums offered through MOOCs are also widely used to connect with students from across the globe and share each other's knowledge and experience (EDUCAUSE, 2012).

Finally, providing formative feedback (on-going) and summative assessment (e.g., exams or final papers) is essential in developing deeper learning and supporting engagement. Research has found that online formative assessment through peer feedback can enhance student engagement and support deeper learning which in turn can be used to complement structured response (e.g., multiple-choice question) summative exams (e.g., Gikandi, Morrow, & Davis, 2011; Joordens, Desa, & Pare, 2009).

Military Context in Education

As the focus of the report is on understanding the military student, in particular at the DP3 qualification (i.e., Major/Lieutenant Colonel), the literature review concludes with an examination of the use of learning theories and learning delivery systems in the military setting. At a graduate level education, there is not much difference between military and non-military students with regard to their approach to learning (e.g., Simons, 2009; Wiarda, 2011), and instruction should be provided that is relevant to the military context and supports higher levels of learning, such as developing critical thinking and strategic skills. A study by Tung et al. (2009) reviewed a Taiwanese advanced military education (AME) training course tailored to commanding officers, and identified that distance education curriculum must be tailored to the type of instruction provided. For example, text and video-based lectures accompanied by writing reports and discussion forums are well suited for teaching theory-based content, however the same course design does not translate well to courses that need to teach tactical, problem-solving or collaboration skills. Tung et al. proposed an online platform where students could create and run war-game simulations, followed by submitting written reports and holding video conferences.

Discussion and Recommendations for the Joint Command and Staff Programme

The curriculum for the JCSP RESID and JCSP DL are almost identical in terms of the courses offered. The courses emphasize military operations and operational planning, the study of leadership and command, and an

understanding of the context of defence through national and international studies (Forgues, 2013). Both programs (variants) offer graduate level courses and lead to the DP3 qualification (i.e., Major/Lieutenant Colonel).

In the JCSP DL programme, face-to-face lectures are substituted by readings and recorded lectures. In addition, seminars and face-to-face discussions are replaced by asynchronous threaded discussions with an instructor monitoring and providing feedback. Emphasis is placed on consistent and thorough student participation in order to stimulate effective and thoughtful dialogue. The DL programme greatly benefits from having two residential periods where students can meet each other and participate in learning activities that will promote collaboration, brainstorming and critical thinking. However, additional design components can be introduced to enhance the distance learning course. For example, online simulations can be introduced to promote problem-solving and collaboration (e.g., Bonk & Dennen, 2005; Bonk & Wisher, 2000; Tung et al., 2009), synchronous communication (e.g., video conferencing, live chats) can be used to simulate real-time and face-to-face interaction, and social networking can be used to extend peer networking and sharing of personal experiences linked to informal learning.

1   Introduction

This report explores the different learning delivery systems to identify what kind of learning is best suited for residential in-class learning (e.g., group, seminar and structured modes) and distance learning (e.g., online learning, self-study modes). In particular in-class, distance and blended learning delivery systems are reviewed to identify their strengths and limitations, with regards to their effectiveness to deliver learning that could be applied to Developmental Period 3 (DP3) courses. Because the typical DP3 level student is an officer at a graduate level, particular focus is placed on adult learning at a graduate level in the military setting.

The report begins with a review of influential adult learning theories (e.g., Knowles' theory of andragogy; Bloom's taxonomy, holistic learning) and how they are applied to adult learning. For example, Knowles' theory of andragogy is important in understanding the characteristics of adult learners (i.e., what motivates them; Knowles, 1990), while Bloom's taxonomy is instrumental in course design by providing a hierarchy of learning from shallow learning (i.e., knowledge comprehension) to deeper learning (i.e., analyzing, evaluating, creating; Anderson & Krathwohl, 2001). Other theorists, such as Simons (2009) and Yang (2003), have introduced the concepts of holistic learning, which incorporate learning that occurs outside of formal course curriculum such as through personal experience, friends and peers. Finally, learning styles, which look at personality factors, are also reviewed although they are less commonly applied in the field of adult learning.

Understanding adult learning can then be applied to educational practices and instructional design to develop more effective and engaging course content, especially when using technology as a primary mode of learning delivery. A review of in-class, distance and blended delivery systems highlight that learner characteristics and needs are the same; however they need to be implemented in slightly different ways. For example, delivering content through a combination of text, images, and video, serves to support different learning modalities. In addition, communication and sense of belonging is fundamental for any learning delivery system and must be carefully designed for maximum effectiveness in a distance education setting. Finally, providing assessment and feedback remains fundamental both in terms of helping consolidate learning (e.g., Gikandi, Morrow, & Davis, 2011; Gilbert, Whitelock, & Gale, 2011) and as a means to obtain qualification (Simons, 2009).

The report concludes with a review of the two delivery systems currently offered by the Joint Command and Staff Programme (JCSP) – residential learning (RESID; in-class) and distance learning (DL; online) to identify how educational best practices can be applied to increase student engagement, especially in a distance learning setting.

2   Literature Search Methodology

A systematic review of the literature was conducted in January 2014 to examine the relationship between learning delivery systems and educational practices with a focus on adult learning. The review focussed on:

- Adult learning population (post-secondary and above);
- Influential adult learning theories (e.g., Knowles' theory of andragogy and Bloom's taxonomy – cognitive domain), specifically how adults acquire different levels of learning (surface, deep, strategic);
- Educational practices and instructional design specifically applied to distance learning;
- Research was not military specific, though military examples beyond the Canadian Armed Forces (CAF) were used where appropriate, especially to identify if there are notable differences in learning considerations between military and non-military students; and
- A review of JCSP RESID and DL course curriculums to try to address why the RESID students appear to have a richer learning experience than the DL students (email correspondence, Lisa Williams, 23 Dec 2013).

2.1   Key Words

The following keywords were used to conduct the literature review:

- (adult learning) AND (distance education OR distance learning OR e-learning OR online learning)
- (distance learning OR distance education OR e-learning) AND (classroom OR in-class)
- active learning
- adult learner
- adult learner AND distance education
- adult learning
- adult learning AND curriculum
- adult learning AND learning delivery
- andragogy
- Bloom's taxonomy
- classroom OR in-class
- deep learning
- depth of learning
- distance education OR distance learning OR e-learning OR online learning
- distance learning OR distance education OR e-learning
- educational practices AND adult learning
- educational practices in distance education
- holistic learning
- instructional design
- learning delivery
- learning modality OR learning modalities
- level of learning
- massive online open courses
- military AND curriculum
- social media AND informal learning

2.2   Databases

The following databases were examined:
- PsychINFO,
- Google Scholar, and
- Academic Search Complete (EBSCO).

2.3   Inclusion and Exclusion Criteria

This review included studies that:
- addressed adult learning (post-secondary and above), and
- primarily focussed on peer reviewed articles.

This review excluded studies that:
- addressed learning in children (pedagogy),
- were non-peer reviewed, and
- focussed on understanding and assisting learners with learning disabilities.

3 Adult Learning

This section provides an overview of adult learning theories and educational practices as a foundation for understanding how adults learn.

3.1 Adult Learning Theories

Particular focus is placed on different perspectives of adult learning in order to provide an overview of different facets that influence learning and ultimately instructional design. Knowles' theory of andragogy has had a strong influence in the field of adult education because of its focus on adult self-determination and motivation to learning (e.g., Elwood, Wilson, & Bates, 2009; Forrest & Peterson, 2006). Bloom's taxonomy of learning objectives does not place an emphasis on adult learning characteristics, but is nonetheless one of the most influential theories of learning because it connects different levels of cognition with different forms of teaching (Byrnes, 2001). In other words, it connects what needs to be taught with how it needs to be taught, regardless of the level of learner. Gagné's conditions of learning theory incorporates the concept of learning taxonomies, similar to Bloom, but also introduces the concepts of instructional events and the conditions of learning, similar to Knowles (Driscoll, 2000). Simons (2009) and Yang (2003) have introduced holistic concepts of learning. Simons (2009) expands the on the formal conditions in which learning occurs to introduce hidden or informal learning which is obtained from interactions with others and life events. Yang (2003) not only emphasises previous experience as a type of implicit learning but also introduces an emancipatory or affective component of knowledge which is value-laden. Other learning theories: Gardiner's multiple intelligences (1985), learning modalities (Barbe, Swassing, Dunn, & Dunn, 1985, as cited in Guild and Garger, 1998), and Kolb's experiential learning (Kolb, 1984) focus on individual characteristics which define a preferred style of learning. While these theories highlight preferred learning styles based on individual characteristics, they are not often used in instructional design (Kolb, Boyatzis, & Mainemelis, 2001).

3.1.1 Andragogy

Andragogy has emerged as one of the dominant frameworks for teaching adults in the past 40 years (e.g., Beder & Carrea, 1988; Lawson, 1997; Merriam & Brockett, 1997; Pratt, 1998; Rachal, 2002). Beginning in the 1920s, when adult education started to be systematically organised, teachers identified that adults required a different style of instruction than children (Knowles, 1980). The traditional teaching of children (pedagogy), which included transferring of facts from the teacher to the student, assigned readings, quizzes and memorization was not sufficient for adult learning, and school drop-out rates were high (Knowles, 1980). Knowles observed that adults needed to understand the reasons for acquiring new knowledge and skill and they needed to be able to apply this new knowledge in practical and tangible ways that were relevant to them.

A basic principle of andragogy is the involvement of learners in planning their own learning activities with the teacher serving as a procedural guide and content resource (Knowles, 1980). In terms of evaluation of learning, adults should not feel judged by another adult, but should be guided to understand their learning gaps and how to address them in a self-directed way. Focus is also placed on practical application of knowledge or skill and empowering learners to apply their learning to their day-to-day lives (Knowles, 1980).

Knowles (1980) touches on motivation by stating that adults are driven to engage in learning to the extent that they perceive a need to learn and obtain an objective through this learning. To that extent, they will use the resources available, including teachers, peers, books, learning materials, as long as they are relevant to their

needs. Knowles does not discriminate between, adult learner needs across vocations, in terms of their needs and motivation to learn. The content of learning for different specialisations may be different but the source of motivation will be the same.

Knowles' principles of adult learning are very much driven by self-determination, where certain conditions need to be put in place for optimal adult learning (e.g., Elwood et al., 2009; Fry, Ketteridge, & Marshall, 2009; Guibaud, 2007). These conditions must be created in an environment of mutual respect and freedom of expression between teacher and learner, the learner's goals must be aligned with the educational goals, the learning process makes use of the existing experience of the learner, and the learners have a sense of progress towards their goals. When designing an adult curriculum, rather than stating "What the course is all about" the focus needs to be "What are you hoping to get out of this course?" (Knowles, 1980, p. 54).

In the early stages of research on the differences between how adults and children learn, Knowles (1980) noticed that it was not fitting to separate pedagogy (how children learn) from andragogy (how adults learn) but rather the two models are better applied when seen as two ends of a spectrum. In other words, the pedagogical model may be suitable in some circumstances (i.e., when acquiring knowledge) and not in others (i.e., when applying a skill in new context).

