Khoo Teck Puat Hospital
Alexandra Health

Digital Learning for Health Care Professionals

Workshop Manual

Compiled by
Dr Vaikunthan Rajaratnam

Welcome to this workshop on

Digital Learning for

Health care professionals.

To maximize your learning please try and follow the instructions.

Some readings beforehand will accelerate your learning so that you can concentrate on your skill acquisition in the workshop.

Engage and participate for maximum benefit.

About the facilitators

Dr Vaikunthan Rajaratnam, Senior Consultant Hand Surgeon, KTPH

Following his undergraduate education at the University of Malaya, Dr Vai did his core training in orthopedic surgery there before proceeding to UK and US for his plastic, hand and micro surgery training. In the 90's, Dr Vai worked on various health care portals prior to the dotcom collapse. His team worked on innovative areas of biometric identification of patients, EMR and medical fraud detection software for the health insurance sector. Dr Vaikunthan Rajaratnam furthered his skills sets by obtaining a MBA and has delivered his competencies for various management projects in the area of health care facility development, due diligence, merger and acquisition process in health care and medical fraud detection for the insurance agencies. The last decade saw Dr Vai in the UK with the NHS developing the speciality of hand surgery and involved in the delivery, assessment and quality of post graduate medical education for which he was awarded the Fellowships of the, Academy of Medical Educators UK and Faculty of Surgical Trainers Edinburgh.

He has developed an online Master's program for Hand Surgery, Hand Therapy and MBA for doctors using the Moodle platform. He continues on his life long journey as a learner and is completing his Masters in Medical Education at the University of Dundee, and a Masters in Instructional design and Technology with Open University Malaysia. Since relocating to Singapore in 2011 Dr Vai is Honorary Senior Lecturer, YYL School of Medicine, National University of Singapore, Core Faculty for Orthopaedic Surgery and Hand and Reconstructive Micro Surgery, NHG Residency Program, SINGAPORE.

Dr. Dujeepa D. Samarasekera, Director of the Medical Education Unit, Yong Loo Lin School of Medicine, National University of Singapore (NUS).

Prior to joining NUS, he was a Medical Educationalist attached to the Centre for Medical and Health Science Education (CMHSE), University of Auckland, New Zealand, and the Medical Education Development And Research Centre (MEDARC), University of Colombo, Sri Lanka.

After graduating as a medical doctor from University of Colombo he trained further in medical education at University of Maastricht in Netherlands. Dr Samarasekera has been involved in curriculum planning, evaluation, and student assessment at both undergraduate and postgraduate level health professional courses. He provides educational expertise, staff development to the Ministry of Health, medical schools and other health professional institutions locally and internationally. He serves as a member of the Undergraduate Curriculum Committee and heads the Continuous Quality Improvement section of the deanery education of Yong Loo Lin School of Medicine. He is the Co-chair for faculty development at the National University Health System (NUHS) Residency program and a member of the Graduate Medical Education Committee of NUHS. Dr. Samarasekera is in the editorial advisory boards of South East Asian Journal of Medical Education (SEAJME), Korean Journal of Medical Education and assist the editorial office of Stanford University faculty development online open access journal – Tomorrow's Professor. He was the chair of Asia Pacific Medical Education Conference from 2009-2013. Recent involvements include developing Interprofessional Education at NUS, member of the panel of reviewers for ASPIRE – A Medical School Program for International Recognition of Excellence in Education anchored by Association of Medical Education Europe, AMEE Ambassador, Board Member of Association of Asian Medical Educators, Association of Medical Education in the Western Pacific Region. He is a Fellow of Academy of Medicine Singapore, an honorary Professor to Semey State Medical University, Kazakhstan, External Evaluator for the Centre for Health Professional Education University of Auckland and is an advisor to the Ministry of Health, Singapore. His main research interests are in effective teaching/learning behaviours and assessment.

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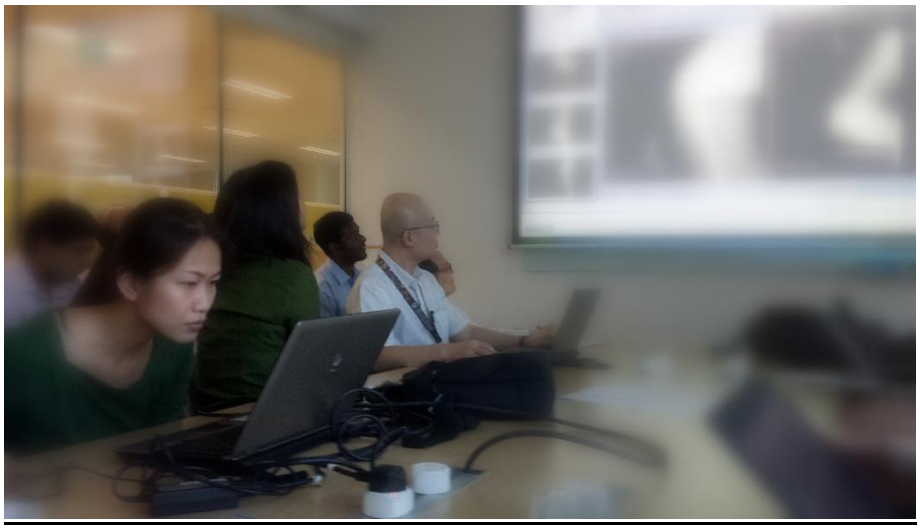

Detailed program

Participants Expectations 830 - 845

What is learning? 845 915

Learning Outcomes

At the end of this session you should be able:-

- To list and describe 4 theories of learning
- Adapt the theories for the digital age
- Describe how they will affect teaching

How to design a learning program 915 – 930

Learning Outcomes

At the end of this session you should be able:-

- To describe the instructional design process
- Use the process to design a learning program
- To create a residency digital learning program

What is digital learning? 930 - 1000

Learning Outcomes

At the end of this session you should be able:-

- To understand and describe what is e learning, mobile learning and open on line courses
- Evaluate the use of various technology for your residency learning program
- To design a residency digital learning program

Tea 1000 – 1015

Interactive discussion 1015 - 1030

Workshop 1 Writing Learning outcomes 1030 - 1130

Learning Outcomes

At the end of this session you should be able:-

- To write learning outcomes for a residency courses
- List and evaluate various digital technology for your residency learning program
- Use the ADDIE and GAGNE nine events tools to develop your digital learning program

Presentation and discussion of materials from workshop 1 – 1130 - 1200

The curriculum and Assessment 1200 – 1230

Learning Outcomes

At the end of this session you should be able:-

- To critically evaluate your residency curriculum
- Map and generate digital pedagogy strategies to deliver the curriculum
- Utilise blueprinting and rubrics in assessments of your program

Lunch 1230 1330

Workshop 2 1330 – 1430

Designing a digital learning program

Learning Outcomes

At the end of this session you should be able:-

- To assemble a digital learning module for a component of your residency program
- Design and develop engaging and rich digital learning objects
- Evaluate and choose digital resources and activities for your program
- Understand the principles of portfolio is assessment and the use of Evernote as a digital tool

Presentation of Workshop 2 1430 – 1445

Introduction to learning management systems (LMS) 1445 -1515

Learning Outcomes

At the end of this session you should be able:-

- Define and understand the anatomy of LMS
- To describe and use the components of the Moodle LMS
- List ,understand and use the functionality of a virtual learning environment (VLC WizIq)and student response system (Socrative)

Workshop 3 15150 – 1615

Deploying products of workshop 2 on Moodle

Learning Outcomes

At the end of this session you should be able:-

- Use a portable version of Moodle (Poodle) to deploy your program
- To test and evaluate your program on Moodle
- Be able to redesign and review your program as necessary

Tea 1615 - 1630

Monetizing your program (optional) 1630 -1645

Learning Outcomes

At the end of this session you should be able:-

- Identify and use various platforms to deliver your digital learning program
- Develop strategies to obtain revenue from your content
- Create and capitalize on alternate channels from your expertise

Wrap up 1645 - 1700

Digital Learning for Health Care Professionals

This course will help you understand learning in general and the principles and theory of adult learning and how technology can be used to enable learning based on the **work based learning framework.**

Learning outcomes

This course will provide the knowledge base and theories adapted for digital learning in the local context. It will include lectures, discussions and workshops on the concept and utility and follow on to designing of digital learning programs and deploying them on a learning management system.

Overall Course objectives

This one day course explores digital age education based on the theories of learning and instructional design. This interactive course will equip the participants with skills to design, develop and deploy relevant and quality digital learning programs for any work based health care education program.

What is learning?

Learning Outcomes

At the end of this session you should be able:-

- To list and describe 4 theories of learning
- Adapt the theories for the digital age
- Describe how they will affect teaching

Learning is acquiring new, or modifying and reinforcing, existing knowledge, behaviors, skills, values, or preferences and may involve synthesizing different types of information. The ability to learn is possessed by humans, animals and some machines. Progress over time tends to follow learning curves. Learning is not compulsory; it is contextual. It does not happen all at once, but builds upon and is shaped by what we already know. To that end, learning may be viewed as a process, rather than a collection of factual and procedural knowledge. Learning produces changes in the organism and the changes produced are relatively permanent.

Human learning may occur as part of education, personal development, schooling, or training. It may be goal-oriented and may be aided by motivation. The study of how learning occurs is part of neuropsychology, educational psychology, learning theory, and pedagogy.

Learning may occur as a result of habituation or classical conditioning, seen in many animal species, or as a result of more complex activities such as play, seen only in relatively intelligent animals. Learning may occur consciously or without conscious awareness. Learning that an aversive event can't be avoided nor escaped is called learned helplessness. There is evidence for human behavioral learning prenatally, in which habituation has been observed as early as 32 weeks into gestation, indicating that the central nervous system is sufficiently developed and primed for learning and memory to occur very early on in development.

Play has been approached by several theorists as the first form of learning. Children experiment with the world, learn the rules, and learn to interact through play. Lev Vygotsky agrees that play is pivotal for children's development, since they make meaning of their environment through play. 85 percent of brain development occurs during the first five years of a child's life. The context of conversation based on moral reasoning offers some proper observations on the responsibilities of parents.

http://en.wikipedia.org/wiki/Learning

Learning theories are conceptual frameworks that describe how information is absorbed, processed, and retained during learning. Cognitive, emotional, and environmental influences, as well as prior experience, all play a part in how understanding, or a world view, is acquired or changed, and knowledge and skills retained.

Behaviorists look at learning as an aspect of conditioning and will advocate a system of rewards and targets in education. Educators who embrace cognitive theory believe that the definition of learning as a change in behavior is too narrow and prefer to study the learner rather than the environment, and in particular the complexities of human memory. Humanists emphasize the importance of self-knowledge and relationships in the learning process. Those who advocate constructivism believe that a learner's ability to learn relies to a large extent on what he already knows and understands, and that the

acquisition of knowledge should be an individually tailored process of construction.

Outside the realm of educational psychology, techniques to directly observe the functioning of the brain during the learning process, such as event-related potential and functional magnetic resonance imaging, are used in educational neuroscience. As of 2012, such studies are beginning to support a theory of multiple intelligences, where learning is seen as the interaction between dozens of different functional areas in the brain, each with their own individual strengths and weaknesses in any particular human learner.

http://en.wikipedia.org/wiki/Learning_theory_(education)

Oxford Centre for Staff and Learning Development OCSLD
Learning and Teaching Briefing Papers Series

OXFORD BROOKES UNIVERSITY

Theories of learning

Lee Dunn

27 June 2002

First published in 2000 on the OCSLD website at:http://www.brookes.ac.uk/services/ocsd/2_learntch/theories.html

There are many different theories of how people learn. What follows is a variety of them, and it is useful to consider their application to how your students learn and also how you teach in educational programmes. It is interesting to think about your own particular way of learning and to recognise that everyone does not learn the way you do.

Burns (1995, p 99) 'conceives of learning as a relatively permanent change in behaviour with behaviour including both observable activity and internal processes such as thinking, attitudes and emotions.' It is clear that Burns includes motivation in this definition of learning. Burns considers that learning might not manifest itself in observable behaviour until some time after the educational program has taken place.

Sensory stimulation theory

Traditional sensory stimulation theory has as its basic premise that effective learning occurs when the senses are stimulated (Laird, 1985). Laird quotes research that found that the vast majority of knowledge held by adults (75%) is learned through seeing. Hearing is the next most effective (about 13%) and the other senses — touch, smell and taste — account for 12% of what we know.

By stimulating the senses, especially the visual sense, learning can be enhanced. However, this theory says that if multi-senses are stimulated, greater learning takes place. Stimulation through the senses is achieved through a greater variety of colours, volume levels, strong statements, facts presented visually, use of a variety of techniques and media.

Reinforcement theory

This theory was developed by the behaviourist school of psychology, notably by B.F. Skinner (Laird 1985, Burns 1995). Skinner believed that behaviour is a function of its consequences. The learner will repeat the desired behaviour if positive reinforcement (a pleasant consequence) follows the behaviour.

Positive reinforcement, or 'rewards' can include verbal reinforcement such as 'That's great' or 'You're certainly on the right track' through to more tangible rewards such as a certificate at the end of the course or promotion to a higher level in an organisation.

