**References for Session 1: The Mind**

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**References for Conclusion and Wrap:** See article *Fives Essentials for Transforming Nursing Education*

**References for Session 2: The Heart**

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**Therapeutic Interventions:**

• Affirmations – Louise Hay 1977 as counselor worked with HIV/AIDS

• PSYCH-K® - Robert Williams, Counselor 1984 developed belief change

• EMDR – Releases Trapped Feelings, Beliefs

• Prayer &/or Meditation – Oldest form of changing beliefs

• NLP – Negative or unwanted habits from ‘unconscious’ Mind

• EFT – Mercola psychological acupressure, based on the same energy meridians - [http://eft.mercola.com/](http://eft.mercola.com/)


• NET – Neuro Emotional Technique - [https://www.netmindbody.com/](https://www.netmindbody.com/)

• NAET – Nambudripad’s Allergy Elimination Techniques [http://www.naet.com/](http://www.naet.com/)


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Editor's Note: This is a milestone article that deserves careful study. Connectivism should not be confused with constructivism. George Siemens advances a theory of learning that is consistent with the needs of the twenty-first century. His theory takes into account trends in learning, the use of technology and networks, and the diminishing half-life of knowledge. It combines relevant elements of many learning theories, social structures, and technology to create a powerful theoretical construct for learning in the digital age.

**Connectivism: A Learning Theory for the Digital Age**

George Siemens

**Introduction**

Behaviorism, cognitivism, and constructivism are the three broad learning theories most often utilized in the creation of instructional environments. These theories, however, were developed in a time when learning was not impacted through technology. Over the last twenty years, technology has reorganized how we live, how we communicate, and how we learn. Learning needs and theories that describe learning principles and processes, should be reflective of underlying social environments. Vaill emphasizes that “learning must be a way of being – an ongoing set of attitudes and actions by individuals and groups that they employ to try to keep abreast of the surprising, novel, messy, obtrusive, recurring events…” (1996, p.42).

Learners as little as forty years ago would complete the required schooling and enter a career that would often last a lifetime. Information development was slow. The life of knowledge was measured in decades. Today, these foundational principles have been altered. Knowledge is growing exponentially. In many fields the life of knowledge is now measured in months and years. Gonzalez (2004) describes the challenges of rapidly diminishing knowledge life:

“One of the most persuasive factors is the shrinking half-life of knowledge. The “half-life of knowledge” is the time span from when knowledge is gained to when it becomes obsolete. Half of what is known today was not known 10 years ago. The amount of knowledge in the world has doubled in the past 10 years and is doubling every 18 months according to the American Society of Training and Documentation (ASTD). To combat the shrinking half-life of knowledge, organizations have been forced to develop new methods of deploying instruction.”

Some significant trends in learning:

- Many learners will move into a variety of different, possibly unrelated fields over the course of their lifetime.

- Informal learning is a significant aspect of our learning experience. Formal education no longer comprises the majority of our learning. Learning now occurs in a variety of ways – through communities of practice, personal networks, and through completion of work-related tasks.

- Learning is a continual process, lasting for a lifetime. Learning and work-related activities are no longer separate. In many situations, they are the same.

- Technology is altering (rewiring) our brains. The tools we use define and shape our thinking.
The organization and the individual are both learning organisms. Increased attention to knowledge management highlights the need for a theory that attempts to explain the link between individual and organizational learning.

Many of the processes previously handled by learning theories (especially in cognitive information processing) can now be off-loaded to, or supported by, technology.

Know-how and know-what is being supplemented with know-where (the understanding of where to find knowledge needed).

Background

Driscoll (2000) defines learning as "a persisting change in human performance or performance potential...[which] must come about as a result of the learner’s experience and interaction with the world" (p.11). This definition encompasses many of the attributes commonly associated with behaviorism, cognitivism, and constructivism – namely, learning as a lasting changed state (emotional, mental, physiological (i.e. skills)) brought about as a result of experiences and interactions with content or other people.

Driscoll (2000, p14-17) explores some of the complexities of defining learning. Debate centers on:

- Valid sources of knowledge - Do we gain knowledge through experiences? Is it innate (present at birth)? Do we acquire it through thinking and reasoning?
- Content of knowledge – Is knowledge actually knowable? Is it directly knowable through human experience?
- The final consideration focuses on three epistemological traditions in relation to learning: Objectivism, Pragmatism, and Interpretivism
  - Objectivism (similar to behaviorism) states that reality is external and is objective, and knowledge is gained through experiences.
  - Pragmatism (similar to cognitivism) states that reality is interpreted, and knowledge is negotiated through experience and thinking.
  - Interpretivism (similar to constructivism) states that reality is internal, and knowledge is constructed.