Although andragogy continues to be a powerful influence in the field of adult education (e.g., Feuer & Gerber, 1988; Knowles, Holton, & Swanson, 1998; Lawson, 1997; Merriam, 1987), it is not without its critics. Most notably, there have been few studies that have been able generate consistent results with regard to the effectiveness of andragogical principles in instructional design (e.g., Strawbridge, 1994; Weinstein, 2002; Williams, 2001). The majority of research in andragogical principles tends to be descriptive and qualitative, making the results difficult to reproduce (e.g., Long, Hiemstra, & Associates, 1980; Rachal, 2002, as cited in Elwood et al., 2009; Williams, 2001,). One of the reasons for the inconsistency of empirical data is that there is ambiguity in its definition and confusion in its use (Holmes & Abington-Cooper, 2000; Rachal, 2002).

3.1.2   Bloom's Taxonomy of Learning

Where Knowles defined the conditions that influence adult learners, such as self-determination and a learner-centered approach, Bloom focussed on defining the process of acquiring information in terms of a hierarchy of learning.

Bloom's taxonomy is one of the most commonly cited and widely applied theories of learning (e.g., Byrnes, 2001; Forehand, 2012; Wruck, 2011). The taxonomy is popular because it provides a hierarchy of acquiring knowledge and skills in a way that can be used by educators to classify learning and develop objectives. Eventually, this framework became a taxonomy of learning consisting of three domains: cognitive, affective and psychomotor.

The cognitive domain involves knowledge and the development of intellectual skills (Bloom, 1956). This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. There are six major categories: knowledge, comprehension, application, analysis, synthesis and evaluation. The categories can be thought of as sequential degrees of complexity, such that the first one must be mastered before moving to the next one.

The affective domain (Krathwohl, Bloom, & Masia, 1973) is concerned with the way we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. Similar to the cognitive domain, the affective categories are organised from the simplest to the most complex behaviour beginning with receiving (willingness to receive information), responding (becoming involved in doing something),

valuing (committing to something because of its worth), organising (organising a set of values), characterising (integrating values onto a total philosophy of acting; Bloom & Masia, 1964).

The psychomotor domain (Simpson, 1972) includes physical movement, coordination, and use of the motor-skill areas. Simpson (1972) proposed the following levels: perception, set, guided response, mechanism, complex overt response, adaptation, and origination. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution.

3.1.3   Conditions of Learning

Gagné's theory of instruction combines Bloom's affective and psychomotor domains into one classification (Driscoll, 2000). The affective domain becomes *attitudes*, in which a learner will chose a personal action based on internal states of understanding and feeling, such as choosing to respond to incoming emails within twenty-four hours. The psychomotor domain becomes *motor skills* requiring the use of the body to execute a task, such as performing surgery. Gagné's theory also proposes a learning hierarchy where a set of component (i.e., modular or simple) skills must be learned before the complex skills of which they are part can be learned (Gagné, 1985). These components, or prerequisites, are identified by doing a task analysis of a learning task.

In addition, the theory outlines nine instructional events and corresponding cognitive processes. These events provide the necessary conditions for learning and serve as the basis for designing instruction and selecting appropriate media (Gagné, Briggs, & Wager, 1992). The events are outlined below:

1. Gaining attention (reception),
2. Informing learners of the objective (expectancy),
3. Stimulating recall of prior learning (retrieval),
4. Presenting the stimulus (selective perception),
5. Providing learning guidance (semantic encoding),
6. Eliciting performance (responding),
7. Providing feedback (reinforcement),
8. Assessing performance (retrieval), and
9. Enhancing retention and transfer (generalization).

Gagné was influenced by Bloom by firstly proposing a taxonomy of learning outcomes (Driscoll, 2000), followed by the concept learning hierarchies, and finally introducing the concepts of instructional events and the conditions of learning, similar to Knowles.

3.1.4   Learning Styles

The following set of learning theories: Gardiner's multiple intelligences (1985), learning modalities (Barbe, Swassing, Dunn & Dunn, 1985, as cited in Guild & Garger, 1998), and Kolb's experiential learning (1984), all focus on individual characteristics which define a preferred style of learning.

Gardner (1985) introduced the idea of multiple intelligences which expanded upon traditional measures of IQ, which largely focus on linguistic and logical modes of thought processing (e.g., Spearman's two factor intelligence theory, 1904; Gardner, 2004). He postulated that an individual holds multiple intelligences that include linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, intrapersonal and interpersonal aptitudes (Gardiner, 2004). Gardner (1985) argues that individuals have a unique combination of strengths and weaknesses in these seven domains (Gardner, 2004).

Similar to Gardner's multiple intelligences is the concept of learning modalities or learning styles. Learning modalities are defined as three senses by which students are naturally predisposed to receive information: visual (remembering concepts best when recalling a page from a textbook or an image), aural (remembering information by listening, reading aloud, or playing music), and tactile/kinesthetic (remembering information from touching or handling objects; Barbe, Swassing, Dunn & Dunn, 1985, as cited in Burke & Garger, 1998). While both children and adults may have preferred learning styles, most research on instructional design activities related to multiple intelligences and learning modalities has focussed on children (Burke & Garger, 1998).

It is important to note that both Gardner's theory of multiple intelligences and learning style theories have had critics, including Gardiner himself, who states that moulding the educational curriculum to fit individual learning characteristics needs to be carefully balanced with content that is being taught (Gardiner, 1985).

Finally, Kolb's (1984) theory of *experiential* learning emphasizes the central role that experience plays on the learning process. He defined experiential learning as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 41). Kolb defines a four stage learning cycle which consists of: two modes of grasping experience - concrete experience (CE) and abstract conceptualization (AC); and two modes of transforming experience - reflective observation (RO) and active experimentation (AE). Information is first acquired by having concrete experiences, which are then transformed into abstract concepts from which new implications are drawn. When grasping experience, some learners prefer reflective observation, such as observing others do a task first or reading information, while others prefer active experimentation, or learning while doing a task. As we experience different learning activities, we develop a preferred way of grasping information, or what Kolb referred to as a *learning style*.

Rather than being used for instructional design, Kolb's theory has been most closely associated with understanding personality types, (e.g., Myers-Briggs Type Indicator), educational specialization or professional career choice (Kolb et al., 2001). For example, people who are primarily *diverging* in their learning style tend to choose professions in social service, arts and communication, whereas people who have a primarily *assimilating* style tend to gravitate towards sciences, information or research (Kolb et al., 2001).

3.1.5   Holistic Learning

The final approaches to learning that will be reviewed fall under the *holistic* learning category: Yang's (2003) theory of holistic learning and Simons' (2009) approach to holistic learning.

Yang (2003) proposed a holistic learning theory to address the fact that existing adult learning theories and conceptualizations tend to narrowly define knowledge and learning. Yang posits that learning consists of three indivisible facets: explicit, implicit, and emancipatory knowledge. Explicit knowledge refers to content or information that is transmittable in formal and systematic format. Theories, models, and formulas in textbooks are examples of formal learning. The implicit facet is the behavioural component of knowledge that denotes implicit knowledge that is not openly expressed or stated. This implicit knowledge is gained through the accumulation of knowledge, skill, attitudes and insights from daily experiences and exposure to the environment (Coombs & Ahmed, 1974). Implicit knowledge can be viewed as the submerged part of an iceberg and denotes personal, context-specific familiarity, or accumulated experience that serves as the foundation of deeper knowledge, but is not something that we articulate. The emancipatory facet is the affective component of knowledge and is reflected in affective reactions to the outside world. Emancipatory knowledge is value-laden and reflects how we perceive people and situations. Hence, rather than developing a hierarchy of learning or proposing different learning styles, Yang posits that all of the three facets are present in all adult-learning processes, even though not all of them need to experience a change (Yang, 2003).

In response, Simons (2009), defines holistic learning as acquiring knowledge, skills and attitudes from any source – formal, non-formal, and informal (La Belle, 1982). Formal learning is the deliberate setting of learning objectives by an external source, such as an instructor. Informal learning occurs where the learner controls the objectives of learning, but not the means of instruction. For example, the learner may decide that they need to obtain more information on a particular topic and seek out ways to obtain that information. Self-directed learning occurs when the learner controls the objectives and the means of learning, without the assistance of the educator (Schugurensky, 2000). Simons also introduces the term hidden learning (Simons, 2009) to identify learning that occurs outside of formal learning. Hidden learning includes non-formal learning, which results from activities influenced by the institution, but which are not directly related to the curriculum, self-directed learning, and informal or incidental learning.

As the next section will show, instructional designers have often combined multiple theories of learning, whether explicitly or implicitly, in order to identify design elements to be used in adult instructional design.

3.2   Adult Learning and Educational Practices

This section explores the different learning theories and how they have been used in instructional design. Given the diverse personal attributes of adult learners, a variety of strategies can be leveraged in the design and development of adult instruction.

3.2.1   Andragogy

In addition to theories of learning motivation, Knowles (1990) proposed an instructional model based on a set of six assumptions, which underline the characteristics of learners. Table 1 shows the six assumptions and how they apply differently to the pedagogical and andragogical models. Examples of different instructional approaches are also included.

Table 1: Characteristics of Learners (Knowles, 1990).

Assumption of learning	Characteristics of Learning
Need to know	Adult learners need to know why they are doing something before they spend time engaging with the subject.
Concept of the learner	Instructor supports the learner towards developing increasing self-directed behavior.
Role of the learner's experience	Adults bring their own knowledge and experience. *Experiential teaching techniques are most effective, such as laboratory experiments, discussion, problem-solving cases, simulation exercises, etc.*
Readiness to learn	Adults learn when they experience a need to learn, such as when they are faced with a real-life task or problem. *Learning programs should be organised around "need to know" activities and sequenced according to the learners' readiness to learn.*
Orientation to learning	Adults are oriented around gaining practical skills. *Learning experiences should be built around developing skills and knowledge that will help the adult learner perform a particular role.*
Motivation	Adults respond better to internal motivators (e.g., job satisfaction, self-esteem, quality of life).

In addition to andragogical principles, andragogical process design elements need to be incorporated as part of curriculum design in order to organize the learning process and enhance the practice of adult education (Darkenwald & Merriam, 1982). The design elements are outlined in the table below (Table 2; Knowles, 1990).