Negative reinforcement also strengthens a behaviour and refers to a situation when a negative condition is stopped or avoided as a consequence of the behaviour. Punishment, on the other hand, weakens a behaviour because a negative condition is introduced or experienced as a consequence of the behaviour and teaches the individual not to repeat the behaviour which was negatively reinforced. Punishment creates a set of conditions which are designed to eliminate behaviour (Burns, 1995, p 108). Laird (1985) considers this aspect of behaviourism has little or no relevance to education. However, Burns says that punishment is widely used in everyday life although it only works for a short time and often only when the punishing agency is present.

Burns notes that much Competency Based Training is based on this theory, and although it is useful in learning repetitive tasks like multiplication tables and those work skills that require a great deal of practice, higher order learning is not involved. The criticism of this approach is that it is rigid and mechanical.

Cognitive-Gestalt approaches

The emphasis here is on the importance of experience, meaning, problem-solving and the development of insights (Burns 1995, p 112). Burns notes that this theory has developed the concept that individuals have different needs and concerns at different times, and that they have subjective interpretations in different contexts.

Holistic learning theory

The basic premise of this theory is that the 'individual personality consists of many elements... specifically ... the intellect, emotions, the body impulse (or desire), intuition and imagination' (Laird, 1985, p 121) that all require activation if learning is to be effective.

Facilitation theory (the humanist approach)

Carl Rogers and others have developed the theory of facilitative learning. The basic premise of this theory is that learning will occur by the educator acting as a facilitator, that is by establishing an atmosphere in which learners feel comfortable to consider new ideas and are not threatened by external factors (Laird 1985).

Other characteristics of this theory include:

- a belief that human beings have a natural eagerness to learn
- there is some resistance to, and unpleasant consequences of, giving up what is currently held to be true
- the most significant learning involves changing

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APM Perspectives

The Association of Professors of Medicine (APM) is the national organization of departments of internal medicine at the US medical schools and numerous affiliated teaching hospitals as represented by chairs and appointed leaders. As the official sponsor of The American Journal of Medicine, the association invites authors to publish commentaries on issues concerning academic internal medicine.

For the latest information about departments of internal medicine, please visit APM's website at www.im.org/APM.

Overview of Current Learning Theories for Medical Educators

Dario M. Torre, MD, MPH,[a] Barbara J. Daley, PhD,[b] James L. Sebastian, MD,[a] D. Michael Elnicki, MD[c]

[a]Medical College of Wisconsin, Milwaukee, [b]University of Wisconsin – Milwaukee, and [c]University of Pittsburgh Medical School, Penn.

Medical education is in the midst of a major transformation that will require medical educators to reassess standard teaching practices and develop innovative strategies to optimize student and resident learning. New training standards from the Accreditation Council for Graduate Medical Education (ACGME),[1] the changing nature of the health care delivery system, and the integration of evidence-based medicine, point-of-care learning, and continuous quality improvement into daily medical practice are some of the forces that have coalesced to create renewed interest in the process of learning. What teaching and learning practices can best assist medical educators to meet the current challenges? Are there aspects of learning theory that can help medical educators thrive in this climate of change?

A working knowledge and understanding of key learning theories can help inform teaching practice by providing a rational basis for the selection of specific instructional strategies, fostering the articulation of important learning objectives, and facilitating the implementation of evaluation strategies that are well matched to curricular goals. This article describes several key learning theories and provides concrete examples of how specific educational methodologies are linked to these learning approaches. The 5 learning theories discussed in this article are based on the work of Merriam and Caffarella[2] and include behaviorist, cognitivist, humanist, social learning, and constructivist orientations to learning. The strength of understanding learning theory from multiple perspectives is that it provides medical educators with different teaching strategies that can be retrieved from their educational "tool boxes," depending on the specific learning outcomes that are desired.

Portions of this work were previously presented at the Clerkship Directors in Internal Medicine National Meeting in Portland, Oregon in October 2005.

Requests for reprints should be addressed to Dario M. Torre, MD, MPH, Medical College of Wisconsin, Froedtert East Clinic Building, 9200 West Wisconsin Avenue, Milwaukee, WI 53226.

E-mail address: dtorre@mcw.edu

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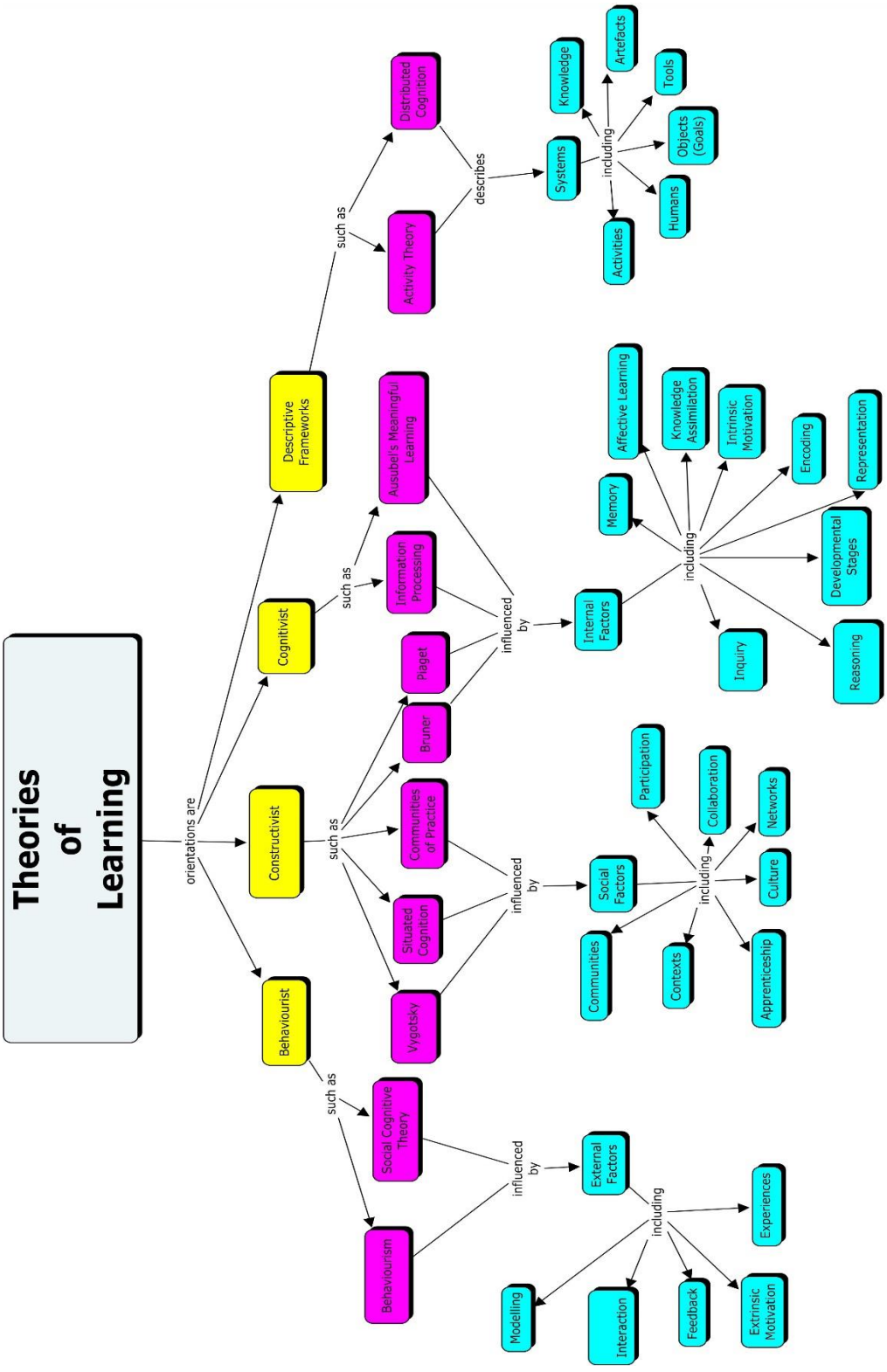
BEHAVIORIST ORIENTATION

The behaviorist learning orientation is particularly useful for the development of competencies and for demonstrating technical or psychomotor skills. This learning theory is most advantageous when a change in behavior is the desired outcome of an educational intervention.

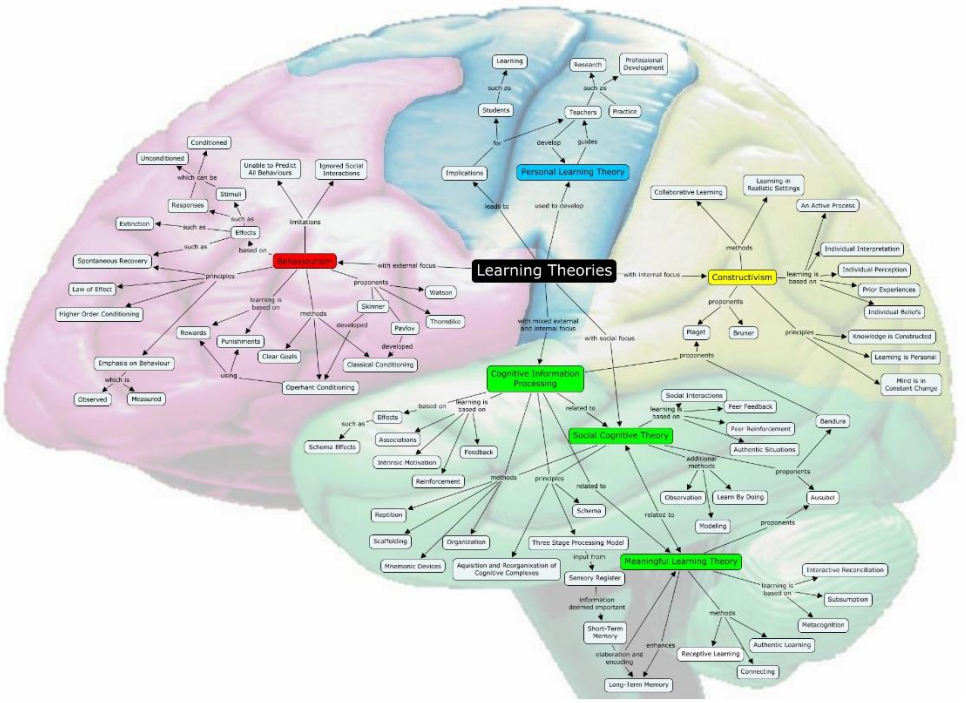
Learning Theory

The behaviorist model involves a teacher-centered approach in which the educator's role is to manipulate the environment for learners to elicit a specific response. Behavioral change in a desired direction is the main goal of this learning orientation. The locus of learning in the behaviorist approach lies in how various stimuli are presented or arranged in the external environment.[2]

Behaviorism is rooted in 3 basic assumptions: observable behavior is the focus of learning, environment shapes behavior, and reinforcement is central to the learning process.[3] Behaviorism focuses on the mastery of prerequisite steps before moving to subsequent steps; this learning orientation is aimed at reinforcing what the teacher wants the learner to perform.[4]



http://erikvandusen.wordpress.com/2008/10/07/learning-theory-concept-map/



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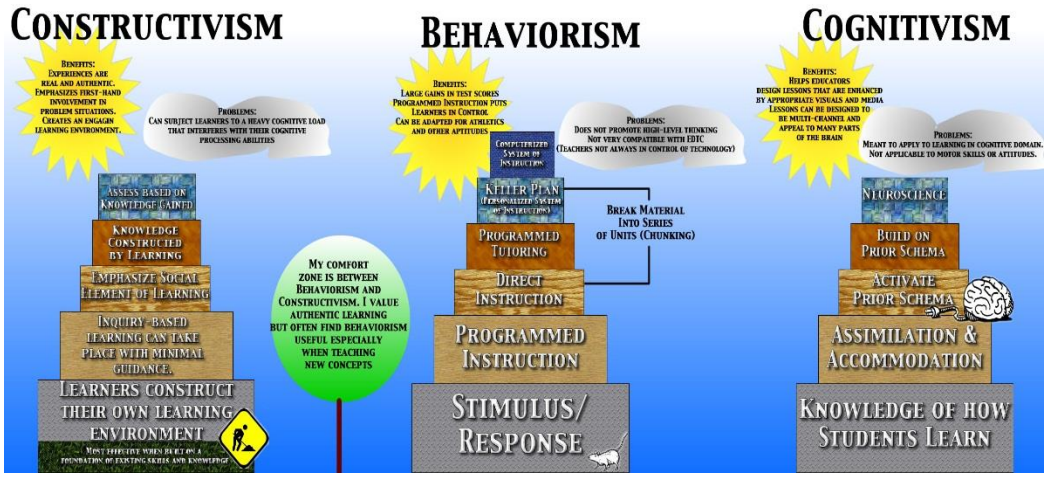

http://www.sringsmuth.com/wp-content/uploads/2011/08/Learning-Theories.jpg

http://en.wikipedia.org/wiki/Connectivism

Connectivism is a theory of learning which emphasizes the role of social and cultural context. Connectivism is often associated with, and proposes a perspective similar to Vygotsky's 'zone of proximal development' (ZPD), an idea later transposed into Engeström's (2001) Activity theory. The relationship between work experience, learning and knowledge, as expressed in the concept of 'connectivity, is central to connectivism, motivating the theory's name. It is somewhat similar to Bandura's Social Learning Theory that proposes that people learn through contact.