All of these learning theories hold the notion that knowledge is an objective (or a state) that is attainable (if not already innate) through either reasoning or experiences. Behaviorism, cognitivism, and constructivism (built on the epistemological traditions) attempt to address how it is that a person learns.

Behaviorism states that learning is largely unknowable, that is, we can’t possibly understand what goes on inside a person (the “black box theory”). Gredler (2001) expresses behaviorism as being comprised of several theories that make three assumptions about learning:

1. Observable behaviour is more important than understanding internal activities
2. Behaviour should be focused on simple elements: specific stimuli and responses
3. Learning is about behaviour change

Cognitivism often takes a computer information processing model. Learning is viewed as a process of inputs, managed in short term memory, and coded for long-term recall. Cindy Buell details this process: “In cognitive theories, knowledge is viewed as symbolic
mental constructs in the learner’s mind, and the learning process is the means by which these symbolic representations are committed to memory.”

Constructivism suggests that learners create knowledge as they attempt to understand their experiences (Driscoll, 2000, p. 376). Behaviorism and cognitivism view knowledge as external to the learner and the learning process as the act of internalizing knowledge. Constructivism assumes that learners are not empty vessels to be filled with knowledge. Instead, learners are actively attempting to create meaning. Learners often select and pursue their own learning. Constructivist principles acknowledge that real-life learning is messy and complex. Classrooms which emulate the “fuzziness” of this learning will be more effective in preparing learners for life-long learning.

Limitations of Behaviorism, Cognitivism, and Constructivism

A central tenet of most learning theories is that learning occurs inside a person. Even social constructivist views, which hold that learning is a socially enacted process, promotes the principal of the individual (and her/his physical presence – i.e. brain-based) in learning. These theories do not address learning that occurs outside of people (i.e. learning that is stored and manipulated by technology). They also fail to describe how learning happens within organizations.

Learning theories are concerned with the actual process of learning, not with the value of what is being learned. In a networked world, the very manner of information that we acquire is worth exploring. The need to evaluate the worthiness of learning something is a meta-skill that is applied before learning itself begins. When knowledge is subject to paucity, the process of assessing worthiness is assumed to be intrinsic to learning. When knowledge is abundant, the rapid evaluation of knowledge is important. Additional concerns arise from the rapid increase in information. In today’s environment, action is often needed without personal learning – that is, we need to act by drawing information outside of our primary knowledge. The ability to synthesize and recognize connections and patterns is a valuable skill.

Many important questions are raised when established learning theories are seen through technology. The natural attempt of theorists is to continue to revise and evolve theories as conditions change. At some point, however, the underlying conditions have altered so significantly, that further modification is no longer sensible. An entirely new approach is needed.

Some questions to explore in relation to learning theories and the impact of technology and new sciences (chaos and networks) on learning:

- How are learning theories impacted when knowledge is no longer acquired in the linear manner?
- What adjustments need to be made with learning theories when technology performs many of the cognitive operations previously performed by learners (information storage and retrieval).
- How can we continue to stay current in a rapidly evolving information ecology?
- How do learning theories address moments where performance is needed in the absence of complete understanding?
- What is the impact of networks and complexity theories on learning?
- What is the impact of chaos as a complex pattern recognition process on learning?
- With increased recognition of interconnections in differing fields of knowledge, how are systems and ecology theories perceived in light of learning tasks?
An Alternative Theory

Including technology and connection making as learning activities begins to move learning theories into a digital age. We can no longer personally experience and acquire learning that we need to act. We derive our competence from forming connections. Karen Stephenson states:

“Experience has long been considered the best teacher of knowledge. Since we cannot experience everything, other people’s experiences, and hence other people, become the surrogate for knowledge. ‘I store my knowledge in my friends’ is an axiom for collecting knowledge through collecting people (undated).”

Chaos is a new reality for knowledge workers. ScienceWeek (2004) quotes Nigel Calder's definition that chaos is “a cryptic form of order”. Chaos is the breakdown of predictability, evidenced in complicated arrangements that initially defy order. Unlike constructivism, which states that learners attempt to foster understanding by meaning making tasks, chaos states that the meaning exists – the learner's challenge is to recognize the patterns which appear to be hidden. Meaning-making and forming connections between specialized communities are important activities.

Chaos, as a science, recognizes the connection of everything to everything. Gleick (1987) states: “In weather, for example, this translates into what is only half-jokingly known as the Butterfly Effect – the notion that a butterfly stirring the air today in Peking can transform storm systems next month in New York” (p. 8). This analogy highlights a real challenge: “sensitive dependence on initial conditions” profoundly impacts what we learn and how we act based on our learning. Decision making is indicative of this. If the underlying conditions used to make decisions change, the decision itself is no longer as correct as it was at the time it was made. The ability to recognize and adjust to pattern shifts is a key learning task.