Table 2: Design Elements Applied to the Andragogical Approach to Learning

Design Element	Andragogical Approach to Learning
Preparing the learner	Instructor needs to set expectations, prepare students for participation, develop realistic expectations and supply information in a timely manner
Climate	Needs to be relaxed, mutually respectful, collaborative, informal
Planning	The lesson plans should be mutually agreed upon between the learners and the instructor
Needs	Learners and instructors need to conduct a mutual assessment of needs
Objectives	Objectives are set by mutual negotiation
Designing learning plans	Learning plans need to be set through mutual contracts, setting learning projects and sequenced by readiness to move to the next step
Learning activities	Activities should revolve around inquiry projects, independent study, and experiential techniques
Evaluation	Evaluation needs to be validated by peers, facilitator and criterion-referenced

Elwood and colleagues (2009) sought to assess which of the six adult learner principles (see Table 1) and eight design elements (see Table 2) are most influential in designing educational experiences specific to adult learners' needs. The study used a sample of four hundred and four graduate students enrolled in five core MBA courses at a large, for profit, private university with campuses located throughout the United States. Using a factor analysis, the results showed that the principles of motivation and design element of setting the learning objectives were by far the most significant factors influencing student satisfaction with course design.

3.2.2 Bloom's Taxonomy

Bloom's taxonomy was originally intended "as a method of classifying educational objectives, educational experiences, learning processes, and evaluation questions and problems" (Paul, 1985 p. 39), numerous examples of test items (mostly multiple choice) were included. This led to a natural linkage of specific verbs with each level of the taxonomy. Thus, when designing effective lesson plans, teachers often look to Bloom's Taxonomy for guidance. Bloom's Taxonomy has endured the test of time because it provides a systematic classification of the process of thinking and learning that consists of a cumulative hierarchical framework (Byrnes, 2001).

When using Bloom's Taxonomy for educational design, most instructional or curriculum designers focus on the cognitive domain (Driscoll, 2000). Bloom's Taxonomy has been applied in a variety of instructional design situations (e.g., Chyung, 2003; Halawi, McCarthy, & Pires, 2009; Robinson & Hullinger, 2008; Wruck, 2011). For example:

- The taxonomy has been used to provide educators with a common language to understand how to design courses, identify overlaps and develop appropriate assessment tools (e.g., Chyung, 2003; Halawi et al, 2009).

- Researchers have also used Bloom's taxonomy as an assessment tool to evaluate student performance in traditional courses versus online simulations (e.g., Boyd & Murphy, 2002; Vidakovic, Bevis, & Alexander, 2003).
- Educators also use Bloom's taxonomy to verify the value of discussion by including a table of verbs which are used to initiate discussion questions. Student responses are then organised into the appropriate taxonomy levels (e.g., Joyce & Weil, 1996; Wong & Wong, 1998).
- The hierarchical organisation of the taxonomy is especially useful when an instructor wishes to move students through a learning process using an organised framework (Forehand, 2005).

A notable change to Bloom's taxonomy was spearheaded by Anderson (2001), a former student of Bloom. With a team of psychologists, instructional designers and testing experts, Anderson revised the terminology, structure and emphasis of the cognitive taxonomy to allow it to be more useful tool for curriculum planning, instructional delivery and assessment (oz-TeacherNet, 2001). The revision of the taxonomy allows it to provide a "clear, concise, visual representation" (Krathwohl, 2002) of the alignment between standards and educational goals, objectives, products and activities. Table 3 shows the revised cognitive domain (Anderson & Krathwohl, 2001).

Table 3: Revised Cognitive Domain and Educational Goals and Activities (Anderson & Krathwohl, 2001)

Revised Taxonomy	Educational Goals and Activities
Creating	Parts are put together in new ways, such as developing theories, hypotheses
Evaluating	Creating critiques, recommendations and reports
Analyzing	Distinguishing between parts by creating spreadsheets, surveys, charts or diagrams
Applying	Concepts are applied to new situations through models, presentations, interviews or simulations
Understanding	Producing drawings or summaries to demonstrate understanding
Remembering	Memory is used to produce definitions, fact charts, lists or recitations

Several studies have also been conducted to attempt to link levels of Bloom's taxonomy and learning outcomes (e.g., Robinson & Hullinger, 2008; Wruck, 2011). Wruck (2011) conducted a study applying the six levels of cognition based on Bloom's cognitive domain: (a) knowledge, (b) comprehension, (c) application, (d) analysis, (e) synthesis, and (f) evaluation to assess how different computer-mediated communication (CMC) strategies can be used to promote higher order thinking. The CMC strategies were: (a) read and respond, (b) scenario, (c) case study, (d) controversy/debate, and (e) search and critique. A total of four hundred and ninety one responses were selected from four online courses in a doctorate business program. The findings showed that the learners achieved the application level (Bloom's level 3) when responding to four of the five CMC instructional strategies controversy/debate, case study, scenario, and search and critique. Learner responses achieved comprehension (Bloom's level 2) when responding to read and respond instructional strategies. Only 4% of the learner responses achieved Bloom's higher order cognitive level of synthesis or evaluation. Hence, the study showed that the CMC strategies were largely not adequate to elicit the higher levels of cognition that would involve critical thinking skills.

Similarly, Jin and Jeong (2013) conducted a study to examine Bloom's the six levels of cognitive domain exhibited as part of a threaded discussion in a structured online debate consisting of: argument, critique, evidence, and

explanation. Jin and Jeong assessed thirty three graduate students enrolled in an online entry-level course. Chi square tests indicated that higher levels of learning were most likely to be exhibited in critique and argument postings. Message–response exchanges ending with critiques or starting with argument messages were most likely to elicit higher level responses.

3.2.3   Conditions of Learning

Gagné's conditions of learning are a useful tool for instructional design because it stipulates several different types or levels of learning, each of which requires different types of instruction. Gagné suggests that learning tasks for intellectual skills can be organized in a hierarchy according to complexity: stimulus recognition, response generation, procedure following, use of terminology, discriminations, concept formation, rule application, and problem solving (Gagné et al., 1992). The primary significance of the hierarchy is to identify prerequisites that should be completed to facilitate learning at each level. Gagné et al. then mapped these prerequisites to nine events of instruction, outlined below (Driscoll, 2000)

These events of instruction are:
1. Gaining attention. Related to motivation, this requires the instructor focussing the attention of the learner to the task at hand.
2. Informing the learner of the objective. This requires the instructor to set expectations related to the learning activity, such as stating the learning goals.
3. Stimulating recall of prior learning. This allows learners to build on previous knowledge and created dependencies in content. In the case of adult learners, who bring knowledge gained from personal experience, they can simply be asked to reflect on personal experience and how that related to the information being taught.
4. Presenting the stimulus. The stimulus must be demonstrated in a way that is consistent with the knowledge or skill being taught. For example, knowledge learning can consists of a textbook chapter or presentations, skill learning can be stimulated through a demonstration or role play, and attitudinal learning can be modelled.
5. Providing learning guidance. Related to the concept of scaffolding, providing guidance needs to be tailored to learner needs. Advanced learners in a topic might just require guidance or coaching, while more novice learners would require specific guidance.
6. Eliciting performance requires the learner to produce an appropriate indicator of what is leaned and is used to gauge progress.
7. Providing feedback. Feedback is provided incrementally in order to assist the learner in making improvements.
8. Assessing performance in this context is similar to summative feedback, where performance is assessed at the completion of a learning activity where grades are assigned, such as through tests, projects, portfolios, skill demonstrations, etc.
9. Enhancing retention and transfer. Related to higher level cognitive thinking and attitudes, this event seeks to instil long-term learning through skill application in a new or unrelated setting.

3.2.4   Holistic Learning

Instructional design methodologies based on sound theoretical frameworks continue to be rather sparse (e.g., Forbes, 2003; Miller, 1999; Scott, 2010). One of the more comprehensive instructional design methodologies has been proposed by Simons (2009). Simons conducted a study using military personnel to identify the effect that holistic learning (formal, non-formal, informal, self-directed, and incidental learning) had on the professional development of twenty nine mid-career military officers. It involved a detailed study of their participation in a

seven-month course at the New Zealand Defence College. The study included observations, interviews, questionnaires, focus groups and document analysis.

Simons identified that there is a relationship between learner empowerment and increased holistic professional military development. He identified the need for institutions to allow students to learn skills in a way, and at a pace, that suits their preference - hence, the need to allow learners to be more self-directed. Simons also identified that the student's perception of value - to achieve qualification (exchange value) or professional development (practical value) - to be a strong determinant in the student's level of motivation towards his or her learning. Hence summative assessment (e.g., tests, exams, essays, etc.) as a means of obtaining a university qualification (exchange value) and future work (practical value) continue to be important motivators.

Simons' recommendations are to incorporate cognitive agility (learning how to think and more importantly how to think critically) and holistic understanding of the profession with existing content-centric syllabi in order to maximise student motivation and learning. Curricula and assessment tools need to be designed to measure the skills taught, not just the ones easiest to assess (Anderson, 2002). As an instructional design methodology, Simons proposes the development of a *relational matrix* that monitors the linkages between syllabus objectives (formal learning) and intangible curriculum outcomes (informal learning) through a multitude of learning activities, such as discussions, visits and other deliverables (Martinez, 2008). Each learning activity is further broken down into component parts that are designed to capture holistic learning in a more structured format. The matrix proposed in Figure 1 targets holistic learning and cognitive agility.

Figure 1. *Holistic Learning and Cognitive Ability.*

The messages in Simon's study and the concept of holistic learning echo those in cognitive and constructivist theories. Students need to be provided both formal learning opportunities as a structural component, and activities that promote critical thinking (Rodney, Fox, Kleinman, Moskowitz, & Lauer, 2008). Some of these activities include: complex problem solving, dialectic debates to increase alternative thinking, such as playing the devil's advocate and polemic arguing, thinking hats where learners are asked to think from different perspectives (de Bono, 1970), coloured questions (Rhode & Thame, 1988), and other methods designed to promote critical

thinking. However, Simons stresses that care must be taken to create a safe atmosphere where learners can express their views without fear of reprisal.

While Simons' study is specifically tied to a military curriculum, he admits that many of his findings will resonate with other adult learning environments. This suggests that outside of specialized military training, e.g., field and combat training, teaching academic content to military students, e.g., Professional Studies, is quite comparable to non-military student populations.

3.3   Summary of Adult Learning

The evolution of the learning theories can also be mapped to the evolution of the psychological schools of thought from behaviourism (a cause-and-effect largely linked to acquiring lower levels of learning or rather the transmission of learning from teacher to student – traditional pedagogy), to more cognitive approaches, where the process of knowledge acquisition is taken into account, i.e., higher levels of learning and knowledge retention, (e.g., Gagné and Bloom), to constructivism (i.e., where the holistic needs of the learner are taken into account, and the learner is perceived as an active and willing participant in his/her education, e.g., Bowles, Gardiner, learning modalities, Kolb, Yang, (e.g., Fry et al., 2009; Guibaud, 2007).

Understanding how learning theories can be mapped to instructional design components means that courses can be developed that not only address the facets relevant to adult learning, such as personal characteristics, motivators and needs, but that these facets can also be aligned with course goals or objectives.

4   Learning Delivery Systems

This section will provide a review of learning delivery systems: residential in-class learning, distance learning and blended or hybrid learning, followed by a review how educational practices translate to instructional design methodologies for in-class (e.g., group, seminar and structured modes) and distance (e.g., online learning, self-study).