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)

http://www.ingedewaard.net/papers/connectivism/2005_siemens_ALearningTheoryForTheDigitalAge.pdf

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Connectivism: Learning theory of the future or vestige of the past?

Rita Kop
University of Wales Swansea

Adrian Hill
Open School BC, Canada

Abstract

Siemens and Downes initially received increasing attention in the blogosphere in 2005 when they discussed their ideas concerning distributed knowledge. An extended discourse has ensued in and around the status of 'connectivism' as a learning theory for the digital age. This has led to a number of questions in relation to existing learning theories. Do they still meet the needs of today's learners, and anticipate the needs of learners of the future? Would a new theory that encompasses new developments in digital technology be more appropriate, and would it be suitable for other aspects of learning, including in the traditional class room, in distance education and e-learning? This paper will highlight current theories of learning and critically analyse connectivism within the context of its predecessors, to establish if it has anything new to offer as a learning theory or as an approach to teaching for the 21st Century.

Keywords: e-Learning; online learning; open learning; distance education; pedagogy; learning theory; educational theory

Introduction

To what extent do existing learning theories meet the needs of today's learners, and anticipate the needs of learners of the future? Since Siemens' *Connectivism: Learning as Network Creation* (2005) and Downes' *An Introduction to Connective Knowledge* (2005) initially garnered increasing attention in the blogosphere in 2005, an extended discourse has ensued in and around the status of connectivism as a learning theory for the digital age. Kerr (2007d) identifies two purposes for the development of a new theory: it replaces older theories that have become inferior, and the new theory builds on older theories without discarding them, because new developments have occurred which the older theories no longer explain.

If older theories are to be replaced by connectivism, then what are the grounds for this measure? If connectivism is to build on older theories, how is the integration of the old and new theories to be conducted? Forster (2007) maintains that for connectivism to be a learning theory, the theory's limitations and the full range of contexts in which learning can take place must be

How to design a learning program

Learning Outcomes

At the end of this session you should be able:-

- To describe the instructional design process
- Use the process to design a learning program
- To create a residency/allied health digital learning program

http://en.wikipedia.org/wiki/Instructional_design

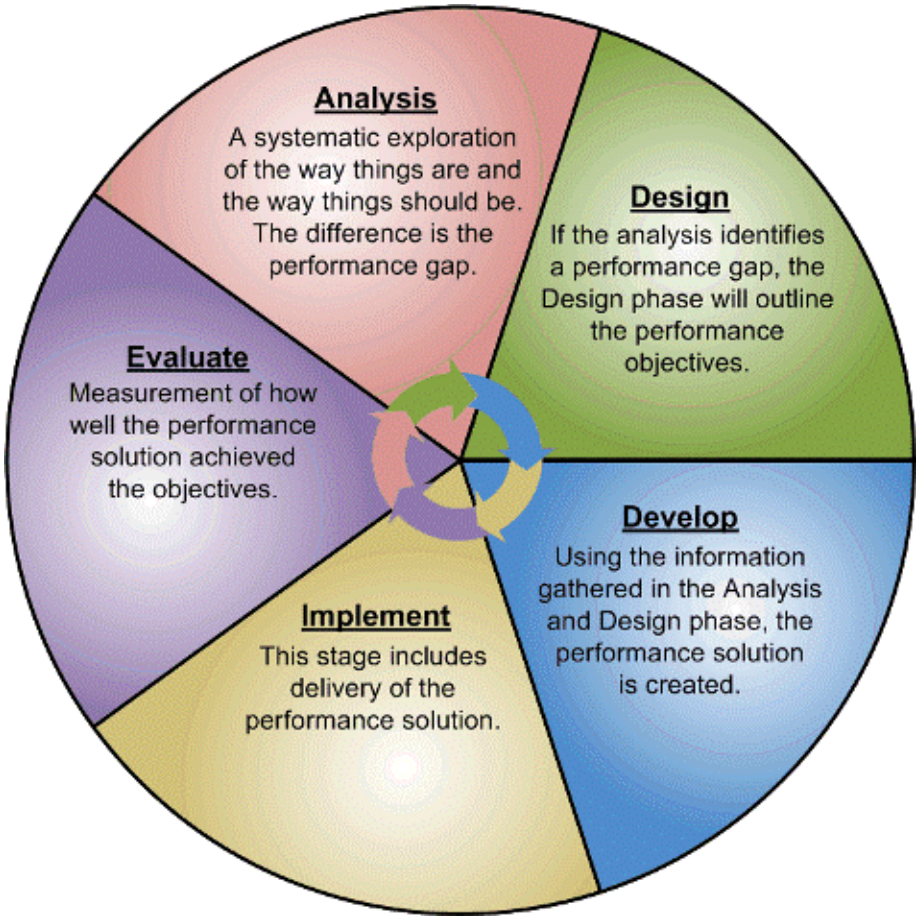
Instructional Design (also called Instructional Systems Design (ISD)) is the practice of creating "instructional experiences which make the acquisition of knowledge and skill more efficient, effective, and appealing. The process consists broadly of determining the current state and needs of the learner, defining the end goal of instruction, and creating some "intervention" to assist in the transition. Ideally the process is informed by pedagogically (process of teaching) and andragogically (adult learning) tested theories of learning and may take place in student-only, teacher-led or community-based settings. The outcome of this instruction may be directly observable and scientifically measured or completely hidden and assumed. There are many instructional design models but many are based on the ADDIE model with the five phases: analysis, design, development, implementation, and evaluation. As a field, instructional design is historically and traditionally rooted in cognitive and behavioral psychology, though recently Constructivism (learning theory) has influenced thinking in the field.

“Instructional Design is the art and science of creating an instructional environment and materials that will bring the learner from the state of not being able to accomplish certain tasks to the state of being able to accomplish those tasks. Instructional Design is based on theoretical and practical research in the areas of cognition, educational psychology, and problem solving.”

Edmonds Gerald S, Robert C, Branch and Prachee Mukherjee (1994), A Conceptual Framework for Comparing Instructional Design Models, ETR&D, VoL 42, No. 4, 1994, pp. 55-72 LSSN 1042-1629.

ADDIE Model

The ADDIE model is a systematic instructional design model consisting of five phases: (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation. Various flavors and versions of the ADDIE model exist.



http://hlwiki.slais.ubc.ca/index.php/ADDIE_model

Diabetes education in primary care: A practical approach using the ADDIE model

Diabetes is a chronic disease that probably requires the most attention to changes in lifestyle.

BOB MASH, *MB ChB, DCH (UK), DRCOG (UK), MRCGP (UK), FCFP (SA), PhD*

Head, Family Medicine and Primary Care, Stellenbosch University, W Cape

Professor Mash runs the web-based postgraduate Diploma and Masters programmes in Family Medicine at Stellenbosch University. His current interests are asthma, diabetes, motivational interviewing, district health services, family medicine in sub-Saharan Africa, health and climate change. His paintings can be seen at http://bobmash.jimdo.com

Correspondence to: Bob Mash (rm@sun.ac.za)

Diabetes is an almost perfect example of a chronic disease that requires high levels of behaviour change and self-care activities. Many articles are written on the aspects of lifestyle that should be modified and what the goals should be.[1] I have previously written in *CME* on the application of motivational interviewing in consultations with diabetic patients.[2] The reality in many primary care practices is that we are often too busy managing the patient's presenting problem (e.g. sore throat, joint pains, backache) in a limited time frame to comprehensively deal with the underlying continuing problem. All too often we only have time to repeat or modify the prescription, do a blood test or hand the patient a leaflet on lifestyle change after a few words of advice. In this article I therefore focus on a more explicit approach to the incorporation of diabetic education into primary care practice using the conceptual framework of ADDIE.[3]

ADDIE stands for analyse, design, develop, implement and evaluate, and can be used to consider any educational intervention. I explore these steps specifically with regard to diabetes education in primary care.

Diabetes is an almost perfect example of a chronic disease that requires high levels of behaviour change and self-care activities.

Analyse

Analyse the factors that are important in the design of a diabetic education programme in your practice.

Think about the diabetic patients in your practice. How many are there and what are their characteristics? Typically, you will have a large number of patients with type 2 diabetes who will be mostly middle aged or older. However, you may also have a significant number of younger patients with type 1 diabetes. How do you currently organise your care for patients with diabetes? For example, do they attend a mini-clinic on the same day each week or merely present alongside other patients in the general queue? What educational level and resources do your patients have? For example, does your practice population mostly comprise indigent patients with high levels of illiteracy and poor access to sources of information? Alternatively, your practice population may be better educated with easy access to resources on the internet. What languages are spoken? How well informed and educated are your diabetic patients already? What are their learning needs? Do your diabetic patients have a voice in the way care is organised in your practice?

Which of the health workers in your practice can play a role in the education of diabetic patients? In the public sector there may be medical officers, clinical nurse practitioners, health promoters or nutrition advisers. In the private sector you may have access to dietitians or biokineticists. Who has the expertise and the time to engage with diabetic patients?

The answers to most of these questions will be easy to most established doctors who know their practice and practice population well, but you may never have sat down with your chronic care team to explicitly analyse your patients.

Design

The design of an appropriate diabetic education programme depends on a thorough understanding of the target audience and the practice setting as described in the section on analysis. Following on from this you should be able to make some fundamental decisions about the design. For example, should you focus on group education because the patient numbers are high and the health workers have limited time or can you afford to plan for one-on-one counselling? Group diabetic education has been shown to be effective in terms of reducing glycosylated haemoglobin, medication, weight and blood pressure.[4] Likewise, you should be able to decide on who is most appropriate to deliver diabetic education or what combination of people will deliver different aspects.

The content of a diabetic education programme has been well described;[5] however, it can be structured and packaged in different ways. Table I is an example of the structure and content recommended by chronic care teams in the Cape Town public sector for patients with type 2 diabetes.[6]

Explaining diabetes in lay terms in a way that actually gives the patient an understanding of its pathophysiology is a challenging task. It allows patients to understand why and how behaviour change and medication can control their diabetes. Most educational programmes resort to metaphors, such as those shown in Fig. 1, where the cells of the body are represented as small rooms with a door that can be opened by a key (insulin) to let in the glucose (spoonfuls of sugar) to create energy.[7] The keys are made by the pancreas and sugar comes from the intestine (food) and sometimes the liver, which are also shown in the drawing. In a patient with type 2 diabetes, as shown in Fig. 1, some of the doors are closed because the keys do not work properly (due to insulin resistance) and therefore glucose increases in the bloodstream.

Table I. Content and structure of a diabetic education programme[6]

Session 1: Understanding your diabetes
- What constitutes diabetes
- Some of the common myths and facts about diabetes

Session 2: Understanding your medication
- Using medication to control diabetes
- Considerations when using medication
- Dealing with hypoglycaemia (low blood glucose)

Session 3: Living a healthy lifestyle
- What is healthy food
- What are sensible or healthy portion sizes
- How to prepare food
- Timing of meals and snacks
- Physical activity
- Other lifestyle issues (smoking, stress, alcohol)

Session 4: Avoiding complications
- The dangers of high blood glucose
- Recognising and controlling high blood glucose
- What medical assessments need to be done to effectively identify and prevent complications and when these should be done

Gagne published in 1965, identified the mental conditions for learning. These were based on the information processing model of the mental events that occur when adults are presented with various stimuli. Gagne created a nine-step process called the events of instruction, which correlate to and address the conditions of learning.

Gagne's 9 Events of Instruction

1. Gain attention – This works great in e-learning. Use of animation, audio, graphics, etc. make this any easy task. The important thing is to tie it to the content and to "stimulate learning" of the subject at hand. Do not just get the learners' attention, but get them curious and motivated to learn about the subject/skill your course addresses.
2. Inform learners of the objectives/direction – I always include objectives. Learners should, and want to, know what they are going to learn, but do not include objectives as written in your course design plan; they're very dry and boring that way. State them as if you were face to face with the learners. If your course has characters, let them tell the learners what they will learn and what to expect.
3. Stimulate recall of prior learning – Have an exercise(s) that will assist learners associate the subject with concepts they are already familiar with or link the exercise to prior experience or knowledge. You need to really know your audience to pull this off, which requires a thorough needs assessment. In the classroom you can also use this event to measure your audience and tailor the training to them, if needed. In an asynchronous e-learning environment you will not be able to do this in a direct manner, but you can allow for self reflection and user control of the course. The user should be able to pick and choose the content they need. Even if you are making a very linear course, you should at least have a very accessible contents menu.
4. Present the content- This does not mean shifting into page turner mode. Keep it interactive. This can include using a character and story to deliver the content, breaking it up with questions and input from the learner, games, branching scenarios/sims, etc. I also like to use interactive Flash animation to put emphasis on the content and to allow practice and application of the new skill or knowledge. FYI: Typically the following feedback levels (5-7) will be incorporated into the "present the content" event.
5. Provide learning guidance - This is an opportunity for the learner to apply the learned knowledge or skill, but with guidance. A good example is a

simulation. Whether a software sim or a soft skill branching sim, it should have sound instruction/directions and feedback for incorrect choices or answers. Unlike classroom training you cannot directly gauge the challenges the learner is having and any feedback provided is pre-scripted. The only alternative is a way for the learner to post questions or need for clarification through the course, such as an e-mail function. This will still not provide immediate guidance, but is an alternative if the course's feedback is not enough. Another reason that course evaluation and redesign is important.