Luis Mateus Rocha (1998) defines self-organization as the “spontaneous formation of well organized structures, patterns, or behaviors, from random initial conditions.” (p.3). Learning, as a self-organizing process requires that the system (personal or organizational learning systems) “be informationally open, that is, for it to be able to classify its own interaction with an environment, it must be able to change its structure...” (p.4). Wiley and Edwards acknowledge the importance of self-organization as a learning process: “Jacobs argues that communities self-organize in a manner similar to social insects: instead of thousands of ants crossing each other’s pheromone trails and changing their behavior accordingly, thousands of humans pass each other on the sidewalk and change their behavior accordingly.”. Self-organization on a personal level is a micro-process of the larger self-organizing knowledge constructs created within corporate or institutional environments. The capacity to form connections between sources of information, and thereby create useful information patterns, is required to learn in our knowledge economy.

Networks, Small Worlds, Weak Ties

A network can simply be defined as connections between entities. Computer networks, power grids, and social networks all function on the simple principle that people, groups, systems, nodes, entities can be connected to create an integrated whole. Alterations within the network have ripple effects on the whole.

Albert-László Barabási states that “nodes always compete for connections because links represent survival in an interconnected world” (2002, p.106). This competition is largely dulled within a personal learning network, but the placing of value on certain nodes over others is a reality. Nodes that successfully acquire greater profile will be more successful at acquiring additional connections. In a learning sense, the likelihood that a concept of learning will be linked depends on how well it is currently linked. Nodes (can be fields, ideas, communities) that specialize and gain recognition for their expertise have greater chances of recognition, thus resulting in cross-pollination of learning communities.
Weak ties are links or bridges that allow short connections between information. Our small world networks are generally populated with people whose interests and knowledge are similar to ours. Finding a new job, as an example, often occurs through weak ties. This principle has great merit in the notion of serendipity, innovation, and creativity. Connections between disparate ideas and fields can create new innovations.

**Connectivism**

Connectivism is the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing.

Connectivism is driven by the understanding that decisions are based on rapidly altering foundations. New information is continually being acquired. The ability to draw distinctions between important and unimportant information is vital. The ability to recognize when new information alters the landscape based on decisions made yesterday is also critical.

**Principles of connectivism:**

- Learning and knowledge rests in diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliances.
- Capacity to know more is more critical than what is currently known.
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas, and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
- Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

Connectivism also addresses the challenges that many corporations face in knowledge management activities. Knowledge that resides in a database needs to be connected with the right people in the right context in order to be classified as learning. Behaviorism, cognitivism, and constructivism do not attempt to address the challenges of organizational knowledge and transference.

Information flow within an organization is an important element in organizational effectiveness. In a knowledge economy, the flow of information is the equivalent of the oil pipe in an industrial economy. Creating, preserving, and utilizing information flow should be a key organizational activity. Knowledge flow can be likened to a river that meanders through the ecology of an organization. In certain areas, the river pools and in other areas it ebbs. The health of the learning ecology of the organization depends on effective nurturing of information flow.

Social network analysis is an additional element in understanding learning models in a digital era. Art Kleiner (2002) explores Karen Stephenson’s “quantum theory of trust” which “explains not just how to recognize the collective cognitive capability of an...
organization, but how to cultivate and increase it”. Within social networks, hubs are well-connected people who are able to foster and maintain knowledge flow. Their interdependence results in effective knowledge flow, enabling the personal understanding of the state of activities organizationally.

The starting point of connectivism is the individual. Personal knowledge is comprised of a network, which feeds into organizations and institutions, which in turn feed back into the network, and then continue to provide learning to individual. This cycle of knowledge development (personal to network to organization) allows learners to remain current in their field through the connections they have formed.

Landauer and Dumais (1997) explore the phenomenon that “people have much more knowledge than appears to be present in the information to which they have been exposed”. They provide a connectivist focus in stating “the simple notion that some domains of knowledge contain vast numbers of weak interrelations that, if properly exploited, can greatly amplify learning by a process of inference”. The value of pattern recognition and connecting our own “small worlds of knowledge” are apparent in the exponential impact provided to our personal learning.

John Seely Brown presents an interesting notion that the internet leverages the small efforts of many with the large efforts of few. The central premise is that connections created with unusual nodes supports and intensifies existing large effort activities. Brown provides the example of a Maricopa County Community College system project that links senior citizens with elementary school students in a mentor program. The children “listen to these “grandparents” better than they do their own parents, the mentoring really helps the teachers...the small efforts of the many - the seniors – complement the large efforts of the few – the teachers.” (2002). This amplification of learning, knowledge and understanding through the extension of a personal network is the epitome of connectivism.