4.1   Review of Learning Delivery Systems

This section provides a brief overview of the strengths and weaknesses of in-class, distance and blended learning delivery systems. The biggest benefit of in-class learning is the opportunity to have face-to-face interactions with instructors and peers, while its shortcomings are the lack of scalability and opportunity to deliver learning anytime and anyplace (Scott, 2010). Conversely, the exact opposite is true for distance learning. Blended learning tries to address the shortcomings of distance learning by offering in-class components that support face-to-face interaction, while providing course content components through distance education (e.g., flipped classroom, JCSP DL, Masters of Human Rights in International Law program at Oxford, etc.; Hamdan et al., 2013). Properly designed blended learning courses build on deeper learning through the in-class course component that encourages interaction, self-directed learning though problem solving exercises and group interaction (Hamdan et al., 2013). While blended learning delivery may the ideal, some learners may not have an opportunity to attend the in-class portion. Hence, because of their accessibility, distance learning delivery systems continue to gain popularity, although factors such as cost, accessibility and the use of technology still need to be addressed. The biggest challenge with properly implementing distance learning delivery systems is applying the proper instructional design methodology for content delivery, which will be addressed in the section on Designing Effective and Engaging Distance Education Courses.

4.1.1   In-Class Learning

Face-to-face instructor led training is the oldest form of knowledge delivery. It normally involves an instructor delivering a lecture. It is traditionally used to impart introductory knowledge, teach basic skills, build a team and teach social skills (Cennamo & Kalk, 2005). An advantage to face-to-face learning is that it is possible to design and deliver content relatively quickly as there is no technological overhead required. In this forum, the quality of the instructor is paramount. A dynamic and engaging instructor can sufficiently engage the learners (Cennamo & Kalk, 2005). However, in order to maximise engagement in a classroom setting, instructors need to incorporate activities where learners can reinforce their understanding through discussions, worksheets, quizzes, practice and feedback, group projects, presentations, and role-play activities (Cennamo & Kalk, 2005). Good instructors convey enthusiasm, expert knowledge, experience, and context. They are sensitive to the needs of the class, such as being able to answer questions in real time and change the pace and direction of a class based on the participants' responses. In-class activities can also incorporate opportunities for higher order learning through essays, group assignments, discussions and role-play activities. Instructors can also tap into learner-centered needs by assigning projects or problems that are based on the student's real-life needs. As students progress from novice to expert, such as from undergraduate to graduate courses, the instructor's role should move to a more facilitative role where students are encouraged to be self-directed, while the instructor provides guidance and support (Hamdan et al., 2013). Courses that require direct interaction or guidance between instructor and student are best suited for face-to-face instruction, such as laboratory courses in natural sciences or performance courses in the arts (Lyke & Frank, 2010).

The challenge with face-to-face learning delivery systems is their reliance on the instructor's presence, in terms of both cost and availability (Scott, 2010). Another challenge is the lack of scalability (Scott, 2010). Large class sizes limit the options for the activities that the instructors can facilitate and manage. Finally, in-class learning limits accessibility to students who have the time or the means to attend the class in person.

4.1.2 Distance Learning

Distance learning can incorporate e-learning, distance education, distributed learning, online education and Web-based learning (Halawi et al., 2009). Distance education is commonly defined as any form of instruction, teaching or learning situation in which learner and instructor are separated during the majority of instruction (e.g., Collision et al., 2000; Johnson, 2003; Weller, 2002).

Distance learning continues to be a more and more popular learning delivery system because it solves some of the shortcomings of in-class instruction; however, it creates another set of limitations. A well-designed course can be reusable and access a much larger and geographically dispersed learner community (Sitzman et al., 2009). A key benefit of Internet-based instruction can be the unique opportunity offered to adult learners to pursue their studies at their own pace (e.g., Eastmond, 1998; Gibbons & Wentworth, 2001; Scott, 2010). The greatest challenge with distance learning is the lack of face-to-face interaction with instructors and peers (Bersin, 2004).

4.1.3 Blended Delivery Systems

Blended learning is a confluence of in-person and distance learning which has been defined in various ways in the literature. The first definition concerns the blending of instructional modalities, such as using different technologies and activities (Bersin, 2004). The second definition is used to combine different instructional methods such as blending different pedagogical approaches to (e.g., constructivism, behaviorism, cognitivism) to produce an optimal learning outcome with or without instructional technology (Driscoll, 2000; Rossett, Douglis, & Frazee, 2003). The third definition is used to describe a combination of online and face-to-face instruction (e.g., Graham, 2006; Rooney, 2003). According to Bonk and Graham (2006), this third definition more precisely mirrors the historical background of the emergence of blended learning systems and is more commonly applied.

An example of blended delivery is the *flipped classroom*. The flipped classroom consists of a combination of online learning components, such as short video lectures, with in-class time which is devoted to exercises, projects or discussions (EDUCAUSE, 2012). The flipped classroom uses concepts as active learning, student engagement, hybrid course design, and course podcasting. While, currently there is no prescriptive methodology as to how to apply flipped learning model, there are unifying themes identified as the *Four Pillars of F-L-I-P*, an acronym for Flexible, Learning Culture, Intentional Content and Professional Education (Hamdan et al., 2013). The pillars are described below:

- "Instructors endeavour to create *flexible* learning environments where students can interact with each other in ways that best suit them;
- *Learning* culture is shifted from a teacher-centered classroom to a learner centered-approach where in-class time is meant for exploring topics in greater depth and creating richer learning experiences;
- *Intentional* content is a careful review of which knowledge is best gained outside of the group learning space (e.g., conceptual understanding) as opposed to inside group learning space (e.g., procedural fluency);
- *Professional* Educators must know exactly when to shift instruction methodologies, such as from group interaction to individual activities" (Hamdan et al., 2013, p. 5).

The benefit of the flipped classroom is that it allows students to view the video lectures at their own time and pace. The students can then fully prepare for the in-class portion where instructors have more time to interact with students and focus on reinforcing and enriching the learning, and correcting errors rather than lecturing. The instructors function as coaches or advisors, encouraging students in individual inquiry and collaborative effort. Hence, the focus shifts from teacher-led instruction to student-centered learning. The class time becomes a workshop where students can inquire about lecture content, test their skills in applying knowledge, and interact with each other in hands-on activities. Activities can also be student-led, through group projects and discussions (EDUCAUSE, 2012). Teachers who implement flipped classrooms generally report higher student achievement, increased student engagement, and better attitudes toward learning and school (Hamdan et al., 2013). Teachers also report having improved job satisfaction and feeling re-energized by the increased interaction with the students (Hamdan et al., 2013).

There are numerous additional examples of blended learning programs that use a combination of distance and in-class learning. For example, the JCSP DL programme has two residential periods where they apply learning to a number of activities and analyse complex problems (Forgues, 2013) and the Masters of Human Rights in International Law programme at Oxford University[1], consists of a seven-month online course followed by two three-week residential seminars.

Combining features of face-to-face instruction and online components (both synchronous and asynchronous) can greatly facilitate interaction and communication (Carbonaro et al., 2008). In particular, it is beneficial to initiate a learning program with face-to-face interaction with instructors and peers in order to facilitate greater interaction and communication in the online environment (e.g., Carbonaro et al., 2008; Guilbaud, 2007).

4.2 Factors Impacting the Effectiveness of Distance Learning

4.2.1 Costs of Instruction

The review of literature by (Carey & Trick, 2013), suggests that online instruction has the potential to introduce tremendous cost savings as compared to traditional face-to-face delivery model. Some of the benefits of online course delivery are that they are that they are developed centrally and can be reused as often as necessary. However, while the claims of costs savings seem self-evident, there is remarkably little empirical literature that documents the costs of online education relative to face-to-face education (Bates & Sangra, 2011; Carey & Trick, 2013). In fact, costing studies often show that introducing new digital technologies into higher education often costs more than traditional methods of education delivery (Guri-Rosenblit, 2005; Ramage, 2005). This is not to say that the cost of distance education is necessarily higher overall; however, there are costs associated with delivering online, digital content that are different than those of traditional instructional delivery that need to be considered.

One of the primary barriers to doing a cost analysis is defining which costs are to be included and over what period of time. For example, Bates and Sangra (2011), highlight that institutions need to put in place operational procedures for tracking costs, and for using that data for both strategic and day to day decision-making, especially with regard to measuring the effects of technology investment on teaching and learning. Several researchers have tried to identify the costs associated with development and delivery of distance educational courses with mixed results as to the cost benefits. For example, Ramage (2005) reviewed the cost efficiency of introducing online courses across 12 community colleges in Illinois and found that introducing technology actually increased the costs

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[1] Masters of Human Rights and International Law at Oxford, http://ihrlmst.conted.ox.ac.uk/course-details/modes-of-teaching/

of instruction. Ramage calculated the cost of online courses by looking at actual, direct, fixed, and variable costs as well as other variables suggested in the literature (Rumble, 2001), using the following formula: C1+O+C2+D = Expenditures. Cost category C1 included compensation of management, professional staff, full-time faculty, part-time faculty, clerical, and student/other personnel. The cost category O included operating expenses such as office/instructional supplies, travel, communications, duplication and printing, postage and distribution, contractual services, licenses, and rent. The cost category C2 consisted of capital items defined as equipment that had a useful life greater than one year, had an acquisition cost greater than $1,000, and was owned by the college. The cost category D consisted of development costs usually paid to faculty for developing an online course. Ramage found that the cost of instruction was the most significant cost factor impacting the cost of technology enabled instruction. Given that 78% of all courses were taught by full-time faculty and the median class size was only 14 students, economies of scale, which are potentially the greatest cost savings for online instruction (e.g., Inglis, 1999; Jewett, 2002; Jones & Matthews, 2002; Laurillard, 2007; Ramage, 2005), could not be achieved. However, as Laurillard (2007) points out, as economies of scale are achieved, additional costs are introduced, such as the need of additional staff time for providing personal support and assessment of student work, which is especially relevant in higher level graduate courses. Hence, the labour intensive nature of student support diminishes economies of scale achieved in other areas (Laurillard, 2007). There are however ways to introduce costs savings without compromising support. The Observatory of Borderless Higher Education (OECD-CERI, 2005) conducted a survey of online learning in a small but representative sample of universities worldwide and concluded that most of the universities consulted see the potential cost reduction in online learning. Universities with the best developed online presence state that the initial start-up costs are high, however, over time, the costs can be reduced by applying the following steps:

- Substituting rather than duplicating online services,
- Increasing the re-use and sharing of online resources,
- Increasing peer learning, which helps reduce faculty and instructor time, and
- Introducing more standardized production of materials.