6. Elicit performance - Allow the learners to practice the new skill. An interactive exercise or a simulation. Remember, this event does not require as much guidance as the prior event. They should be at the point where they can apply the skills and wish to practice those skills. For example, a software sim in a "try me" mode, but with little are no instruction. Feedback can be provided, but more likely at the end of the event. This is an opportunity for the learners to confirm their understanding of the content and a chance to practice and increase the likelihood of retaining information.
7. Provide Feedback - For e-learning courses, feedback is folded into the 2 prior events/feedback levels.
8. Assess performance – With very few exceptions, I include an assessment at the end of the course (switching events 8 and 9). I will include feedback for both correct and incorrect answers. For correct answers I may provide some additional pertinent information, which may boost retention. And for incorrect answers I will provide feedback that provides information on why their answer is incorrect and, if appropriate, what the correct answer is and why. If the content involves software I may also include a screenshot if it helps. Although this is the eigth event I always make it the last event, after Enhance Retention and Transfer. My experience is that once the learner has completed the assessment and received their certificate and credit for the course, they most likely exit. So, I swap the ninth and eigth events.
9. Enhance retention and transfer (closure) - Prior to the assessment I will provide a conclusion. I highlight and review important elements of the content and re-affirm if the course objectives were met. I will also discuss how this new knowledge or skill will be used in the workplace. This is also an opportunity to provide review questions prior to launching an assessment (event 8).

http://elearningcyclops.wordpress.com/2009/01/29/using-gagnes-9-events-of-learning-in-e-learning/

What is digital learning?

At the end of this session you should be able:-

- To understand and describe what is e learning, mobile learning and open on line courses
- Evaluate the use of various technology for your learning program
- To design a residency digital learning program

E-learning refers to the use of electronic media and information and communication technologies (ICT) in education. E-learning is broadly inclusive of all forms of educational technology in learning and teaching . E-learning is inclusive of, and is broadly synonymous with multimedia learning, technology-enhanced learning (TEL), computer-based instruction (CBI), computer-based training (CBT), computer-assisted instruction or computer-aided instruction (CAI), internet-based training (IBT), web-based training (WBT), online education, virtual education, virtual learning environments (VLE) (which are also called learning platforms), m-learning, and digital educational collaboration. These alternative names emphasize a particular aspect, component or delivery method.

E-learning includes numerous types of media that deliver text, audio, images, animation, and streaming video, and includes technology applications and processes such as audio or video tape, satellite TV, CD-ROM, and computer-based learning, as well as local intranet/extranet and web-based learning. Information and communication systems, whether free-standing or based on either local networks or the Internet in networked learning, underly many e-learning processes.

E-learning can occur in or out of the classroom. It can be self-paced, asynchronous learning or may be instructor-led, synchronous learning. E-learning is suited to distance learning and flexible learning, but it can also be used in conjunction with face-to-face teaching, in which case the term blended learning is commonly used.

It is commonly thought that new technologies make a big difference in education.[citation needed] Many proponents of e-learning believe that everyone must be equipped with basic knowledge of technology, as well as use it as a vehicle for reaching educational goals
http://en.wikipedia.org/wiki/E-learning

The term m-learning or "mobile learning", has different meanings for different communities, that refer to a subset of e-learning, educational technology and distance education, that focuses on learning across contexts and learning with mobile devices. One definition of mobile learning is, "any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies." In other words, with the use of mobile devices, learners can learn anywhere and at any time.

M-learning technologies include handheld computers, MP3 players, notebooks, mobile phones and tablets. M-learning focuses on the mobility of the learner, interacting with portable technologies, and learning that reflects a focus on how society and its institutions can accommodate and support an increasingly mobile population. There is also a new direction in m-learning that gives the instructor more mobility and includes creation of on the spot and in the field learning material that predominately uses smartphone with special software such as AHG Cloud Note. Using mobile tools for creating learning aides and materials becomes an important part of informal learning.

M-learning is convenient in that it is accessible from virtually anywhere. M-learning, like other forms of e-learning, is also collaborative. Sharing is almost instantaneous among everyone using the same content, which leads to the reception of instant feedback and tips. This highly active process has proven to increase exam scores from the fiftieth to the seventieth percentile, and cut the dropout rate in technical fields by 22 percent. M-learning also brings strong portability by replacing books and notes with small RAMs, filled with tailored learning contents. In addition, it is simple to utilize mobile learning for a more effective and entertaining experience.
http://en.wikipedia.org/wiki/M-learning

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.

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MOOCs

Scenario

For the fall term, Margaret Lane decides to teach her course "Novel Writing" as a MOOC, a massively open online course. Each time the course is offered, it fills to capacity with students from the university, and there are always many requests from the community for slots to audit the course—after all, who doesn't want to write a novel? As a MOOC, the course still has a cap of 25 for-credit students, who meet in class and receive a grade for the course. However, another 1,600 students sign up for free as "open students," some from campus but most from around the world, including seven non-U.S. countries. These students have access to recorded class lectures and other course materials, and a set of social networking tools allows the group to interact with one another and form cohorts—including students from campus—around the type of novel they want to write. Although the for-credit students have priority for direct feedback from Lane, she provides as much guidance to as many students as possible.

Over the course of the semester, the many students in the MOOC organize themselves into self-selected review groups to provide feedback on others' writing exercises. This peer-review process follows the direction that Lane provides, but it takes place largely outside her direct supervision. Lane tries to develops course activities that allow all students to participate equally, whether they are for-credit students or any of the hundreds of open participants, who have diverse motivations for taking the course and similarly varied expectations of it. Due to the number of participants, the MOOC depends on a high degree of student-to-student interaction and self-directed learning, and some of the open students who need a more structured approach drift out of the course. For those who persist, the range of voices and perspectives on their writing samples is invaluable. Some students receive hundreds of critiques, and the opportunity to read samples from so many other budding novelists is itself extremely helpful.

The diversity and activity of the MOOC extend beyond what students in the course would typically expect, and most participants also leave with a list of contacts for ongoing feedback and support. Meanwhile, a lot more people become familiar with Lane and her novels, and the exposure provided by the MOOC means that writers and readers increasingly view Lane's university as one of the short list of institutions for aspiring writers.

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1 What is it?

As its name suggests, **a massively open online course (MOOC) is a model for delivering learning content online to virtually any person—with no limit on attendance—who wants to take the course.** Participants can be students enrolled at the institution hosting the MOOC or anyone with Internet access. The "open" students, who pay nothing to participate, can join in some or all of the course activities, which might include watching videos, posting on discussion boards and blogs, and commenting via social media platforms, though anything hosted by the institution's LMS would likely be off-limits. Although "open" participants receive no credit for the course and may get little or no direct feedback from the instructor, their involvement can add a dynamic to the course that benefits all students. While a MOOC might accommodate enrollment in the thousands, some of these courses enroll far fewer—the "massive" part of the name speaks more to the potential to include vast numbers of students than to the actual size of the class.

2 How does it work?

Although the curriculum for a MOOC might be identical to that of a standard course, learning activities are typically restructured to better match the dynamic of a large and fluid group of participants. **Course activities could be scheduled or asynchronous, and a flexible structure is valuable because students can choose their level of participation and many will do so in an à la carte manner.** A MOOC is typically hosted on easily accessible sites such as a wiki, blog, or a Google site. In addition, course interactions might take place in blogs, tweets, and other public, online venues. Public announcements regarding the course are generally made on blogs, academic websites, or professional organizations. Open students register online so that they can receive information and announcements.

3 Who's doing it?

In 2008, George Siemens and Stephen Downes co-taught a class thought to be the first to use the term MOOC. The course, called "Connectivism and Connective Knowledge," was presented to 25 tuition-paying students at the University of Manitoba and offered at the same time to around 2,300 students from the general public who took the online class at no cost. Since that time, most MOOCs have been taught on subjects in the education or technology spheres, but a few topics have been designed for wider appeal. Early this year, for example, Jim Groom led a team of instructors in offering "Digital Storytelling" as a for-credit course at the University of Mary Washington and as a free online course to the public. Students in both groups set up online spaces, told their stories, and published them using assorted digital media. To date, those MOOCs that have drawn the largest crowds have been

more >>

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Digital learning

Literature review by Vaikunthan Rajaratnam

Digital learning is about the use of technology to enhance the students learning experience. It is not merely online learning but the efficient utilisation of high-quality instructional material designed specifically for the varying learning styles of students allowing for on demand ,self-paced, ubiquitous learning environment. The characteristics of Digital learning include the ability to personalise learning material that is flexible. This is led by teachers but with significant support and allows for collaboration and is aligned to a common vision. It has high-quality resource materials and encourages a transparent and ongoing learning environment. (Alliance for excellent education).

Solvie & Kloek, have shown in the paper that technology tools have the ability to address students' varying learning needs and styles and preferences. In the study they show that as they work within constructivist environment, these technologies tools can be used successfully and integrated to support the students learning. In their study they found that the students believe indicated they believed technology tools were assisting them in the construction of knowledge. They also showed that "preferences for technology are not as indicative of performance as is a match between characteristics of the tool and learning styles."

From simple technology tools like the use of audience response system, it has been shown that students feel more engaged in learning and experience and enhanced learning process.(Sternberger, 2012) . The Centre for learning and performance technology, in 2012 listed the top 100 tools useful learning by professionals. Some of the tools listed include Twitter, Skype, dropbox, you tube, slideshare, Google drive. The plethora of digital tools for learning poses challenges for the 21st century teacher. It has been shown that the creation of an authentic learning experience with the use of technology enhances learning .(Herrington & Kervin, 2007). According to the authors, the learning environment should:-

1. Provide authentic contexts that reflect the way the knowledge will be used in real life

2. Provide authentic activities

3. Provide access to expert performances and the modelling of processes

4. Provide multiple roles and perspectives

5. Support collaborative construction of knowledge

6. Promote reflection to enable abstractions to be formed

7. Promote articulation to enable tacit knowledge to be made explicit

8. Provide coaching by the teacher at critical times, and scaffolding and fading of teacher support

9. Provide for authentic, integrated assessment of learning within the tasks

Herrington and Kervin have shown that technology can be used as a cognitive tool within authentic learning environments rather than just merely disseminator of content and information. These technology tools allow students to be more engaged with tasks and allows for ownership of the knowledge. They provide practical ways in incorporating technology within the learning environment to enhance the learning experience. They argue that the teacher's role is to align the technology experiences of the student with that of the purpose of the learning.

Student feedback in technology mediated learning has been very positive. Hardaway and Scammell in their paper looked at the student response with the use of technology in a business course. (Hardaway & Scamell, 2005). They showed that students by working with various search engines were able to locate relevant information, and then by using web authoring tools to compose their documents, conducting discussions on the bulletin board, and taking an on-line final exam, the students utilise all the technology features during their learning experience. "By including these technology features in the course, students gained an appreciation for the value of technology within a learning context and the relationship that technology has to the process of learning. " (Hardaway & Scamell, 2005). They concluded that the challenges of teachers today is the development of courses that are designed to use technology to enhance the learning experience for the student and then use valuable face-to-face time to provide richer environment and productive activities.

Therefore the creation of learning objects becomes crucial in Digital learning. Huang (2005) who notes from the Virtual Labs Project at Stanford University, that current methods for the design of multimedia learning modules are not standardized and lack strong instructional design. (Huang, 2005). The author discusses the phases in the development of a multimedia module , which includes :" (1) understand the learning problem and the users' needs; (2) design the content to harness the enabling technologies; (3) build multimedia materials with web style standards and human factors principles; (4) user testing; (5) Evaluate and improve design."(Huang, 2005). Here we therefore see the principles of instructional design being used in the development of digital content to facilitate learning.

Asynchronous tools are useful digital tools to help students to share ideas and exchange cultural perspectives outside the physical boundaries of a classroom.(Walker & Jeurissen, 2003). In this study the authors created a hybrid course in which they added an e-learning discussion and posting of knowledge by the participants in addition to face-to-face learning. They found that the e-learning discussion groups facilitated open and frank discussion which otherwise would not have been possible for certain students within the class who may have been marginalised.

Among the various tools available for digital learning to occur there certain preferences among educational professionals. Among certified educational profession it was found that virtual learning networks, videos sharing and online events scheduling were the most important web 2.0 application while social bookmarks, social networks and music were the least important.(Pritchett, Wohleb, & Pritchett, 2013). They also commented that many educators are not aware of the benefits technology can offer them as professionals in carrying out the implementation of the curriculum in their classrooms.