**Implications**

The notion of connectivism has implications in all aspects of life. This paper largely focuses on its impact on learning, but the following aspects are also impacted:

- **Management and leadership.** The management and marshalling of resources to achieve desired outcomes is a significant challenge. Realizing that complete knowledge cannot exist in the mind of one person requires a different approach to creating an overview of the situation. Diverse teams of varying viewpoints are a critical structure for completely exploring ideas. Innovation is also an additional challenge. Most of the revolutionary ideas of today at one time existed as a fringe element. An organizations ability to foster, nurture, and synthesize the impacts of varying views of information is critical to knowledge economy survival. Speed of “idea to implementation” is also improved in a systems view of learning.

- **Media, news, information.** This trend is well under way. Mainstream media organizations are being challenged by the open, real-time, two-way information flow of blogging.

- **Personal knowledge management in relation to organizational knowledge management**

- **Design of learning environments**

**Conclusion:**

The pipe is more important than the content within the pipe. Our ability to learn what we need for tomorrow is more important than what we know today. A real challenge for any learning theory is to actuate known knowledge at the point of application. When
knowledge, however, is needed, but not known, the ability to plug into sources to meet the requirements becomes a vital skill. As knowledge continues to grow and evolve, access to what is needed is more important than what the learner currently possesses.

Connectivism presents a model of learning that acknowledges the tectonic shifts in society where learning is no longer an internal, individualistic activity. How people work and function is altered when new tools are utilized. The field of education has been slow to recognize both the impact of new learning tools and the environmental changes in what it means to learn. Connectivism provides insight into learning skills and tasks needed for learners to flourish in a digital era.

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About the Author

George Siemens is an instructor at Red River College in Winnipeg, Manitoba, Canada. He is enamored with the
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Abstract

**Background:** Moving from the *Industrial* to the *Digital Age* with evolving technology, increasing information availability, and the half-life of knowledge shortening incrementally, nursing educators need knowledge of these changes, the shifting paradigms and the theories and methods of teaching/learning emerging and needing to be integrated into nursing education.

**Method:** A literature review was done on educational theory and methods which have been adopted, developing or in process, especially regarding e-learning and e-teaching.

**Results:** Five significant themes emerged: 1) changing purpose and role of education 2) revised Bloom’s Taxonomy, 3) movement from single loop to double loop learning, 4) changes in assessing learning which motivate lifelong self-determined learning, 5) utilizing a new digital age theory titled *Connectivism* for patient/client centered connected healthcare,

**Conclusion:** In transforming nursing education to meet the needs of providers and populations served in the *Digital Age*, attention and adoption of these five essentials is imperative.
Five Essentials for Transforming Nursing Education:

Teaching-Learning in the Digital Age

“Profound changes in science, technology, patient activism, the market-driven health care environment, and the nature and settings of nursing practice have all radically transformed nursing practice” (Benner, Sutphen, Leonard, & Day, 2010, p. 1). The transforming of nursing education is clearly needed but the how and into what are the larger questions. This process must include the changes and developments in teaching and learning theory and methods for 21st century students and higher education. Incorporating and integrating nursing knowledge, theory, and best practices will serve as guides and add to the transformation process. From the studies which demonstrate that baccalaureate prepared nurses have better patient outcomes, (Aiken et al., 2003, Aiken et al., 2014), we see the need for a liberal arts education as essential to the “integrated theory and knowledge development” in the nurse (Chinn & Kramer, 2008). The development of higher order thinking skills requires more complexity of concepts and methods as seen in Tanner’s (2006) Clinical Judgment Model and the development of moral reasoning by using reflection as a means of double-loop learning. Nursing as a practice discipline means that moving from “novice to expert” is a process through which the nurse integrates prior knowledge with current and new knowledge, and then applies it in the care of their patient/client and family and community members. Nurses work in collaboration with a health care team where communication and informatics fluency are essential along with current and evolving technology. This team has expanded to include the technology experts and knowledge workers of the information age we live in. From Dr. Ironside’s (2001) article on a review of pedagogical approaches used by nurse educators to meet the educational challenges of 15 years ago, she sums up what is still needed today “a national agenda for research in nursing education calls nurse
teachers to address these challenges by creating, utilizing, and evaluating alternative approaches to education” (Ironside, 2001, p.85).

This article will discuss the underlying changes in teaching/learning theory and practice which have been occurring and evolving but have not been widely applied and integrated into the curriculum by nurse educators. These changes are essential in the educating of nurses and other healthcare providers in order for them to obtain the competencies as knowledge brokers and evidence-based practitioners which are necessary to meet 21st century health care challenges and continue as capable self-determined lifelong learners.