Before identifying where the cost savings could be achieved between old and new methods of instructions, Laurillard (2007) argues that the question that should be asked first is: "Can new technology offer a better way to achieve our objective?" (p. 12). She introduces a cost-benefit modelling tool that needs to take into account not only the potential costs savings, but also potential effect on the learners in terms of level of personalization they can expect and the quality of the learning experience planned. Laurillard highlights that introducing technology enabled learning (TEL) will also impact how students, instructors and administrators spend their time and that a cost-benefit modelling tool needs to incorporate costs in terms of learner, teacher and support staff time for a meaningful period of study time, e.g. a course module, a school week, etc. Finally, technology specific benefits must be properly leveraged, such as encouraging interactivity, creativity and communication, while taking advantage of the economies of scale and reusability.

Neely and Tucker (2010) argue that online education may be more cost effective in some situations; however, without a clear understanding of the costs associated with the entire course design, development and delivery lifecycle, it is difficult to state what, if any costs savings actually exist. Neely and Tucker (2010) state that a more accurate way to understand the cost implications associated with online programs is to *unbundle* the role of the faculty. This sentiment is echoed by Bates and Sangra (2011) who emphasize that a better understanding of the changing role of faculty is important if we are to understand the consequences of transferring increasing amounts of resources to technology supported teaching. While traditionally, the faculty member is responsible for most aspects of course design development, delivery and assessment; the online course requires the faculty role to be distributed amongst several people, which shifts the costs from one faculty member to several instructional support providers. In order to control costs and increase benefits to students, it is important to leverage other resources such as instructional designers, web support staff, and project management, and free up instructor time

for more interaction with students (Bates & Sangra, 2011). Figure 2 illustrates the unbundled model (Neely & Tucker, 2010, p. 2).

Traditional Faculty Model

Faculty member
- delivers instruction
- develops and maintains courses and curriculum
- assesses elarning outcomes
- aligns course materials to delivery method
- advises students
- provides unversity service
- conducts research

Unbundled Faculty Model

Course instructor or facilitatator
- delivers instrucction

Curriculum writter and subject mater experts
- design and maintain academic content of courses

Instructor/Graders
- assess learning outcomes

Academic advisor
- advises students and monitors student progress

Instructional designer
- aligns technology and course materials with overall curriculum design

Figure 2. *The unbundling of a traditional instructor role.*

Neely and Tucker's study found that, based on the unbundled faculty model, instructional support cost $3,676 per course, as compared to $8,986 per course, for a traditional faculty member. However, the cost of $3,676, may understate the cost of the online model, because it makes no provision for faculty time devoted to course development and maintenance, or to administrative and university service. It also does not provide for the time of department chairs and lead faculty in coordinating the design, development and implementation of new courses, faculty supervision and training (Neely & Tucker, 2010). Ultimately, Neely and Tucker decline to declare whether online instruction is less expensive, stating that "it is difficult to identify and assign costs for instructional activities in higher education, particularly when comparing the traditional faculty model with the unbundled faculty model" (p. 4).

One of the few studies that suggests a cost savings of online instruction was conducted by Bowen, Chingos, Lack and Nygren (2012; see also Bowen, 2013), who conducted exploratory simulations comparing the costs of two types of traditional teaching models: a large common lecture and a common lecture followed by group discussion, with a simulated costs of a hybrid model. In the hybrid model, the instruction is delivered online followed by face-to-face sessions with part time instructors. The course is overseen by a tenure-track professor (with administrative responsibilities delegated to a part-time instructor). They declined to publish a detailed model on the grounds that it was highly speculative, i.e., it required many assumptions about how a university would manage its online instruction. They did report, however, "the crude models we employed suggest savings in compensation costs ranging from 36% to 57% in the all-section model, and 19% in the lecture-section model" (pp. 25-26). Bowen et al. also speculate additional cost advantages, including:

- Reduced demand for space,
- Scheduling savings,
- Ability to accommodate higher enrolments without increasing the demands on tenured faculty,
- Reduced recruitment costs for new faculty, and
- Reallocation of faculty time towards smaller, more advanced classes.

Hence, as the costing considerations above suggest, it will be difficult to identify exactly what, if any, cost savings exist with regard to introducing an online course without capturing the whole extent of course design, delivery, implementation, maintenance and student outcome factors.

4.2.2   Accessibility

In a study of universities in Australia, Ernst and Young (2012) predicted that digital technologies will transform the way education is delivered and supported. They stress that applications that enable real-time student feedback will continue to close the gap between distance and face-to-face interaction, while increasing the accessibility of learning in remote and regional areas. Similar to Ernst and Young's conclusions, Scott (2010), identified that although learners would prefer a face-to-face environment, external constraints such as immediacy, scalability and the geographical distance between learner and course, are significant motivators for learners to choose an online or blended delivery option.

4.2.1   Technology

With the availability of high speed Internet and advances in video and teleconferencing software, distance education is facilitating more natural communication between instructors and learners. In addition, as learners become more comfortable with computer technology over time, they are more likely to participate in distance courses (Harnar, Brown, & Mayal, 2000).

4.3   Designing Effective and Engaging Instructional Content

This section discusses instructional factors that are fundamental in designing effective and engaging instructional content regardless of delivery system. Particular emphasis is placed on understanding which instructional components best support self-directed and deeper learning, and how those components can be applied to distance or blended learning delivery methods. Instructional components that are important to a self-directed adult learner in a graduate program are methods in which content is delivered using the appropriate medium (Bhowmick, Khasawneh, Bowling, Gramopadhye, & Melloy, 2007), there is opportunity to communicate in a variety of forums, both formally and informally (e.g., Simons, 2009, Madge, Meek, Wellens, & Hooley, 2009; Toland, 2013), and feedback is both informal (i.e., formative) and formal (i.e., summative) (e.g., Gikandi et al., 2011; Gilbert et al., 2011; Simons, 2009). While, proper application of these instructional components is essential, individual factors that may impact learning are also considered.

4.3.1   Content Delivery

Earlier uses of technology in distance learning have followed a content/teacher-centric or push approach to content delivery (e.g., Cuban, 1986; Januszewski, 2001). Tools and methods used in computer-based teaching (CBT) or computer-based instruction (CBI) served mainly to recreate what was delivered in traditional classrooms, such as projecting lectures, providing reading materials and offering a list of frequently-asked questions. There was little interaction between teacher and student except through email, and the information presented was asynchronous (i.e., not in real-time; Guilbaud, 2007). Internet-based instruction supports the perspective that adults are self-directed and solution-focused (Guilbaud, 2007) and the evolution of personal computing, Internet content, and content design software allowed designers to start creating more tailored instructional content that could target many types of learners. Technology can allow multiple learners access instructional material anywhere and anytime as well as deliver richness of content that is not readily available in face-to-face classrooms. Distance learning also allows for rich sources of media to present content dynamically. These media can include:

- Text and images can be used to supports different learning modalities (e.g., visual and auditory), as well as serve to augment instructor delivered content,
- Video and audio, often referred to as multi-media, allows rich content to be presented synchronously (in real-time) or asynchronously (on-demand streaming or downloading content), and
- Virtual worlds, multi-player online games, and simulations can be used to augment reality and test crisis situations in a safe, virtual environment (e.g., Bonk & Dennen, 2005; Bonk & Wisher, 2000; Tung, Huang, Keh, & Wai, 2009).

A study conducted by Bhowmick et al. (2007), found that choosing the appropriate media for learning modules or systems is critical to designing an efficient web-based learning systems or modules. The authors found that the choice of media elements was not relevant for tasks that were perceived as easy or procedural in nature, which is directly related to shallow or superficial learning. However, for tasks that were perceived as more complex and requiring deeper learning, (e.g., discrimination and problem solving skills), a combination of audio, video, and synchronized texts was found to be more effective in terms of learning performance.

4.3.2   Communication

A necessary requirement of effective learning is the ability to communicate with the instructor and peers. Face-to-face communication, as part of in-class education, can include formal, scheduled meetings with professors, and informal chats with students, such as through hallways discussions. However, in a distance learning environment, these types of communication methods need to be addressed differently. For example formal meetings can be replaced with emails for communicating with instructors, and informal or social-type communication can be replaced with discussion boards (e.g., Garrison & Shale, 1990; Kearsley 2000; Roffe, 2004). These two communication methods are also related to different types of learning. Formal communication can be used for formal learning (i.e., directly associated with course curriculum; e.g., Simons, 2009), while informal communication can support informal learning, such as informal discussions with peers (e.g., Madge et al., 2009; Toland, 2013).

Technologies used for communication fall under two categories: synchronous and asynchronous. Synchronous communication refers to two way live communication, such as a phone conversation, teleconference or video conference whereas asynchronous communication occurs independently and non-concurrently without input from its intended audience (Guilbaud, 2007). Synchronous communication such as *live* chats, instant messaging, or videoconferencing can create a greater sense of community amongst the participants due to instantaneous interaction with others; however, a disadvantage is that conversation can degenerate into one line responses, which do not lend themselves to deeper or more reflective learning (Chamberlin & Parish, 2011). In addition, if the group is large, some comments may not get addressed at all (Chamberlin & Parish, 2011). Hence, care must be taken to moderate and manage live chat environments. Synchronous communication is best used for one-on-one discussion between peers and instructors to simulate a real-time or face-to-face communication (Hastie, Hung & Chen, 2010).

Asynchronous communication, on the other hand, can support in-depth communication and deeper learning, by allowing learners to structure and respond to material at their own pace (Tallent-Runnels et al., 2006). Message boards, where learners can both post and offer feedback to other comments/postings are by far the most used (Tallent-Runnels et al., 2006). When using discussion boards as part of formal learning curriculum, care must be taken to define the questions and set expectations for the discussion to guide learners on how to appropriately respond (e.g., length of response, depth of response, research expected, etc.). Discussion can be encouraged by including participation as a percentage of the learners' grade.

4.3.3   Community and Collaborative Learning

Community refers to a group of people who belong to a social unit, such as learners in a class (Picciano, 2002). One of the key features that supports student engagement and collaborative learning is sense of community (e.g., Baturay, 2011; Bloomberg, 2008; Rovai, 2001). Collaboration is key to promoting learning in the online classroom (e.g., Bonk & Wisher, 2000; Conrad & Donaldson, 2004; Weiss, Knowlton, & Speck, 2000). Palloff and Pratt (2001) suggested that collaborative work empowers and engages the learner to the extent that it affects subsequent learning situations. Group exchanges that solicit multiple perspectives and idea sharing are effective learning techniques and learning with peers is key to collaborative learning (e.g., Benbunan-Fich et al., 2005; Conrad & Donaldson, 2004; Kemery, 2000). In addition, a meta-analysis on the effect of online learning on students' education identified that the benefits of online instruction were greater for students where online instruction was collaborative or instructor-directed than in online studies where learners worked independently, i.e., were self-directed (Carey & Trick, 2013).

The classroom community can be defined in terms of two components: (a) social community or the feelings of connectedness among community members and (b) learning community or their common expectations of learning and goals (Baturay, 2011). A sense of community with the instructor and peers has been demonstrated to be much more crucial to the success of online courses and student satisfaction than in traditional courses (e.g., Fulford & Zhang, 1993; Woods, 2002). Defining a student community in terms of social and learning community is important when distinguishing between formal and informal learning. A learning community can be geared towards achieving the formally defined learning objectives of the course; while a social community can be used to support informal learning through peer interaction and sharing of personal experiences.