On-line feedback tools play an important role in Digital education. Results show that students' prior experiences with traditional feedback guide their perceived preferences regarding online feedback." Students were aware of many specific challenges that they faced during online research, and expressed a strong desire for technologies that could support identification of valid and relevant online content. Self-reported, online feedback needs were consistent with successful features of digital learning environments that have been shown to support deeper learning"(Ferrara & Butcher, 2012).

As technology, becomes universally excepted in education, this framework to understand and describe the kinds of knowledge required by teachers for effective pedagogical practice resulted in the creation of the term called Technological Pedagogical Content Knowledge (TPACK). It therefore embraces the concept of effective technology integration for teaching specific content or subject matter and requires understanding and negotiating the relationships between these three components: Technology, Pedagogy, and Content. This framework then includes the skills of instructional designers, educational technologies and subject matter experts. Teachers are able to connect the use of technology to concepts and skills within their curriculum.(Swan & Hofer, 2011). In this study the authors use podcasting as a technology to deliver content in an economy course. They found that the teachers discovered podcasting added value to the learning experience with student motivation and offering opportunities for meaningful alternative assessment and student expression. They also found that teachers demonstrated strong technological pedagogical knowledge (TPK) i.e. but a lack of technological content knowledge (TCK) in the design and implementation of the podcasting projects. (Swan & Hofer, 2011).

If teachers were trained in TPACK , they were found to have enhanced used of technology in the selection and use of learning activities and technologies, becoming more conscious, strategic, and varied; their instructional planning became more student-centred, focusing primarily upon students' intellectual, rather than affective, engagement; and (c) their quality standards for technology integration were raised, resulting in deliberate decisions for more judicious educational technology use .(Harris & Hofer, 2011)

It is clear from this literature review that digital learning is becoming more and more popular in the research literature and digital tools have been used effectively to deliver learning programs. Generally students find digital tools and the way learning has been designed to deliver content producing a more enriching and engaging experience resulting in a much more positive acceptance of technology in learning. Educators are incorporating more digital tools but must be backed with sound principles of instruction design to ensure that the tools just become enablers of learning.

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Writing Learning outcomes

At the end of this session you should be able:-

- To write learning outcomes for a residency courses
- List and evaluate various digital technology for your residency learning program
- Use the ADDIE and GAGNE nine events tools to develop your digital learning program

What is a learning outcome?

Learning outcomes are statements of what students will learn in a class or in a class session. The statements are focused on student learning (What will students learn today?) rather than instructor teaching (What am I going to teach today?). These statements should include a verb phrase and an impact ("in order to") phrase -- what students will do/be able to do and how they will apply that skill or knowledge

How do I write learning outcomes?

Bloom's Taxonomy of Educational Objectives (published in 1956 and revised in 2001) gives you a way to express learning outcomes in a way that reflects cognitive skills.

There are five levels (lowest to highest cognitive skills):

- Knowledge/remembering
- Comprehension/understanding
- Application/applying
- Analysis/analyzing
- Evaluation/evaluating
- Synthesis/creating

You can use Bloom's taxonomy to identify verbs to describe student learning. Examples of learning outcomes verbs for library instruction include:

- Knowledge/Remembering: define, list, recognize

- Comprehension/Understanding:characterize, describe, explain, identify, locate, recognize, sort
- Application/Applying: choose, demonstrate, implement, perform
- Analysis/Analyzing: analyze, categorize, compare, differentiate
- Evaluation/Evaluating: assess, critique, evaluate, rank, rate
- Synthesis/Creating: construct, design, formulate, organize, synthesize

There are some verbs to avoid when writing learning outcomes. These verbs are vague and often not observable or measurable. For example, how would you measure whether someone has "become familiar with" a particular tool? Use a more specific verb. If you want students to "understand" something, think more closely about what you want them to be able to do or produce as a result of their "understanding."

Verbs to avoid:

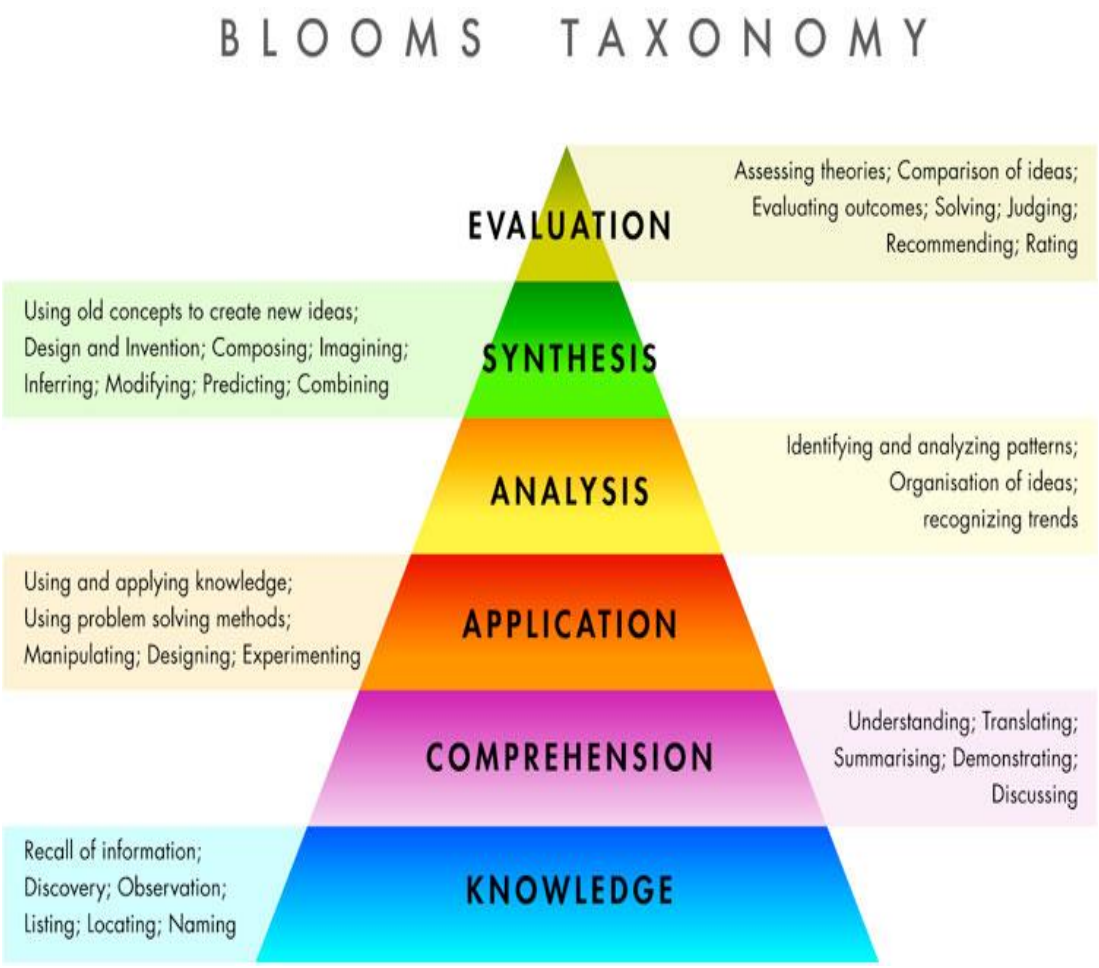
- Understand
- Appreciate
- Know about
- Become familiar with
- Learn about
- Become aware of

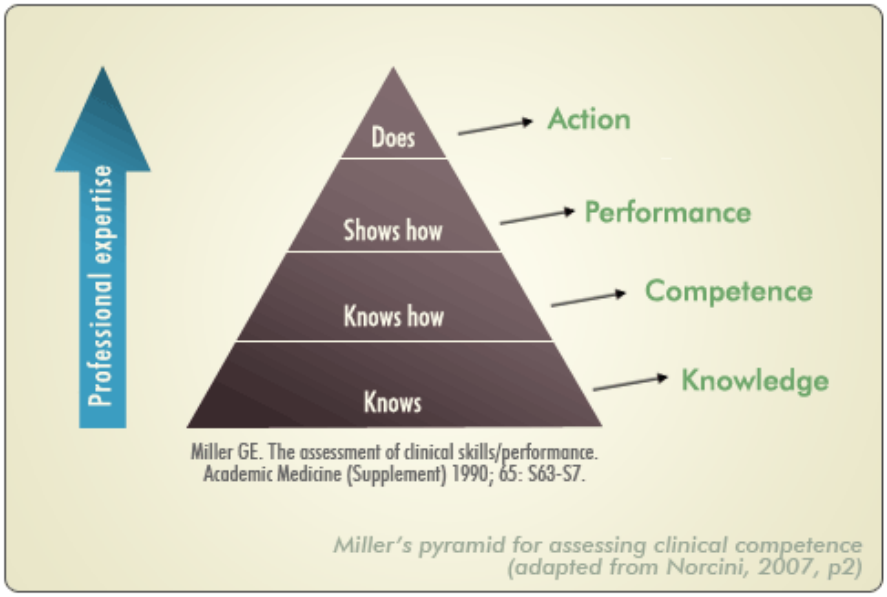
http://www.library.illinois.edu/infolit/learningoutcomes.html

Bloom's taxonomy is a classification of learning objectives within education proposed in 1956 by a committee of educators chaired by Benjamin Bloom, who also edited the first volume of the standard text, Taxonomy of educational objectives: the classification of educational goals. Although named after Bloom, the publication followed a series of conferences from 1949 to 1953, which were designed to improve communication between educators on the design of curricula and examinations. At this meeting, interest was expressed in a theoretical framework which could be used to facilitate communication among examiners. This group felt that such a framework could do much to promote the exchange of test materials and ideas about testing. In addition, it could be helpful in stimulating research on examining and on the relations between examining and education. After considerable discussion, there was agreement that such a theoretical framework might best be obtained through a system of classifying the goals of the educational process, since educational objectives provide the basis for

building curricula and tests and represent the starting point for much of our educational research."

It refers to a classification of the different objectives that educators set for students (learning objectives). Bloom's taxonomy divides educational objectives into three "domains": Cognitive, Affective, and Psychomotor (sometimes loosely described as knowing/head, feeling/heart and doing/hands respectively). Within the domains, learning at the higher levels is dependent on having attained prerequisite knowledge and skills at lower levels. A goal of Bloom's taxonomy is to motivate educators to focus on all three domains, creating a more holistic form of education.
http://en.wikipedia.org/wiki/Bloom's_taxonomy





Miller's pyramid for assessing clinical competence (adapted from Norcini, 2007, p2)

This model is similar to Bloom's Taxonomy in that there is a marked shift (as professionals develop expertise) from being able to demonstrate knowledge that underpins clinical competence (for example knowing the theory – learned from video, demonstration and reading – about how to take a history or examine an abdomen) to 'doing in action' where theory (intellectual skills), psychomotor skills and professional attitudes are synthesised and internalised into a seamless routine that can be carried out in different contexts.

Both these models help us to match learning outcomes with what we might expect the learner to be able to do at any stage. Learning outcomes, and their assessment, for students or trainees, usually relate to knowledge and understanding at a more basic level – possibly in an artificial or limited context – than the actual high-level performance expected of consultants.

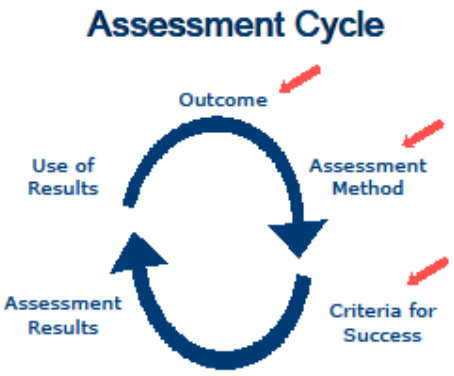
http://www.faculty.londondeanery.ac.uk/e-learning/setting-learning-objectives/some-theory

Writing Measurable Learning Outcomes

Sandi Osters, Director of Student Life Studies
F. Simone Tiu, Assistant Director for Institutional Effectiveness
3rd Annual Texas A&M Assessment Conference

You got to be careful if you don't know where you're going, because you might not get there – Yogi Berra

Assessment is a systematic and on-going process of collecting, interpreting, and acting on information relating to the goals and outcomes developed to support the institution's mission and purpose. It answers the questions: (1) What we are trying to do? (2) How well are we doing it? And (3) How can we improve what we are doing? Assessment begins with the articulation of outcomes. Writing measurable outcomes involves describing the first three components: outcome, assessment method, criteria for success, in the assessment cycle.