The five essential change areas for educators to know and integrate into their curriculum are:

1) The changing purpose and role of education with the advent of technology and the world wide web,

2) the evolution of Bloom’s Taxonomy and its application to curriculum and course design moving from passive learning to active and interactive engaged learning,

3) the continuum from conventional pedagogy, constructivism, experiential and authentic, to informal and social/collaborative learning, and reflective learning, from single loop to double loop learning needs to be understood and applied,

4) changes in the assessment process of learning experiences to outcomes, competencies, and extending to capabilities, which sustain and motivate lifelong and self-determined learning as seen in Heutagogy,

5) in order to provide quality continuous patient/client centered care and meet the requirements of what is being called connected health care, there is a new learning theory. There is need for applying the theory of Connectivism which describes the need
for continuous connectedness in collaboration and communication among and between health care providers and current research, data analysis, and formative evidence.

#1) Changing Purpose and Role of Teaching/Learning

The teaching approaches, methods, and strategies are important to review in light of the changes in the learning of the 21st century student. In higher education, faculty continue to mostly utilize “Conventional” pedagogy which is teacher centered and content driven. Nursing educator Dr. Pamela Ironside (2001) created a table for her article which compares conventional, critical, feminist, postmodern, and phenomenologic pedagogies by general themes, teacher/student relationship, strengths, and limitations. The article and comparison clearly shows the differences between each and in conclusion acknowledges that the conventional pedagogy approach having “been the dominant approach utilized in nursing education for nearly half a century…has served the discipline well” (Ironside, 2001, p.85). Continuing, she states that “Faced with the contemporary challenges in nursing, health care, and higher education, however, teachers increasingly are aware that the conventional approach is no longer sufficient to prepare students for future practice” (Ironside, 2001, p.85).

At the time of Dr. Ironsides (2001) article, other significant changes were being put forth in regard to teaching and learning theories, practices, and methods. Here is a brief history of some of what came before and was primarily used as the theory and practice in higher education. The source of the following is found on a website and learning map created in 2005 and most recently updated in 2008, by Dr. James S. Atherton, a professor of education. Dr. Atherton’s (2005) Angles on Learning is a hyperlinked map which is a compilation and history on learning and learning theories (http://www.learningandteaching.info/learning/index.htm). Only through
technology can we be connected to our sources at the point of citing them. Bloom’s Taxonomy (1956) of learning objectives has been long used in education for the development of teaching plans, course objectives, degree program objectives, and in the measurement of learning. The visual of the levels in Bloom’s Taxonomy is in the shape of a pyramid which is read as levels rising from the bottom to the top. According to Bloom (1956), there are three learning domains: the cognitive, psychomotor, and affective. The cognitive is the most used of the three domains and begins at the base of the pyramid with knowledge, then comprehension, application, analysis, synthesis, and evaluation at the top. They are arranged from what is called the lower order thinking skills (LOTS) to the higher order thinking skills (HOTS) on a continuum. In writing nursing course objectives and formulating curriculum, nursing has been using this taxonomy developed in 1956 along with the rest of higher education (Atherton, 2005, http://www.learningandteaching.info/learning/index.htm).

#2) Evolution of Bloom’s Taxonomy

In 2001, Anderson and Krathwohl revised Bloom’s cognitive model of learning objectives by changing the name of the levels from nouns to verbs and removing synthesis and adding an even higher order thinking level. Their revised continuum of levels from lowest to highest order thinking goes from remembering, understanding, applying, analyzing, evaluating and creating at the top. Many learning theorists and educators advanced the knowledge and discipline of teaching and learning between 1956 and 2001. The work of Ramsden (1988) on deep and surface learning (Atherton, 2005, Motivation), and David Kolb’s (1986) theory of experiential learning (Zull, 2002, p.13), along with others were precursors to the revisions of Bloom’s Taxonomy made by Anderson and Krathwohl (2001). The using of verbs to identify the levels is in keeping
with the idea of learning as a dynamic process which is active, interactive, engaging, social and collaborative. The adding of creating as the highest level learning objective is critical to any discipline but especially to a practice discipline like nursing. As lifelong learners, nurses are needed in developing and the connecting of new knowledge, applying that knowledge as evidence based practitioners, and meeting the needs of patients/clients and the challenges of health care today.

Anderson and Krathwohl’s (2001) Bloom’s taxonomy was revised again by Andrew Churches’ alignment with the digital age by creating Bloom’s Digital Taxonomy in 2007 and comprehensive PDF in 2009. (Churches, 2009). Dr. Skiba’s (2013a) article titled *Bloom’s digital taxonomy and word clouds*, discusses remembering and understanding and the web-based tools that when used by nursing educators can facilitate learning and nursing education (pp. 277-280). In Dr. Skiba’s (2013b) *Digital Taxonomy: Evaluating and creating*, she discusses “the use of videos to facilitate student’s ability to evaluate and create” (p. 428). Evaluating is necessary for critiquing, reviewing, testing of ideas, interventions, data etc. and the developing of critical thinking and clinical reasoning competencies. Creating is necessary in developing the competencies of the designing and constructing of new knowledge and interventions along with the health care planning for an individual, specific population, or whole community.