4.3.3.1 Social Media as a Forum for Informal Learning

Social networking websites (SNW), such as video sharing websites, wikis, blogs, and folksonomies (also known as collaborative tagging or social indexing) where users are increasingly involved in creating web content as well as consuming it have become commonplace and are garnering increasing interest in the field of education (e.g., Ellison, Steinfield, & Lampe, 2007; Selwyn, 2007). Social networking websites such as Twitter and Facebook have begun to be studied as vehicles for informal learning or information exchanges between learners (e.g., Madge et al., 2009; Dabbagh & Kitsantas, 2005; Irwin, Ball, Desbrow, & Leveritt, 2012).

When a Facebook group is established as a peer-to-peer forum in support of a course curriculum it can be a powerful informal learning tool (e.g., Madge et al., 2009; Toland, 2013). Facebook can be used as a learning tool to help students reach their academic goals by supplementing formal learning with informal learning. For example, a study conducted by Irwin et al. (2012) found that students were using Facebook to enhance communication and interaction between students and course instructors. A similar observation could be made based on an interview of a student enrolled in a multi-disciplinary degree program, Masters of Human Rights in International Law at Oxford (Student Interview, January 27, 2014). The program is geared towards working professionals with a substantial experience in their field and students are enrolled from all over the world. The course is a blended delivery system consisting of a seven-month online course followed by two three-week residential seminars[2].

The online course component has two modes of discussion: structured discussion forums that are mediated by the instructor and a Facebook page. The structured discussion consists of an instructor posing a question or a problem to which participants are expected to respond using a series of short discussions. This type of forum supports

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[2] Ibid

formal learning and is linked to a course curriculum. The second mode of discussion is through a Facebook page that has been created by current students and alumni. The Facebook is used as a forum to post ideas and share personal experiences on topics related to human rights law, but not necessarily directly linked to the course curriculum. According to the student interviewed, peers share information on personal experiences related to human rights issues. In addition to sharing experiences, students have access to course alumni who can provide advice on dissertation topics, course outcomes and anything related to student expectations online and in class. The student interviewed stated that it is these informal discussions that can provide support and clarity on selecting a dissertation topic as well as provide an opportunity to network with peers from around the world.

It is important to note that students generally like the use of Facebook because it is a technology that many people are already using and are familiar with (Toland, 2013). When incorporating Facebook as a learning tool, instructors need to apply certain *best practices* in order for students to achieve an optimal learning experience. According to Munoz and Towner (2009), an instructor should do the following:

1. Create a Facebook account that is specific for the course. The instructor can include some personal information and include some references to course related content, such as newsfeeds, websites, podcasts, videos, links to professional associations, in order to initiate student discussion and interaction with the site.
2. Inform students of the Facebook page and leave it open to the learner community. The instructor may chose to invite professional members or alumni to enrich the student experience.
3. Inform students that the instructor will not be viewing students' personal profiles in order to maintain a professional demeanor with students and prevents them from feeling that their *personal spaces* are being invaded.
4. Provide the Facebook page address on the syllabus.
5. Create an icebreaker activity to welcome students, such as posing a question for discussion.

Use of Facebook should be used to supplement formal learning, and not mandated as some students may not wish to be a member of a social network.

Twitter has also been adopted as a communication and learning tool in educational settings like colleges and universities (Sinha, 2013). It has been used as a back channel to promote student interactions (Sinha, 2013). Research has found that using Twitter in college courses helps students communicate with each other and faculty, promotes informal learning, allows shy students a forum for increased participation, increases student engagement, and improves overall course grades (Sinha, 2013).

The challenges with Twitter as a learning tools are the massive amounts of information that can be exchanged with the potential of missing entire conversations by failing to log in at the right moment. Similar to Facebook, students could be encouraged to use Twitter as part of social networking to enhance informal learning, however, not to mandate it as part of formal learning curriculum.

4.3.3.2 Massive Online Open Courses as a way to build Networked Communities

A massive open online course (MOOC) is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance ("Massive Open Online Course MOOC", n.d.). MOOCs often include: lectures formatted as short videos combined with formative quizzes; automated assessment and/or peer and self–assessment and an online forum for peer support and discussion (Glance, Forsey, & Riley, 2013).

The MOOCs teaching methodology is inspired by a connectivist philosophy which values autonomy, diversity, openness, and interactivity (Rodriguez, 2012). Similar to self-directed learning, connectivism teaching strategies

allow an instructor to assume the role of facilitator with learners actively interact with each other (Kop, 2011). Thus, the success of MOOCs relies on learners being self-directed and actively engaged (McAuley, Stewart, Siemens & Cormier, 2010). McAuley et al. (2010) explained that MOOCs use strategies similar to social networking for connectedness but with the added benefit of subject matter experts to facilitate the content and to coordinate a vast array of free, online materials. Students also have the opportunity to engage with others throughout the world with some organizing sub-groups specific to their learning goals and interests.

A literature review of MOOCs by Glance et al. (2013) shows that MOOCs follow sound pedagogical foundations that seem to be comparable to courses offered by universities and face-to-face instruction. For example, MOOCs use formative quizzes to enhance learning by supporting retrieval of information, short video formats with quizzes allow for mastery learning and peer and self–assessment enhance learning. Further claims have been made that short videos complement the optimal attention span of students (Khan, 2012) and that discussion forums provide an adequate replacement of direct teacher–student interactions that would be considered normal for a class delivered on campus.

MOOCs extremely high enrolment rates actually become a barrier to communication and community building. While MOOCs are open to anyone, the number of people in a course can be overwhelming and getting instructor feedback can be next to impossible (Chamberlin & Parish, 2011). The high number of participants can cause synchronous forums to be prone to limited participation, thereby not delivering on the promise of connectedness (Chamberlin & Parish, 2011). It is not surprising then, that although MOOCs have extremely high enrolment rates of up to 160,000 students (Fazackerley, 2012); they also have extremely high drop-out rates. In fact, only 1.7% to 3.5% of students enrolled in a MOOC program actually complete it (Jordan, n.d.). While the massive amount of students enrolled can be one of the contributors, another contributor is related to actually obtaining course credit or diploma. This is because, while active participation is free, course certificates and job placements come with a fee (Coleman, 2013).

Currently, the vast majority of individuals who use MOOCs use them as an informal learning tool to complement their learning, either in the workplace context or for personal interest (EDUCAUSE, 2013). Some of the areas in which MOOCs have been cited as most beneficial include increased options for accessibility and expanded lifelong learning opportunities (e.g., Carr, 2012; Duderstadt, 2012).

4.3.4   Assessment and Feedback

Finally, being able to provide feedback, both in an on-going or formative fashion, and as a final assessment, as part of formal course evaluation, are fundamental in facilitating learning. Gikandi et al. (2011) conducted a literature review on the effect of formative evaluation (used to promote further learning) and summative assessment (assessment of a learner's achievement such as an exam) on student performance in online, blended and in-class delivery systems.

Gikandi et al. (2011) found that online formative assessment can enhance student engagement. Ongoing assessment and interactive feedback engaging the instructor and the learner were identified as important to promote further learning. The types of formative assessment included a variety of online tools such as asynchronous discussion forums, self-test quizzes or knowledge checks, and e-portfolios. Using regular online testing as a form of providing formative feedback improves student performance in summative assessments encourages student learning and reduces exam anxiety. The researchers note, that it is the application of these assessment tools that is more relevant to success rather than the delivery system. For example, immediate feedback, whether provided online or in person is more relevant in consolidating learning than providing delayed feedback (Bowen et al., 2012).

Online summative assessment has been criticised for encouraging superficial learning such as recall of facts and basic applications through the use of structured response questions (Gijbels, Dochy, Van den Bossche, & Segers, 2005; Smith, 2007;). However, if peers are used to provide formative feedback through discussion it can lead to deeper learning (Joordens, Shikinaz, & Pare, 2009). In addition, summative assessment needs to be tailored to the knowledge level being assessed, i.e., using structured response questions may be sufficient to assess factual recall or theory based knowledge, but it is limited in assessing higher order thinking such as analyzing, evaluating and creating (Joordens et al., 2009).

4.4   Learner Factors Impacting the Effectiveness of Distance Learning

Research shows that, on the whole, there do not appear to be significant differences in student outcomes between in-class, distance and blended delivery systems (e.g., Bernard et al., 2004; Carey & Trick, 2013; Cummings, Foels, & Chaffin, 2013; Phipps & Merisotis, 1999; Russell, 1999; Sitzmann & Kraiger, 2006). Where differences do exist are related learner characteristics, external constraints such as work and family, and course factors that can affect learner engagement instructional factors, e.g., access to learning resources, instructors and technological support (Lyke & Frank, 2010; United States Department of Education [USDE], 2010).

4.4.1   Learner Characteristics

Carey and Trick (2013) review of published literature and environmental scan of recent development in the field of online learning identified that, at a postsecondary level, students who are most likely to benefit from online instruction are those who are academically well prepared and highly motivated to learn independently. Learners must also have higher levels of self-efficacy (i.e., a belief in their own ability to reach tasks and complete goals) (Ormrod, 2006) and must have an existing aptitude for the subject matter (Vidakovic et al., 2003). Conversely, students who are not well prepared or do not devote the necessary time to learning are less likely to benefit from online learning, and may perform better in face-to-face learning (e.g., Halawi et al., 2009; Katz, 2010; Robinson & Hullinger, 2008; Simons 2009). Learners must also have a certain level of self-discipline and motivation to willingly engage and remain engaged with self-paced distance education courses. Central to the success of online education are active learners who proactively take charge of their learning (Hiltz & Shea, 2005).

4.4.1.1 Non-traditional Learners

The National Center for Education Statistics (2002) defines a non-traditional student as someone who attends school part-time, is employed full-time, has delayed his or her post-secondary enrolment, is financially independent, has dependents, is a single parent and does not possess a high school diploma.

Non-traditional students perform less well than traditional students in online learning and may require additional support (Smith-Jaggars & Xu, 2010). They argued that poor online performance in community colleges is partly due to characteristics of students (e.g., their life demands). While online drop-out rates in these student populations are high in early college courses, completion rates tend to improve in upper years. The authors argue that this could be due to students gaining more experience with online formats or those who did poorly in online formats switch to face-to-face learning (Smith-Jaggars & Xu, 2010).