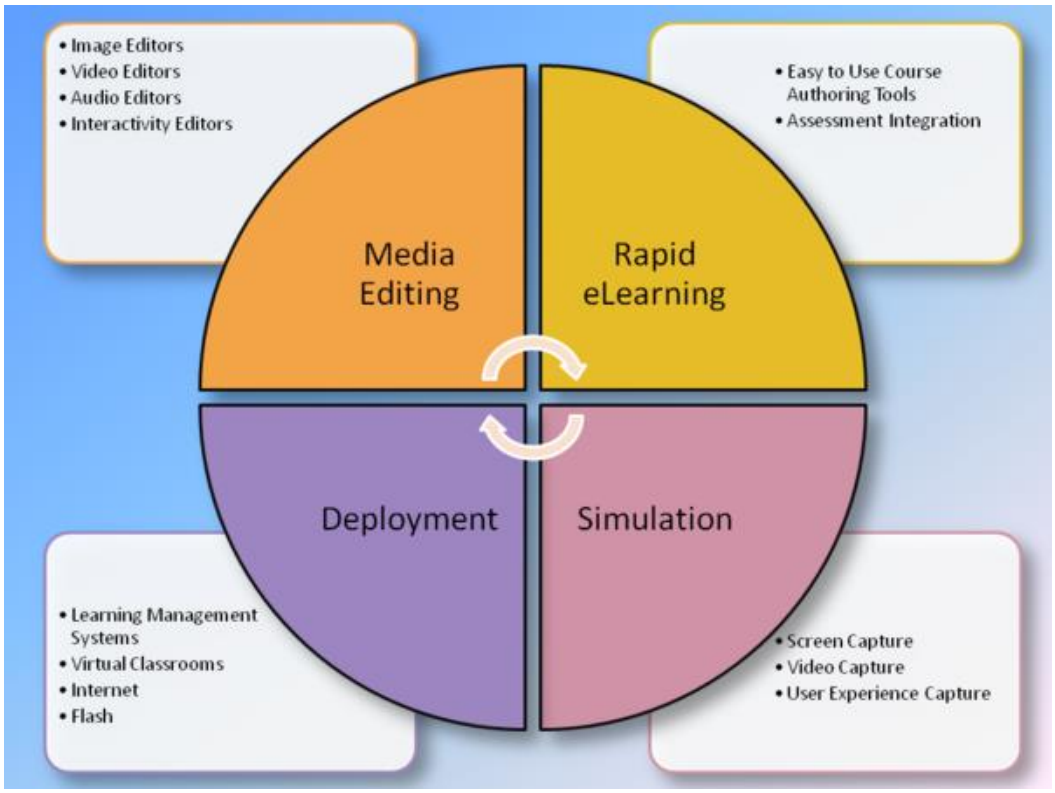
Broadly speaking, there are two types of outcomes: learning outcomes and program outcomes. Learning outcomes describe what students are expected to demonstrate and program outcomes describe what a program is expected to accomplish.

Technology tools for Digital Learning

Today's students are well versed in technology, often arriving on campus adept at communicating by text message, e-mail and message board and armed with laptops, MP3 players, smartphones and PDAs. Many have years of experience with online social networks, blogging and downloading music and video. They're looking to apply their technology and skills to learning, and schools are finding ways to meet those needs with online courses and hybrids that bring new technology to traditional teaching. Yes, these students can take online classes on their personal computers, but they also can:

- Download podcasts of course lectures and professors' audio study notes to their PDAs, smartphones or MP3 players to review wherever and whenever they have time.
- Check and copy information from the professor's daily or weekly blog, including the course syllabus, assignment changes, study notes and other important information.
- E-mail or text message study partners to set up study sessions and get answers to each other's questions about the material they're studying.
- Send instant messages to professors with quick questions or to set up a time to talk more extensively by phone.
- Log in to an online forum or visit a private chat room to discuss the topics being studied with the professor and other students in the class.
- Take notes, photos or video with an iPod or smartphone during lab experiments or in the field to use later as part of papers, presentations or test preparation.
- Bring work home from campus, share information for a collaborative project or submit a project to a professor with a USB flash drive.
- Buy and use educational software available for PDAs to review the subject they're studying.
- Complete written, video or presentation assignments and hand them in via e-mail to the professor.
- Log in with a secure password to check their ongoing grades in each course.

[Source: EDUCAUSE].



http://blogs.adobe.com/elearning/

	Adobe Captivate	Articulate Presenter	Articulate Engage	Adobe Connect	TechSmith Camtasia	Adobe Presenter	Harbinger Raptivity
BEST USE:							
Software Simulations							
Soft Skills Simulations							
Interactions							
Quizzes							
Synchronous							
Asynchronous							
Linear Video							
Simple Branching							
Complex Branching							
INTERFACE:							
PowerPoint							
Stage							
Timeline							
Wizard / Form							
Online							
CAN INSERT:							
Images							
Audio							
Video							
Flash							
Animations							
PowerPoint							
Web Pages							
PLATFORMS:							
Windows							
Macintosh							
Online							
PUBLISH TO:							
HTML / Flash							
Mobile Devices							
MP4 / AVI							
Online							
Word / PDF							
Windows EXE							
Mac App							
COST:							
Standard	$799	$699	$399	$45-$55	$299	$500	$399-$3999
Upgrade	$149	$149	$199	n/a	$150	n/a	See details

Content authoring tools for e learning

http://www.slideshare.net/janehart/top-100-tools-for-learning-2013

Medical Teacher, Vol. 28, No. 1, 2006, pp. 40–48

Information and communication technologies in higher education: evidence-based practices in medical education*

MARTIN VALCKE & BRAM DE WEVER
Department of Education, Ghent University, Belgium

ABSTRACT *In contrast to traditional meta-analyses of research, an alternative overview and analysis of the research literature on the impact of information and communication technologies (ICT) in medical education is presented in this article. A distinction is made between studies that have been set up at the micro-level of the teaching and learning situation and studies on meso-level issues. At the micro-level, ICT is hypothesized to foster three basic information processing activities: presentation, organization, and integration of information. Next to this, ICT is expected to foster collaborative learning in the medical knowledge domain. Empirical evidence supports the potential of ICT to introduce students to advanced graphical representations but the studies also stress the importance of prior knowledge and the need for real-life tactile and practical experiences. The number of empirical studies focusing on the impact of ICT on information organization is restricted but the results suggest a positive impact on student attitudes and relevant learning gains. However, again, students need a relevant level of prior knowledge. Empirical studies focusing on the impact of ICT on information integration highlight the positive impact of ICT-based assessment and computer simulations; for the latter this is especially the case when novices are involved, and when they master the prerequisite ICT skills. Little empirical evidence is available regarding the impact of computer games. Research results support the positive impact of ICT-based collaboration but care has to be taken when skills development is pursued. At the meso-level, the available empirical evidence highlights the positive impact of ICT to promote the efficiency of learning arrangements. Research grounds the key position of ICT in a state-of-the-art medical curriculum. Recent developments focusing on repositories of learning materials for medical education have yet not been evaluated. The article concludes by stressing the need for evaluative studies, especially in the promising field of ICT-based collaborative learning. Furthermore, the importance to be attached to the position and qualifications of the teaching staff is emphasized.*

Introduction

Recent reviews of research concerning the efficacy and efficiency of the integrated use of information and communication technologies (ICT) in education do not always come to optimistic conclusions. The meta-analyses of Kulik (2003) result in statements that the potential of ICT in education is yet not clear and that the findings of evaluative studies are conflicting. Other researchers come to comparable conclusions (e.g. Waxman *et al.*, 2003; Cox *et al.*, 2003). In relation to medical education, Letterie (2003) presents a more specific analysis of research on the potential of computer-assisted instruction based on the content analysis of studies (MEDLINE and ERIC) set up between 1988 and 2000. He concludes: "Few studies of good design clearly demonstrate improvement in medical education over traditional modalities. There are no comparative studies…that demonstrate a clear-cut advantage. Future studies of computer-assisted instruction that include comparisons and cost-assessments to gauge their effectiveness over traditional methods may better define their precise role" (Letterie, 2003, p. 849).

It is important to note that the author could identify only 210 studies that met basic research criteria to be incorporated in the analysis. An additional important critique builds on the statement in the last sentence. Few studies succeed in defining the precise role of ICT in the educational process. Part of the research limitation is the lack of a theory that drives the instructional goals of the ICT applications. Moreover, the expected outcomes can be extremely varied, which presents an additional difficulty to meta-analysis studies of evaluative research.

Alternative approach

The present contribution revisits part of the research literature while adopting an instructional analysis approach when considering the potential of ICT in medical education. As to the potential of ICT, a distinction is made between meso-level and micro-level benefits. At the meso-level, we focus on educational benefits that are linked to the delivery of medical education programmes and characteristics of the student population. At the micro-level the focus will be on specific variables and processes in the teaching and learning setting. As a consequence, the analysis question is no longer whether ICT results in better medical education, but rather what type of ICT use—as it is linked to specific variables and processes in the teaching and learning context—results in more effective, efficient or satisfying education.

The empirical base gathered for this overview has been extracted from MEDLINE and ScienceDirect, by applying the search concepts *medical*, *education* and *computer* and with a focus on studies published in journals since 2000.

Correspondence: Martin Valcke, Department of Education, Henri Dunantlaan 2, B-9000 Gent, Belgium. Tel: +32 9 264 86 75; fax: +32 9 264 86 88; email: martin.valcke@UGent.be

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Curriculum

In formal education, a curriculum is the planned interaction of pupils with instructional content, materials, resources, and processes for evaluating the attainment of educational objectives. Other definitions combine various elements to describe curriculum as follows:

- All the learning which is planned and guided by the school, whether it is carried on in groups or individually, inside or outside the school. (John Kerr)
- Outlines the skills, performances, attitudes, and values pupils are expected to learn from schooling. It includes statements of desired pupil outcomes, descriptions of materials, and the planned sequence that will be used to help pupils attain the outcomes.
- The total learning experience provided by a school. It includes the content of courses (the syllabus), the methods employed (strategies), and other aspects, like norms and values, which relate to the way the school is organized.
- The aggregate of courses of study given in a learning environment. The courses are arranged in a sequence to make learning a subject easier. In schools, a curriculum spans several grades.
- Curriculum can refer to the entire program provided by a classroom, school, district, state, or country. A classroom is assigned sections of the curriculum as defined by the school. For example, a fourth grade class teaches the part of the school curriculum that has been designed as developmentally appropriate for students who are approximately nine years of age.

http://en.wikipedia.org/wiki/Curriculum

2010; 32: 638–645 MEDICAL TEACHER

Competency-based medical education: theory to practice

JASON R. FRANK[1], LINDA S. SNELL[2], OLLE TEN CATE[3], ERIC S. HOLMBOE[4], CAROL CARRACCIO[5], SUSAN R. SWING[6], PETER HARRIS[7], NICHOLAS J. GLASGOW[8], CRAIG CAMPBELL[9], DEEPAK DATH[10], RONALD M. HARDEN[11], WILLIAM IOBST[12], DONLIN M. LONG[13], RANI MUNGROO[14], DENYSE L. RICHARDSON[15], JONATHAN SHERBINO[16], IVAN SILVER[17], SARAH TABER[18], MARTIN TALBOT[19] & KENNETH A. HARRIS[20]

[1]Royal College of Physicians and Surgeons of Canada and University of Ottawa, Canada, [2]McGill University and Royal College of Physicians and Surgeons of Canada, [3]Center for Research and Development of Education, University Medical Center, Utrecht, the Netherlands, [4]American Board of Internal Medicine, USA, [5]Department of Pediatrics, University of Maryland, Baltimore, USA, [6]Accreditation Council for Graduate Medical Education, USA, [7]University of New South Wales, Australia, [8]Australian National University, Canberra, Australia, [9]Royal College of Physicians and Surgeons of Canada and University of Ottawa, Canada, [10]McMaster University and Royal College of Physicians and Surgeons of Canada, [11]University of Dundee, Scotland, [12]American Board of Internal Medicine, USA, [13]Johns Hopkins University, Baltimore, USA, [14]Canadian Association of Internes and Residents, [15]University of Toronto and Royal College of Physicians and Surgeons of Canada, [16]McMaster University, Hamilton, and Royal College of Physicians and Surgeons of Canada, [17]University of Toronto, [18]Royal College of Physicians and Surgeons of Canada, [19]University of Sheffield, England, [20]Royal College of Physicians and Surgeons of Canada, University of Ottawa and University of Western Ontario, Canada

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Abstract

Although competency-based medical education (CBME) has attracted renewed interest in recent years among educators and policy-makers in the health care professions, there is little agreement on many aspects of this paradigm. We convened a unique partnership – the International CBME Collaborators – to examine conceptual issues and current debates in CBME.

We engaged in a multi-stage group process and held a consensus conference with the aim of reviewing the scholarly literature of competency-based medical education, identifying controversies in need of clarification, proposing definitions and concepts that could be useful to educators across many jurisdictions, and exploring future directions for this approach to preparing health professionals.

In this paper, we describe the evolution of CBME from the outcomes movement in the 20th century to a renewed approach that, focused on accountability and curricular outcomes and organized around competencies, promotes greater learner-centredness and de-emphasizes time-based curricular design. In this paradigm, competence and related terms are redefined to emphasize their multi-dimensional, dynamic, developmental, and contextual nature. CBME therefore has significant implications for the planning of medical curricula and will have an important impact in reshaping the enterprise of medical education.

We elaborate on this emerging CBME approach and its related concepts, and invite medical educators everywhere to enter into further dialogue about the promise and the potential perils of competency-based medical curricula for the 21st century.