The use of web-based tools and Churches’ (2007) digital taxonomy are critical to the designing and providing of 21st century nursing education. Whether for use in the flipped classroom or in the online environment, moving students from lower order thinking to higher order thinking is the goal of all nursing education. Churches’ (2007) column of Communication Spectrum is important in putting collaborating at the highest level in line with evaluating and creating as learning objectives. Well designed, online discussion boards’ purpose is to facilitate
FIVE ESSENTIALS FOR TRANSFORMING NURSING EDUCATION

creating new knowledge by and from the student and the sharing of it with others to facilitate what is called social and collaborative learning.

The revised Bloom’s with the addition of creating is key for the future of learning, nursing, leadership, and health care. We ask students to create when we ask them to produce new or original work in developing and constructing a myriad of artifacts such as a reflective learning journal entry, a project, a presentation, a report, a professional development plan. In the constructing of a reflective learning journal entry, they will invoke all the levels of thinking in remembering through analyzing in the writing of it. The initial learning of new knowledge, the reflecting on what was learned and the analyzing and evaluating occurring as they reflect on their prior knowledge. The integrating of prior and new knowledge and the addition of an application experience, real or imagined deepens the learning and anchors it in practice. Reflecting and writing about the learning experience provides a guide for the remembering, understanding, analyzing, and evaluating to take place. By writing, the creating happens and the highest order thinking is given form and provides evidence. It is in student’s reflective learning journals where we find them describing their learning and meeting of the ascribed outcomes and what other learning outcomes they are having. Critical thinking, deep learning, and at times even transformational learning can be seen in the student’s writing. Witnessing their growth and development in their journals gives an educator a window to their student’s world and the quality, evidence-based, health care they are providing in addition to providing the evidence of an assessment learning outcome.

# 3) Conventional through Experiential to Social/Collaborative Learning
FIVE ESSENTIALS FOR TRANSFORMING NURSING EDUCATION

In nursing education, the overloading of courses and curricula with content, as is often found in the conventional approach, is neither effective nor necessary with the advent of technology, web 2.0 - 3.0 tools, and the internet. Shifting the approach from content based to process learning and to interactive student centered learning is challenging when using the original Bloom’s Taxonomy and old pedagogical approaches. The shift has been initiated through the Integrative Learning Strategies (ILSs) found in both the undergraduate and graduate Essentials Tool Kits. The American Association of Colleges of Nursing (AACN)’s Baccalaureate Essentials’ Tool Kit set forth Integrative Learning Strategies which are defined by the American Association of Colleges and Universities (AAC&U, 2004) to be used as “powerful, active, and collaborative instructional methods that thread general education concepts throughout the major” (AACN, Baccalaureate Essentials, Faculty Tool Kit, 2009, p. 3). The table of Integrative Learning Strategies for the master’s level has an introduction which states “Imagineative, transformative, and seamless learning experiences will guide the education of nurses prepared at the graduate level” (AACN, Master’s Essentials, Faculty Tool Kit, Sec. Integrative Learning Strategies and Other Resources, para, 1). This statement and the undergraduate and graduate ILSs are in keeping with the revised Bloom’s Taxonomy and the move toward active, engaged, deep, and transformational learning.

Some subjects require content experts and teacher centered approaches for the learning of the terminology, categorization, formulas, and scaffolding of simple to complex concepts like anatomy, physiology, microbiology, pathophysiology, and pharmacology. The reductionist approach to teaching works when the teaching/learning is about identifying the parts and analyzing them in order for understanding of how they fit together and work, like with science and mathematics. For other subjects, we need the interdisciplinary and the expansionist
approach. We need to develop and bring into our teaching/learning the building of skills and competencies which shift the nurses thinking to systems thinking and connecting with knowledge, technology, and persons who can provide the highest level of evidenced-based care for the whole person, family, and community they serve. Our learning outcomes do not embody these skills and competencies and if they do, there is a difficulty in measuring them. We have no blank space learning outcomes which could be student initiated and completed or uncovered and discovered as they progress through their course learning experiences. The syllabus is a learning contract and teaching/learning tool which needs to move from teacher designed and directed to more of a partnership model with student input and negotiation of learning outcomes that can encompass more or different outcomes than those set forth by faculty and curriculum committees.