4.4.2   Learner Engagement

Learner satisfaction has been linked to learning outcomes in many studies (e.g., Lyke & Frank, 2010; Palmer & Holt, 2009; Smart & Cappel, 2006; Upton, 2006, as cited in Lyke & Frank, 2010). Research shows mixed results with regards to student satisfaction rates between in-class and distance learning instruction (e.g., Lyke & Frank, 2010; USED, (2010), as cited in Carey & Trick, 2013). The inconsistency in data suggests that factors such as relevance of

assignments, access to campus-based resources, availability of technical support, and orientation to the course, can all influence student satisfaction rates (Johnston, Killion, & Oomen, 2005, as cited in Lyke & Frank, 2010; Lyke & Frank, 2010). Availability of the instructor, delays in communication and an inability to read body language are also factors frequently cited as affecting student satisfaction with distance education (e.g., Mason, Helton, & Dziegielewski, 2010; Carey & Trick, 2013).

4.5   Summary of Learning Delivery Systems

As technology advances and instructional design methodologies are used in a more systematic and rigorous fashion, it will continue to challenge the current teacher-centric, classroom based model (O'Driscoll, 2008).

While the fact remains that learners must be self-directed, motivated and enabled to persist in a distance education program, the variety of content delivery mechanisms will continue to provide increased opportunities to engage students and stimulate higher order levels of thinking. Ability to communicate is fundamental in effective learning delivery. First, asynchronous communication allows the learner more time to think critically and reflectively, stimulating analysis, synthesis, judgment, and application. Second, media rich communication promotes thinking. Third, learning communities in online classrooms must be conducive to inquiry and higher level thinking (e.g., Chickering & Ehrmann, 1996; Conrad & Donaldson, 2004; Lorenzo & Moore, 2002). Duderstadt, Atkins, and Houweling (2002) affirmed, "When implemented through active, inquiry based learning pedagogies, online learning can stimulate students to use higher order skills such as problem solving, collaboration, and stimulation" (p. 75).

The following quote captures the best and the worst of online instruction.

> "I started the program with enthusiasm, but I soon felt alone and unsupported. I had no one to impress or disappoint. I struggled to stay motivated. It was impersonal and transactional, and it nearly destroyed my obsession. A face-to-face meeting in a classroom imposes accountability, inspires effort and promotes academic responsibility in subtle ways that we don't fully appreciate. On a campus, students attend class and stay alert because they worry what the teacher will think if they don't. ... In the best online courses, learners connect, collaborate, inspire, discover and create through a myriad of technologies."[3]

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[3] Learning in classrooms versus online (July 25, 2012). http://www.nytimes.com/2012/07/26/opinion/learning-in-classrooms-versus-online.html?_r=0

5 The Military Context in Education

This section explores the use of learning theories and learning delivery systems primarily in the U.S. military setting. Factors such as military culture, military student profile and military education are considered in light of learning approaches, especially in the context of professional military education (PME) programs geared towards senior officers at a graduate level. Examples include developing online learning for a military education and using tactical simulation platforms to develop higher level thinking, cooperation and brainstorming skills.

5.1 Military Education

The key purpose of military education is to be able to apply learning to specialized functions and tasks (Department of Army, 2003). Hence, military learning objectives must be clearly defined in terms of actionable outcomes. While both education and training share the psychological constructs of learning, memory and motivation, there are fundamental differences between the two with regard to goals, outcomes, and eventual application of instruction (Bonk & Wisher, 2000). Education is concerned with the social and intellectual development of the whole person; while military training is concerned with increasing the capacity to perform military functions and tasks (Department of Army, 1990). Although, the majority of military learning is focussed on preparing people to perform certain tasks; at the mid and senior officer level, the focus becomes teaching officers to understand the theory of military tactics that can be applied to solve problems on a much more abstract, conceptual and multi-faceted level. Hence, at the mid to senior officer levels, professional military education (PME) programs become more similar to graduate professional degrees, such as Master of Business Administration, Master of Public Administration, etc. Officers must obtain the training required to be leaders in the field and must be well-educated strategic thinkers in order to understand how all the pieces fit together, from global politics and grand strategy, to logistics and the global community (Johnson-Freese, 2012). The challenges that distance learning PME programs are faced with are similar to graduate level education programs offered in non-military institutions, which is developing an educational strategy to impart high-level critical thinking and problem solving skills to an adult audience, with competing demands for time, and often in geographically dispersed settings.

5.1.1 Military Education and Instructional Design

A key requirement in military education is providing distributed learning environment that supports interaction and collaboration (DUSD, 1999). This need for team-based problem solving and learner interaction has highlighted the need to develop military curriculum that is more closely aligned with a learner-centered, constructivist learning approach (DUSD, 1999).

5.1.1.1 Simulations and Gaming

Use of simulations and games are ideal forums that can be leverage to provide a distributed learning environment that is conducive to interaction and collaboration. The military is one of the largest users of simulation and training exercises as a way to develop tactical and critical thinking skills (e.g., Bonk & Wisher, 2000; Catanzano, 2011). This is not surprising as military activities are both high-stakes and potentially very expensive. Examples of collaborative learning in a distributed learning environment have been battle simulations (Depth and Simultaneous Attack Battle Lab [D&SABL]) at the Field Artillery School, which support collaborative operations between military decision makers and the students (Siegel, Burton, Barnette, Ross, Ross, & Klinger, 2000), and role playing of various staff

positions in a virtual tactical operations centre (e.g., Armor Captains Career Course; Bonk & Wisher, 2000). In the Captains Career Course, collaboration occurs both through a live audio connection and online chats.

5.1.1.2 Use of Social Media

The military has not been immune to the influence of technology and social media on learning there has been a definite trend to incorporate technologies that enable opportunities for self-directed learning, collaboration and interaction between learners and instructors into the military curriculum (Thomas & Seely-Brown, 2011). Instructional approaches that recognise students as active an engaged participants in their own learning are being adopted and the use of networked and mobile learning platforms is being leveraged to allow networking with instructors and peers and share learning with each other (Air Education and Training Command, 2008). Catanzano (2011) reported that a combination of new technologies and emerging trends in learning, including the widespread use of social media, Service Oriented Architecture (SOA), which is a set of principles for designing common functionalities within multiple systems as interoperable services (such as enabling the sharing of databases), cloud computing, and data analytics, will continue to provide richness and improvements in simulation technologies.

5.1.1.3 Making Classroom-based Learning More Engaging

While examples cited above are primarily related to military training, Tung et al. (2009) developed a simulation to identify how the online courses can be modified to match the student engagement of classroom-based learning. Tung et al. (2009) reviewed the online and in-person components of the Taiwanese advanced military education (AME) training course (Taiwan Yearbook, 2007). In order for an officer to be promoted to colonel or major general, he/she must first undergo AME training (Taiwan Yearbook, 2007). The goal of the AME program is to educate commanding officers in the tactics required for joint combat operations. Due to work responsibilities, many of these students must take a hybrid course where the majority of their learning is online. The authors found that self-directed learning was effective in theory courses such as National Security and 'War Theory; however, the asynchronous self-learning method was less effective with courses which required more frequent interaction amongst officer students such as Joint Operations. While to goal of the on-campus course was to develop cooperation and brainstorming skills, this was not achievable in the online AME forum. Table 4 identifies the main differences between the on-campus and correspondence program for Joint Operations.

Table 4: A Comparison between On-campus and Online Joint Operations Course Considerations in the Taiwan Military

Course considerations	On-campus activity	Online program activity
Learning style	Interactive war games designed to teach firepower management and response to contingency conditions; obtained though coordination and interaction among commanding chains.	Writing reports.
Learning effectiveness	Interactive games are followed by on-campus discussion and review. Sharing the experience acquired from joint operations in the after-action review meeting increases the learning effectiveness of the students.	Instructors and students communicate mostly through email. Shared experience is not achieved.
Learning participation	Instructor plays the role of director and students select from the various commander and staff members to participate actively in the war game.	There is no participation with officers and interaction with other students.
Learning	Based on interactive war games.	Decision support model without

materials	any actual case studies.

To try to overcome this gap, Tung et al. (2009), proposed the use of the Distance Learning for Advanced Military Education (DL4AME) system. The DL4AME system uses analytical simulation models, videoconferencing and after-action review discussions between the instructor and officer students to facilitate higher level thinking, cooperation and brainstorming skills. The DL4AME is hosted on a Petri-Net platform, which is a graphical and mathematical modelling tool for the description and analysis of concurrent processes which arise in systems with many components (distributed systems; Petri & Reisig, 2008). The Petri-Net platform is composed of instructor component, student components, e-learning servers, video conference system, and an email system.

Using the DL4AME model, the instructor can plan war game exercises and assign missions to individual students. Students can then develop their own scenarios and plan operations through the DL4AME interface. For each case study, students can choose an appropriate DL4AME model. After performing the simulation, each student may check the simulation results by comparing it with their tactical judgments. They can also revise the parameters and repeat the simulation until they are satisfied with the results. Students can then write their reports according to their own simulation results. Once the reports are submitted, the instructor holds an asynchronous video conference with other students to discuss the simulation results. Thus, it is possible to recreate the cooperation and brainstorming of the on-campus course in an online environment (Tung et al., 2009). Figure 3 shows the teaching flow of the Joint Operations course delivered through DL4AME.
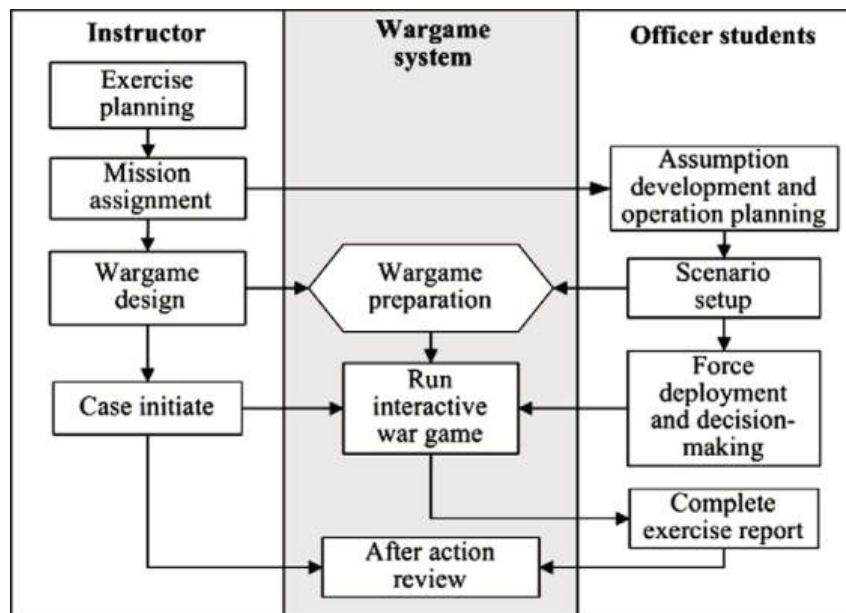
Figure 3. The teaching flow of the Joint Operation course used in Taiwanese military education.

Instructional design methodologies that emphasize experiential learning (e.g., Knowles, 1990; Gagné, 1985), as well as communication and social learning are important to military education and training because of the extensive interpersonal interaction involved, particularly in the context of team performance and the importance of developing leadership skills at all levels of command (Modrick, 1986).