Introduction

> We believe that in the future, expertise rather than experience will underlie competency-based practice and . . . certification (Aggarwal & Darzi 2006)

Issues surrounding competency-based medical education (CBME) have generated increasing attention and debate among health professions educators in recent years. This is evidenced by sessions at major international conferences (Frank et al. 2008; Thompson et al. 2009; Frank & Snell 2010), innovative pilot projects (Kraemer 2009), and a growing number of key publications in medical education journals (Harden 1999; Long 2000; Carraccio et al. 2002;

Practice points

- Competency-based education is a resurgent paradigm in professional education.
- CBME is organized around competencies, or predefined abilities, as outcomes of the curriculum.
- The CBME paradigm employs redefined concepts of competence and its development.
- CBME holds great promise along with many challenges for physician training worldwide.
- CBME has the potential to transform contemporary medical education.

Correspondence: Dr. Jason R. Frank, Associate Director, Office of Education, Royal College of Physicians and Surgeons of Canada, 774 Echo Drive, Ottawa, ON, Canada K1S 5N8. Tel: (613) 260-4173; email: jfrank@rcpsc.edu

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RIGHTSLINK

DEVELOPING A CURRICULUM USING THE SPICES MODEL

AFTER HARDEN ET AL 1984 (UNIV. DUNDEE)

Purpose of the SPICES model:

1. to review an existing curriculum to see where improvements can be made
2. to develop a new curriculum from scratch
3. to tackle specific questions or issues relating to a curriculum
4. to help decide on what sort of teaching methods to use on a course
5. decide what format the assessment should take

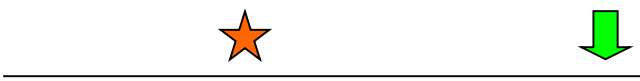
Mnemonic

S	student centred	*vs*	teacher centred	**T**
P	problem based	*vs*	information gathering	**I**
I	integrated	*vs*	discipline based	**D**
C	community based	*vs*	hospital based	**H**
E	elective	*vs*	uniformed/standard	**U**
S	systematic	*vs*	apprenticeship	**A**

How to Do It:

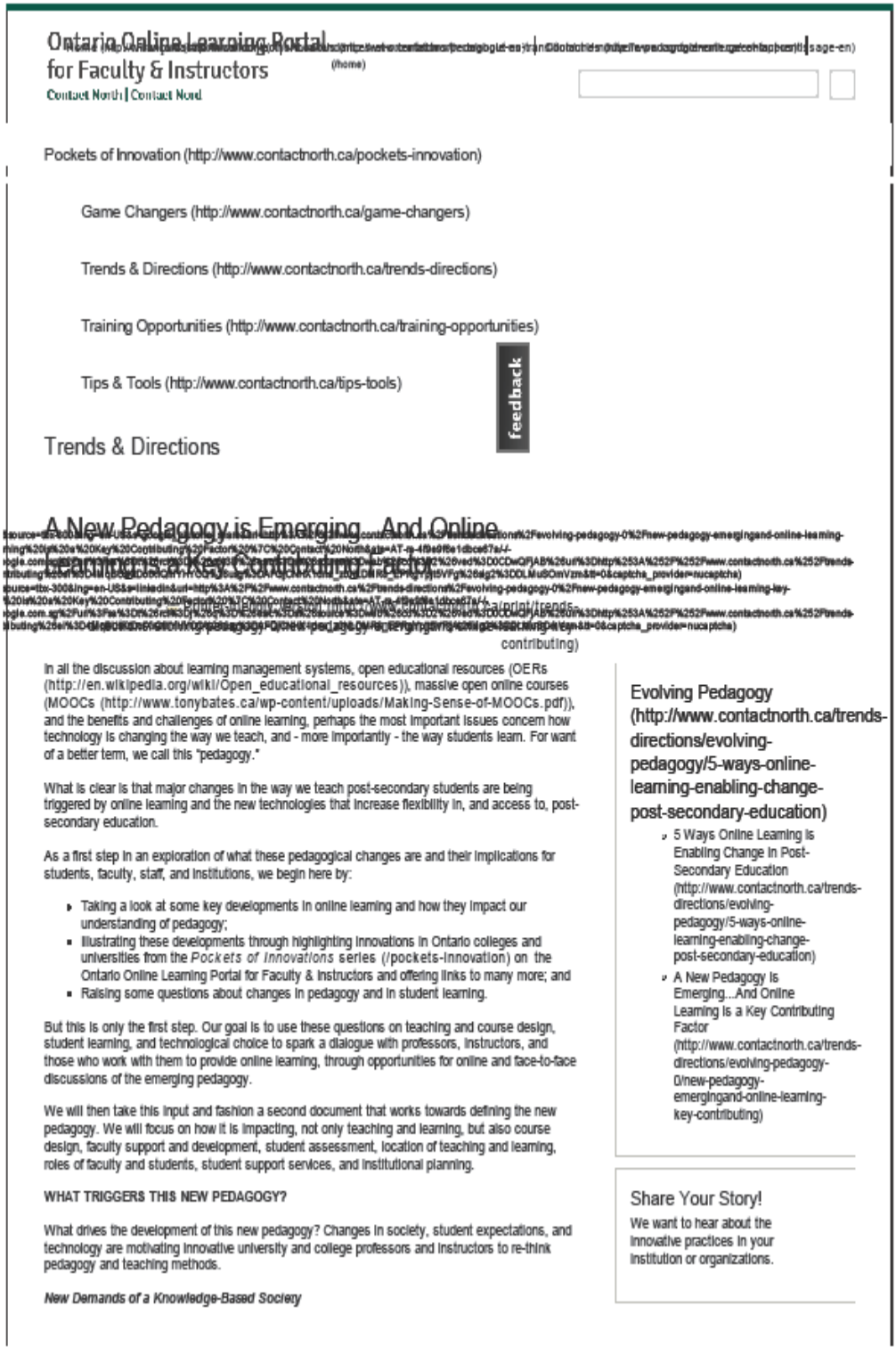
- You need to map out on the charts where you are now and where you feel you need to be. There is no such thing as an ideal place to be; it varies and depends on the aims and objectives of your course.
- Slide the green arrow to where you are now.
- Slide the orange star to where you would like to be.
- Then try and list some possible realistic methods of change that would enable a move towards the ideal (orange star).
-

STUDENT CENTRED - TEACHING CENTRED



student centred *teacher centred*

SUMMARY	SUMMARY
Learners involved in curriculum design	Teaches design the curriculum
Teaching content based on learners' agenda	Teaching content prescribed by teachers on basis of
Leaner centre methods used eg small group work	what they feel learners should know
Expert outside speakers/resources little used	Largely dictatorial eg lectures



Ontario Online Learning Portal for Faculty & Instructors

Contact North | Contact Nord

(home)

Pockets of Innovation (http://www.contactnorth.ca/pockets-innovation)

Game Changers (http://www.contactnorth.ca/game-changers)

Trends & Directions (http://www.contactnorth.ca/trends-directions)

Training Opportunities (http://www.contactnorth.ca/training-opportunities)

Tips & Tools (http://www.contactnorth.ca/tips-tools)

feedback

Trends & Directions

A New Pedagogy is Emerging...And Online

contributing)

In all the discussion about learning management systems, open educational resources (OERs (http://en.wikipedia.org/wiki/Open_educational_resources)), massive open online courses (MOOCs (http://www.tonybates.ca/wp-content/uploads/Making-Sense-of-MOOCs.pdf)), and the benefits and challenges of online learning, perhaps the most important issues concern how technology is changing the way we teach, and - more importantly - the way students learn. For want of a better term, we call this "pedagogy."

What is clear is that major changes in the way we teach post-secondary students are being triggered by online learning and the new technologies that increase flexibility in, and access to, post-secondary education.

As a first step in an exploration of what these pedagogical changes are and their implications for students, faculty, staff, and institutions, we begin here by:

- Taking a look at some key developments in online learning and how they impact our understanding of pedagogy;
- Illustrating these developments through highlighting innovations in Ontario colleges and universities from the *Pockets of Innovations* series (/pockets-innovation) on the Ontario Online Learning Portal for Faculty & Instructors and offering links to many more; and
- Raising some questions about changes in pedagogy and in student learning.

But this is only the first step. Our goal is to use these questions on teaching and course design, student learning, and technological choice to spark a dialogue with professors, instructors, and those who work with them to provide online learning, through opportunities for online and face-to-face discussions of the emerging pedagogy.

We will then take this input and fashion a second document that works towards defining the new pedagogy. We will focus on how it is impacting, not only teaching and learning, but also course design, faculty support and development, student assessment, location of teaching and learning, roles of faculty and students, student support services, and institutional planning.

WHAT TRIGGERS THIS NEW PEDAGOGY?

What drives the development of this new pedagogy? Changes in society, student expectations, and technology are motivating innovative university and college professors and instructors to re-think pedagogy and teaching methods.

New Demands of a Knowledge-Based Society

Evolving Pedagogy (http://www.contactnorth.ca/trends-directions/evolving-pedagogy/5-ways-online-learning-enabling-change-post-secondary-education)

- 5 Ways Online Learning is Enabling Change in Post-Secondary Education (http://www.contactnorth.ca/trends-directions/evolving-pedagogy/5-ways-online-learning-enabling-change-post-secondary-education)
- A New Pedagogy is Emerging...And Online Learning is a Key Contributing Factor (http://www.contactnorth.ca/trends-directions/evolving-pedagogy-0/new-pedagogy-emergingand-online-learning-key-contributing)

Share Your Story!

We want to hear about the innovative practices in your institution or organizations.

2009; 31: 359–361

TWELVE TIPS

Twelve tips for blueprinting

SYLVAIN CODERRE, WAYNE WOLOSCHUK & KEVIN MCLAUGHLIN

Office of Undergraduate Medical Education, University of Calgary, Canada

Abstract

Background: Content validity is a requirement of every evaluation and is achieved when the evaluation content is congruent with the learning objectives and the learning experiences. Congruence between these three pillars of education can be facilitated by blueprinting.

Aims: Here we describe an efficient process for creating a blueprint and explain how to use this tool to guide all aspects of course creation and evaluation.

Conclusions: A well constructed blueprint is a valuable tool for medical educators. In addition to validating evaluation content, a blueprint can also be used to guide selection of curricular content and learning experiences.

Introduction

Validity is a requirement of every evaluation and implies that candidates achieving the minimum performance level have acquired the level of competence set out in the learning objectives. Typically, the type of validity that relates to measurements of academic achievement is content validity (Hopkins 1998). Evaluation content is valid when it is congruent with the objectives and learning experiences, and congruence between these pillars of education can be facilitated by using an evaluation blueprint (Bordage et al. 1995; Bridge et al. 2003).

In this paper we describe an efficient and straightforward process for creating a blueprint, using examples from the University of Calgary medical school curriculum. Although its primary function is to validate evaluation content, a well constructed blueprint can also serve other functions, such as guiding the selection of learning experiences. 'Course blueprint' may therefore be a more appropriate descriptor of this tool.

Tip 1. Tabulate curricular content

The first step in blueprinting is to define and tabulate the curricular content. A blueprint template consists of a series of rows and columns. At the University of Calgary, teaching of the undergraduate curriculum is organized according to clinical presentations, so the rows in our blueprints contain the clinical presentations relevant to the course being blueprinted (Mandin et al. 1995). Column 1 in Table 1 shows the eighteen clinical presentations for the Renal Course at the University of Calgary. Curricular content can be organized in many other ways, including course themes or units.

Tip 2. Provide relative weighting of curricular content

Evaluations have a finite number of items, so some measure of relative weighting of content areas must be decided upon so that priority can be given to more 'important' areas when creating items. Content importance, however, is difficult to define. Attributes such as the potential harm to the patient from misdiagnosing a presentation (a measure of presentation 'impact'), the potential for significant disease prevention (also a measure of presentation 'impact'), and how frequently a presentation is encountered in clinical practice should be considered.

At the University of Calgary we rate the impact and frequency of clinical presentations based on the criteria shown in Table 2. The impact and frequency of each clinical presentation are tabulated (columns 2 and 3 of Table 1) and then multiplied. This produces an I × F product for all eighteen clinical presentations, which ranges from 1 to 9. Next, the I × F product for each clinical presentation (column 4 of Table 1) is divided by the total for the I × F column (80 in our example) to provide a relative weighting for each presentation, which corresponds to the proportion of evaluation items for this presentation (column 5 of Table 1). For example, hyperkalemia – a life threatening emergency that is encountered frequently by physicians caring for patients with kidney diseases – has the highest relative weighting (0.1125). But how do we know that this weighting is reliable?

Tip 3. Sample opinion on weighting from all relevant groups

Reliability is improved by increasing sample size and breadth (Hopkins 1998). In addition to involving course chairs and evaluation coordinators, we solicit input from teachers and, if relevant, previous learners (McLaughlin et al. 2005a). That is, weighting of a content area is established through consensus. Giving potential users the opportunity to have input into the blueprint creation may also improve the likelihood of the blueprint being used to guide all aspects of course design and evaluation (see Tip 10).