The word pedagogy has long been used in education and though peda means child, it has been and is continued to be used in higher education when discussing the education of the adult student. With the move to raise the RN’s education level to a baccalaureate prepared nurse, the need for nurse educators to adjust teaching/learning approaches to the adult student calls to utilize the theory and approach of Andragogy developed by Dr. Malcolm Knowles (1973, 1990) in his *The Adult Learner: A neglected species* (4th ed.). Knowles (1990) discusses the shift from teacher centered to partnership and mutual planning with the student. Appendix D, “Creating Lifelong Learning Communities” (pp. 167-178) lists the skills of self-directed learning and Appendix E, “From Teacher to Facilitator of Learning” (pp.179-181) raises the idea that with adult students you become a facilitator of their learning on what they need to learn and teach learning skills or competencies for continued learning towards *self actualization*. Knowles’ (1990) writings on Andragogy and the changes needed in providing education to the adult learner
are almost prophetic of what higher education itself must embrace with the changes of technology and the speed of knowledge making and sharing.

In developing courses and curricula for teaching/learning in the 21st century, there needs to be a paradigm shift from faculty as content expert toward designer of and the creator of learning environments. Environments which provide authentic and experiential learning and the building of competencies needed as a health care practitioner. Creating learning environments which engage students in the integrating of their prior knowledge with new knowledge while fostering the application will assist them in deepening their learning as they move to highest order thinking. Sharing their learning experiences through a narrative and/or presentation with their peers promotes collaborative and social learning. This can be done in the “flipped classroom” or electronically on a discussion board/blog/wiki etc. The students in courses which include this approach to sharing and contributing, speak of the amount and quality of learning they gained through their peers’ shared learning experiences and contributions to the collective learning environment.

# 4) Assessment of Outcomes, Competencies, Building Capability and Lifelong Learners

Conventional pedagogy with its teacher centered objectives and reductionist thinking in many classes assesses student learning using lower order thinking measures. This is defined by Ramsden (1988) as what is called shallow learning. Some subjects warrant the use of quizzes and tests where memorizing terminology and understanding systems and their processes is necessary. Lower level learning occurs prior to the applying, evaluating, and creating can be achieved by the learner. Higher order thinking skills lead to deeper learning as the individual integrates knowledge and experiences while moving to increased abstract thought in working
with systems thinking. The use of learning outcomes and student centered course design require complex learning activities that join the students and their individual prior learning and move them to new learning and application of the integration of the two. This is what is known as *single-loop learning* and can be seen in activities throughout the course. Assessing learning outcomes for single-loop learning for lower order thinking is easily accomplished in quizzes, tests, short answers, or short papers for discussion boards. Higher order thinking assessments require different measures and approaches. Writing assignments can be one way to assess higher order thinking. Used most often in courses is the standard scholarly paper which may or may not allow for student choice and self-direction. In distant and online courses, writing is required weekly and the level depends on the activities directions and level of the revised Bloom’s Taxonomy used. From lower to higher order, it is the design, criteria to be met, and the directions of an assignment, which can create a learning experience which provides the opportunity for double-loop learning to occur and for faculty and student to assess learning outcomes have been achieved. “To implement a self-determined learning environment, instructors need to alter their teaching approach, primarily by placing value on learner self-direction of the learning process…distance education teaching methods support self-directed learning and the instructor role is already one of guide-on-the side” (Blaschke, 2012, p.66).

Adding reflective learning and journaling to courses accomplishes multiple goals and most importantly a focus on the higher order thinking skills: evaluating and creating. Reflection on the learning accomplished or thinking about the single-loop learning and integrating with prior learning and experiences moves students toward double-loop learning. This demonstrates higher order thinking meeting the criteria for what is called deep learning by Ramsden (1988) and at times is seen to be what is termed transformational learning. Evidence of deep and
transformational learning by nursing students can be viewed and assessed in their reflective learning journal entries, reflective papers, and reflections on clinical practice. Tanner’s (2006) model of “Clinical Judgement” is based on “double loop learning” processes and is the bases for reflective practice competencies and capabilities (pp. 207-208). In Eberle’s (2009) conference proceedings on Heutagogy: What you mother didn’t tell you about pedagogy and the conceptual age, we find a brief on what heutagogy is, namely, double-loop learning, the comparison with pedagogy, and the comparison of traditional classroom and heutagogical learning environments.

Nursing education requires we prepare professionals to not only have a degree but to continue learning as a part of their ongoing professional development and practice. We call it lifelong learning and our teaching/learning theories, approaches, and methods have been limited to what we have thought and done in the past. “In a heutagotypical approach …, learners are highly autonomous and self-determined and emphasis is placed on development of learner capacity and capability with the goal of producing learners who are well-prepared for the complexities of today’s workplace” (Blaschke, 2012, p. 56). The author goes on to talk of this approach being applied to distance education and used as a guide for it. This approach is not just for distant education and is an excellent segue into competency development and assessment. Looking at the tenets of the heutagological approach and its’ key, which is the use of “double loop learning”, we understand the application of it to nursing education in general.

“By incorporating heutagogical practice, educators have the opportunity to better prepare students for the workplace and for becoming lifelong learners, as well as to foster student motivation by cultivating students who “are fully engaged in the topic they are studying because they are making choices that are most relevant or interesting to them” (Kenyon

#5) Connectivism the Learning Theory: Necessary for Providing Inter-professional Connected Care and Continuous Quality Improvement.