5.2   Military Students

Understanding the military student can make a difference in the instructional setting (Smucny & Staver, 2013). In many ways, military students are not much different from non-military students in terms of their approach to learning (e.g., Simons, 2009; Wiarda, 2011). However, military students also have unique challenges associated with where they work (such as remote areas where access to the Internet may be limited or non-existent), work schedules, travel, and contract requirements (Smucny & Staver, 2013). Military students are disciplined and have a strong sense of duty. They operate in a well-defined hierarchy, their focus is on their mission and they often work in high stress environments (Soeters, Winslow, & Weibull, 2006). These characteristics translate to students that are respectful, follow instructions, and observe deadlines (Soeters et al., 2006).

The key difference between military and non-military courses is that military students must complete specific courses if they expect to be promoted. Since promotion is a key incentive for military students to take courses, this can provide an additional motivation to complete their courses (Tung et al., 2009). Active-duty military frequently have heavy demands on their work schedule, with those in combat zones under particular stress. Being aware of the demands that military students face is important for instructors. Instructors should demonstrate flexibility, maintain academic rigor, and expect hard work from the military learners in their courses. Instructors should also familiarize themselves with specific aspects of military culture, including the military language (i.e., terminology and acronyms) as well as basic structural organization (Smucny & Staver, 2013).

An important aspect to consider when designing graduate programs for senior officers is their age demographic. Many officer students at the lieutenant colonel or colonel rank are in their early forties (Wiarda, 2011), which may be a consideration with regards to introducing new technologies into the distance learning curriculum. For example, instructors may wish to provide additional guidance and support when introducing a social media platform.

5.3   Summary of the Military Context in Education

As adult learners, military students need to find content relevant to their own lives, personal experience, and career plans. In introductory and general education courses, instructors should use students' everyday experiences (e.g., in military training, deployments) as instructional tools or examples to illustrate and apply course concepts. Using adult learning principles, instructors should engage military learners by creating assignments and online discussion topics that encourage reflection on educational concepts and applying real-life experiences. In upper-level classes, case studies relevant to military themes are useful in exploring foundational theory (Smucny & Staver, 2013). The use of formal discussion groups and informal learning forums such as social networks can support engagement, interaction and informal learning.

The challenge, with distance learning in the military, as in any other profession that needs to teach higher level thinking, cooperation and quick action, is translating that to an online learning platform. However, as evidenced by Tung et al. (2009), it is possible to use simulations and virtual role-play exercises to elicit a more active level of learning. However, even with this type of learning, the use of discussion and feedback are critical to consolidate the learning.

6   Discussion and Recommendations

This section presents a review of the JCSP RESID and DL programmes. Instructional design recommendations are provided to increase student engagement with the DL.

6.1   Overview of the Joint Command and Staff Programme Residential Learning Curriculum

The curricula for the JCSP RESID and JCSP DL are almost identical in terms of the courses offered. The courses emphasise military operations and operational planning, the study of leadership and command, and an understanding of the context of defence through national and international studies (Forgues, 2013). Both programs (variants) offer graduate level courses and lead to the developmental period (DP) 3 qualification (i.e., Major/Lieutenant Colonel).

The JCSP RESID programme is presented on-site, and includes a series of interactive, seminar style learning activities. The course uses lectures, case studies, and small group discussions to explore the theory of command, the command environment, decision-making, negotiating, and legal constraints in order to enhance students' overall capacity to command. Participants apply tools to resolve command challenges, and subject matter experts provide evaluation and feedback based on experience and published research. Assessment is by participation in seminars and discussions, practical exercises, simulation, and a written essay (Forgues, 2013).

In the JCSP DL programme, face-to-face lectures are substituted by readings and recorded lectures. In addition, seminars and face-to-face discussions are replaced by asynchronous threaded discussions with an instructor monitoring and providing feedback. Emphasis is placed on consistent and thorough student participation in order to stimulate effective and thoughtful dialogue. Students, instructors and defence staff are required both to contribute to the discussion and to keep it lively and on-going (Forgues, 2013). Online discussions typically consist of two parts: initial short postings that address a question from the learning outcome guide (LOG) and responses to peer postings. As the discussion is meant to be fairly informal, students are encouraged to question, debate and use their own personal and professional experiences to support continued discussion. Students are also provided guidelines so that postings provide sufficient detail to address a topic, while encouraging a flow of dialogue. In order to encourage deeper learning, students are rewarded for raising more challenging ideas and discussing them collaboratively with peers.

The JCSP DL programme is hybrid in nature insofar that students have two residential periods where they apply learning to a number of activities and analyse complex problems (Forgues, 2013).

6.2   Recommendations

As a learning mechanism, the online format has benefits and drawbacks. As previously mentioned, asynchronous communication through discussion groups allows students to think and reflect before posting and to participate at a time that is convenient to them. However, the online format also prevents individuals from benefiting from face-to-face interaction with their peers, where body-language, tone of voice and non-verbal cues often convey a deeper meaning than could be conveyed through online discussion alone.

The DL's online forum greatly benefits from having the residential periods where students have an opportunity both to meet each other and participate in learning activities that promote collaboration, brainstorming and

critical thinking. However there are additional features that could be incorporated into the distance learning programme to make it more engaging and effective.

Content Delivery

With the evolution of Internet technologies and 3G networks, there exist a myriad of ways that content can be delivered, such as through computers, tablets and various mobile devices. In addition, content can take the form of text, images, videos, games and various simulations (Catanzano, 2011). Since content delivery is particularly relevant to levels of learning acquisition (Bhowmick et al., 2007), it is important to provide a variety of audio, video, and synchronized texts especially when learners are required to develop deeper learning such as discrimination and problem solving skills. Hence, in addition, to discussion boards, it is possible to incorporate simulations in order to develop brainstorming, collaboration and critical response skills (Tung et al., 2009), followed by videoconferencing or live chats where students can share their experience and provide feedback to each other.

Communication

Asynchronous communication supports reflection and critical thinking, however synchronous communication can foster a sense of engagement and enhance interpersonal relationships (Bhowmick et al., 2007), especially when properly implemented. For example, videoconferencing can be a useful tool to discuss the outcome of a simulation (e.g., Bhowmick et al., 2007; Tung, 2009) simulating a face-to-face discussion. Videoconferencing can also be a useful tool to allow a more personal and informal communication exchange. Videoconferencing or live messages should however, be limited to small group sizes and focus on predetermined tasks in order to manage discussion and stay focussed.

Building Communities

Social networking sites can be powerful tools for building networks and supporting informal learning. Establishing a dedicated JCSP social networking site can be used to allow current students from both the RESID and DL streams, and alumni to network and share personal and professional experiences, and can also facilitate networking with individuals from other related programmes across the world. While social networking sites such as Facebook or Twitter are often easy to use because of their familiarity, caution should be exercised in terms of security and public accessibility. For example, if sharing secure or sensitive information, establishing a discussion group other than Facebook may be more prudent. In order to harness the power of social networking for informal learning, it is important to empower students to moderate content and discussion and to create a clear distinction between content that is linked to curriculum (i.e., formal learning) and content that may informally support the curriculum, but is not directly linked to curriculum (i.e., informal learning).

Assessment and Feedback

Summative assessment should be tied to formal learning (i.e., participation in structured discussion forums, essays and exams); however formative evaluation should be used to enhance student participation (Gikandi et al., 2011). Formative evaluation, such as live chats or videoconferencing can support group problem solving for example, and informal peer feedback through social networking sites can support collaboration and networking through informal discussions.

Learner Factors

While research shows that, under non-combat circumstances, military students are not much different than civilian students (Wiarda, 2011); there are certain fundamental factors that should be considered. Strategies for student engagement, retention, and academic success of military students in the JCSP DL course must address the unique needs of these adult learners, applying an andragogical approach that stresses the adult learner's self-direction, motivation, experience, and practical application of knowledge (Knowles, 1980). As adult learners, military students need to find course content relevant to their own lives, personal experience, and career plans. Instructors should use students' everyday experiences (e.g., in military training, deployments) as tools or examples to illustrate and apply theoretical concepts or military themes. Using adult learning principles, instructors should engage military learners by creating assignments and online discussion topics that encourage reflection on course concepts and how they are applied to real-life experiences. As learners in the JCSP DL programme are often military personnel with full-time jobs and other family responsibilities, the DL programme should provide enough flexibility in terms of class structure, deadlines and deliverables, to accommodate military student needs, such as deployments, work or family obligations.

7   Conclusion

As the research on adult learning and learning delivery systems shows, there are specific characteristics of adult learners that must be considered when developing curriculums both for in-class learning and distance learning delivery systems.

In particular, Knowles' theory of andragogy (or self-directed learning) is influential in adult learning because it addresses the conditions necessary to motivate and engage adult learners, which are especially relevant in distance learning delivery. As research shows, there does not appear to be significant differences in student outcomes between in-class, distance and blended delivery systems (e.g., Bernard et al., 2004; Carey & Trick, 2013; Cummings et al., 2013; Phipps & Merisotis, 1999; Russell, 1999; Sitzmann & Kraiger, 2006). However, differences do exist with regard to motivation, engagement and self-efficacy (e.g., Piccoli, Ahmad, & Ives, 2001), which are crucial in the success of any distance learning course.

As shown, there are multiple ways to leverage technology in order to enhance learning and engagement. For example, content can be delivered through multimedia such as video and auditory files to support multiple learning modalities, students can communicate with each other through asynchronous discussion boards and synchronous live chats or videoconferences, they can build and participate in learning communities through social media platforms, or dedicated discussion forums through their schools. Finally, the role of the teacher has to change form a teacher-centered model where information is provided to the student, to a learner-centered model, where the teacher serves as a facilitator or guide for more self-directed learning.

While, the JCSP DL programme already has many features that enhance adult learner engagement, introducing incremental changes such as social media forums to support student networking and informal learning, and creating projects where students can work in small groups and collaborate through videoconferencing would serve to further promote student engagement and align the distance learning program more closely to the in-class programme.

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List of symbols/abbreviations/acronyms/initialisms

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AC	Abstract Conceptualization
AE	Active Experimentation
AME	Advanced Military Education
CAF	Canadian Armed Forces
CBI	Computer-Based Instruction
CBT	Computer-Based Teaching
CE	Concrete Experience
CMC	Computer-Mediated Communication
DL	Distance Learning
DL4AME	Distance Learning for Advanced Military Education
DND	Department of National Defence
DP	Developmental Period
DRDC	Defence Research and Development Canada
DL4AME	Distance Learning for Advanced Military Education
DUSD	Department of Defence Strategic Plan for Advanced Distributed Learning, Undersecretary of Defense
JCSP	Joint Command and Staff Programme
LOG	Learning Outcome Guide
MOOC	Massive Online Open Courses
PME	Professional Military Education
RESID	Residential Learning
RO	Reflective Observation
SNW	Social Networking Websites
SOA	Service Orientated Architecture
TEL	Technology Enabled Learning