Today, in nursing and health care, the need is for the most current knowledge and best practices in applying that knowledge for this patient/client. As we cannot know everything, we rely on technology to search for the current research and applications to provide evidence-based practice. Gonzalez (2004) wrote about the *half-life of knowledge* as the “span from when it was gained and when it becomes obsolete” and half of what is known today was not known 10 years ago” (para.1). The time said to occur between the research publication date and its application in the field has been ten years or in many cases more. The gap in disseminating findings to the profession and educating those who would apply it can mean that by the time we are sharing the knowledge with nurses it has become obsolete. Our basic science courses do not usually include quantum physics and field theory and are based on reductionist thinking theory and knowledge construction.

The analysis and bypass of the blocked artery alone do not ensure the health and wellbeing of the individual diagnosed with disease of their cardiac system. It is one system of a whole person with many other systems impacting its functioning, relationship, and role in producing a state of health and wellbeing. In health care today, we need *expansionist thinking* which includes a shift to *systems thinking* and to the relationships which impact the whole or what we call health. Individually, we cannot know enough or even what is current and relevant to the health and wellbeing of those we care for. As a larger system, connected to even larger systems of
knowledge, we have access to connect and integrate the content and best process to assist and partner with the individual, family, and community in creating health and “healthy people”.

“Over the last twenty years, technology has reorganized how we live, how we communicate, and how we learn. Learning needs and theories that describe learning principles and processes, should be reflective of underlying social environments” (Siemens, 2004, Introduction, para. 1). On reviewing the development of learning theories, we note their evolution under the broader categories of behavioral, cognitive, and constructivism which singly or combined are inadequate to assist us in navigating the age of information. Nor are they sufficient in the development of approaches, methods, and strategies which provide the teaching/learning knowledge and competencies students need now and into the future. Siemens (2004) learning theory Connectivism does provide us a current and dynamic learning theory as it includes “technology and connection making as learning activities” (Siemens, 2004, An alternative theory, para. 1).

Principles of Connectivism:

- Learning and knowledge rests in diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliances.
- Capacity to know more is more critical than what is currently known.
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas, and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

(Siemens, 2004, Principles of Connectivism section, para. 3)

Nursing and other health professional students need to become proficient “knowledge workers/brokers” in order to provide the best quality care possible. Even with electronic databases and journals available, the practitioner needs connection making which is accomplished through colleagues and communities of practice, and electronically through RSS feeds, email listservs, from journals in a network trusted and evidence based on the evaluation and application of practice and data analysis and research. Inter-professional education can more easily occur through expansionist and systems thinking and learning. Connectivism is a learning theory which encompasses the tenet of this type of thinking and is needed to overcome the healthcare challenges of the 21st century.

Summary

Creating competent and capable self-determined learners is “critical to life in the rapidly changing economy and cultures that characterize postmodern times” (Anderson, 2010, p. 33). As a practice discipline in the conceptual age where technology plays a key role in the safety and quality of care for patients/clients, families, and communities, we need to incorporate and utilize the learning theories and approaches which assist the profession in providing nursing education which inspires and gives them the tools to continue as lifelong learners.

The Future of Nursing (IOM/RWJF) (2010) recommendations have called us to provide the education that is key to the realizing of all of them in “leading change and advancing health”.
The IOM/RWJF (2010) report established the following eight recommendations to help guide the transformation of health care:

- Remove scope of practice barriers
- Expand opportunities for nurses to lead and diffuse collaborative improvement efforts
- Implement nurse residency programs
- Increase the proportion of nurses with a baccalaureate degree to 80 percent by 2020
- Ensure that nurses engage in lifelong learning
- Prepare and enable nurses to lead change to advance health
- Build an infrastructure for the collection and analysis of inter-professional health care workforce data. (Report Recommendations, pp. 1-6)


In the 5 year report Assessing the Progress of the IOM Future of Nursing (2015), the findings identify that while increasing the numbers of nurses with a baccalaureate and higher degrees, there are “concerns about the quality of the programs” (pp. 63-64) and in discussing the lack of movement on ensuring “nurses engage in lifelong learning (p. 83) they quote Tanner (2010, p. 347) “…as new health care needs emerge, a new kind of nurse will be needed. Educational programs must be redesigned to better prepare this nurse.”

http://www.nap.edu/read/21838/chapter/5#83

Nursing education must embrace and implement these five essentials in order to shift the teaching/learning paradigm and better prepare nurses for their continuing learning journey. Without the essential changes there is no future, we remain locked in the past, in our silo, and repeating what we have been doing. “We cannot solve our problems using the same thinking we used when creating them.” Albert Einstein
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