Correspondence: Dr Kevin McLaughlin, University of Calgary, Undergraduate Medical Education, Calgary, Alberta, Canada. Email: kevin.mclaughlin@calgaryhealthregion.ca

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Online Assessment Methods Dr Vaikunthan Rajaratnam

'Assessment and feedback practices should be designed to enable students to become self-regulated learners, able to monitor and evaluate the quality and impact of their own work and that of others.' David Nicol (2010)

Assessment is a key component of any learning program and ensures objectives are met. But also assessment drives learning and ensures motivation to learn and achieve.

The purposes of assessment are to:

- promote learning
- measure performance, and attainment of the stated learning outcomes;
- determine progression;
- provide feedback to students learning gaps
- provide feedback to teachers learning needs and diagnose ineffective teaching.

Key to effective assessment are the linkages between outcomes, the design of assessment tasks, criteria, marking procedures and feedback - the blueprint and rubrics of education and assessment.

Assessment can be both summative and formative and recent evidence is clear that the use of formative assessment allows for deeper learning to occur and encourages the lifelong learner is the eventual outcome of adult education. Well-designed assessment allows for engagement of students and helps them direct their learning especially for those who are on self-paced and on demand learning platforms.

Assessment should allow for determination of performance, against the intended outcomes of the program. So therefore it requires a link between the learning outcomes and clear guidelines on the expected behaviour that will be assessed.

The assessment process should provide for appropriate and timely feedback. It is through feedback that an individual obtains the learning that is meaningful and ensures that the material that has been thought has been received and the objectives achieved.

The use of clearly stated rubrics is essential for assessment to be effective it is here that the student can obtain clear guidelines of the framework of the assessment and the descriptors of the grading and thereby making assessment transparent, equitable and fair.

Assessment methods should provide for a range of assessment instruments and processes to encourage the development of a range of attributes and skills. These tools must match the type of knowledge that is being assessed from the level of basic reproduction of facts like remembering to that of

higher order thinking - the creation of new knowledge according to Bloom's taxonomy.

Assessment should be reliable and valid. This is the cornerstone of any assessment. Both in terms of its content, construct and acceptance to the students and in terms of the contexts in which it is being used the assessment must be valid. Its reliability must be ensured with the use of appropriate psychometric testing that the true measures of what it is meant to measure correctly in different environments and uses.

Assessment tasks and methods should take into account, where possible, past experience/prior student feedback. This is important for the individualisation of the assessment tool to the learning needs of each and every student.

Assessment design should be responsive to students' context such as multiple curricula, different study environments and different cultural contexts.

Assessment methods should provide reasonable accommodation for students with a disability.

So online assessment can be in the form of written assignments, interactive activities drop, quizzes, collaborative assignment, portfolios, online examinations, practicals, simulations, case studies, forums, online discussions, publication of student work and presentation, Journal and reflections.

In the context of online assessment the following are some of the best practices from research in online assessment.

1. Online assessments should be aligned with the curriculum and relevant to the course learning outcomes.

2. Online assessment instructions and question wording should be clear, concise and free from ambiguity.

3. Timely and meaningful feedback should be provided. The extent and nature of this feedback should reflect the purpose of the assessment and the nature of the online assessment method.

4. Marking schemes should be fair, transparent, weighted appropriately and clearly communicated to students.

5. Online assessment tasks should be designed with accessibility in mind. Provision for 'reasonable adjustments' to accommodate students with special needs should be considered as should appropriate alternatives should potential adjustments prove inadequate.

6. Where appropriate, online assessment tasks should incorporate a range of question types in order to assess the breadth and depth of student knowledge.

7. Online assessments incorporating objective questions should include suitable and relevant distracters to minimise the potential for guessing.

8. Online assessment approaches should be guided by the level at which the student is studying.

9. Careful consideration should be made in relation to the time (stage) at which online assessment tasks are employed during a student's course of study and also to the realistic time frame in which students could be expected to complete the task.

10. Online assessments should not test a student's information technology skills or their adeptness at using a specific online assessment tool unless that is the explicit purpose of the assessment.

The advantages of online assessment include learner centeredness, encourage and self-reflection. It includes rubrics for discussion assignments and collaboration and encourages self and peer assessment. It helps to contextualise and align the learning to the learning outcomes and allows for learner input. Online assessments are reusable and efficient though initial design and deployment may be resource intensive. It allows for student input into assessment design and empowers the students in their own assessment. It also allows for timely and personalise feedback if the design ensures detail in the creation of the online feedback. The technologies allow for both self and peer assessment.

The major disadvantages of online assessment are a technical ability needed to design and deploy these assessments. As always, fear and anxiety about the reliability of the technologies will always be there. Whether plagiarism and assistance is obtained while the student is performing the online assessment and practical skill assessment may be difficult to monitor and control.

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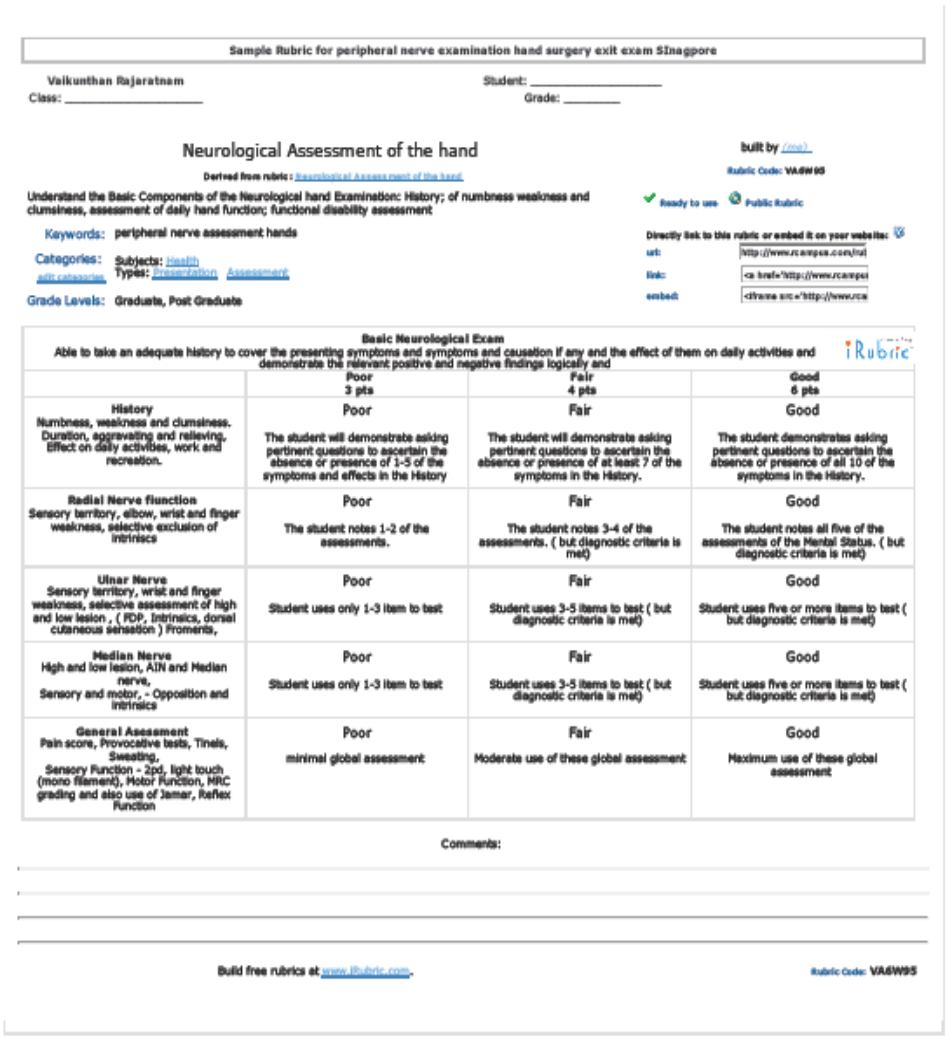

Sample Rubric for peripheral nerve examination hand surgery exit exam SIngapore

Vaikunthan Rajaratnam

Class: _____

Student: _____

Grade: _____

Neurological Assessment of the hand

built by (me)

Derived from rubric : Neurological Assessment of the hand

Rubric Code: VA6W9S

Understand the Basic Components of the Neurological hand Examination: History; of numbness weakness and clumsiness, assessment of daily hand function; functional disability assessment

Ready to use Public Rubric

Keywords: peripheral nerve assessment hands

Directly link to this rubric or embed it on your website:

Categories: Subjects: Health
edit categories Types: Presentation, Assessment

Grade Levels: Graduate, Post Graduate

Basic Neurological Exam

Able to take an adequate history to cover the presenting symptoms and symptoms and causation if any and the effect of them on daily activities and demonstrate the relevant positive and negative findings logically and

	Poor 3 pts	Fair 4 pts	Good 6 pts
History Numbness, weakness and clumsiness. Duration, aggravating and relieving. Effect on daily activities, work and recreation.	Poor The student will demonstrate asking pertinent questions to ascertain the absence or presence of 1-5 of the symptoms and effects in the History	Fair The student will demonstrate asking pertinent questions to ascertain the absence or presence of at least 7 of the symptoms in the History.	Good The student demonstrates asking pertinent questions to ascertain the absence or presence of all 10 of the symptoms in the History.
Radial Nerve fiunction Sensory territory, elbow, wrist and finger weakness, selective exclusion of intrinsics	Poor The student notes 1-2 of the assessments.	Fair The student notes 3-4 of the assessments. (but diagnostic criteria is met)	Good The student notes all five of the assessments of the Mental Status. (but diagnostic criteria is met)
Ulnar Nerve Sensory territory, wrist and finger weakness, selective assessment of high and low lesion , (FDP, Intrinsics, dorsal cutaneous sensation) Froments,	Poor Student uses only 1-3 item to test	Fair Student uses 3-5 items to test (but diagnostic criteria is met)	Good Student uses five or more items to test (but diagnostic criteria is met)
Median Nerve High and low lesion, AIN and Median nerve, Sensory and motor, - Opposition and intrinsics	Poor Student uses only 1-3 item to test	Fair Student uses 3-5 items to test (but diagnostic criteria is met)	Good Student uses five or more items to test (but diagnostic criteria is met)
General Assesment Pain score, Provocative tests, Tinels, Sweating, Sensory Function - 2pd, light touch (mono filament), Motor Function, MRC grading and also use of Jamar, Reflex Function	Poor minimal global assessment	Fair Moderate use of these global assessment	Good Maximum use of these global assessment

Comments:

Build free rubrics at www.iRubric.com.

Rubric Code: VA6W9S

Create an e –portfolio Dr. Vaikunthan Rajaratnam

The portfolio is a collection of student's work that is purposefully performed to provide evidence of the student's efforts, progress or achievement in a given area or areas. This bundle of evidence must include the student participation in the selection of the contents, the guidelines for selection, and the criteria for judging merit, and evidence of student self-reflection.

So therefore the portfolio is a source of evidence from which judgements of achievement can be made as a form of an assessment of learning. This can be in the form of formative assessment as part of the process of learning and if learning is clearing and provide remedial measures and feedback. It can also be utilised as a summative assessment. It would include achievements and results from authentic tasks, performance assessment conventional tests and even work examples. It is documentation of evidence over an extended period of time and therefore is a much more authentic form of assessing learning.

E portfolios are therefore merely a portfolio that has been compiled electronically and usually on a website.

So in creating my e-portfolio the processes that I had utilised include processes that show me as a learner, growing. I chose the contents and materials that were included in the portfolio that would reflect my learning on the domain of cognition and knowledge, to skill and that of attitude and performance. I ensured there was enough evidence of reflection in the portfolio. As an adult life long learner, my learning occurred both synchronously and asynchronously and I ensured that I was able to collect and collate learning moments easily. As part of a clinical learning process, I am constantly looking at outcomes of my surgical practice and therefore needed to document clinical outcomes of my patients.

For any new skills that have I have learnt, I attempt to document it through annotations and reflections of how I would apply that in my practice. If it was something that was observed online I would store it as a bookmark data in my portfolio. If I had viewed this in a live performance then I would record it on my mobile device.

For issues on attitude component of learning, in our practice to be one of professionalism , I will include in my portfolio any commendations, appreciated notes from patients, emails of recommendation, feedbacks from lectures, complaints, negative comments by students, this will be collated and stored in the portfolio.

So therefore the challenges facing this task of capturing, collating, storing and retrieving this evidence can be quite phenomenal. As such I chose an electronic format to store the evidence of my lifelong learning portfolio.

The requirements of the general medical Council in the United Kingdom for the revalidation of practising doctors required the maintenance of evidence of good medical practice. This consists of connecting evidence in 4 domains, which included:-

1. professionalism,
2. knowledge skills and performance,
3. safety and quality, and the
4. domain of maintaining trusts.

In keeping with this I chose various mediums to maintain my electronic portfolio. I use a Twitter account for work based e-portfolio maintenance and the note keeping software Evernote for the maintenance of my research and learning portfolio. I use the group function of LinkedIn to enhance my learning to the posting of difficult problems for my community of practitioners from around the world to teach and learn from. This has been a very powerful tool as the group consists of over 900 practitioners from around the world forming a community of practice of hand surgeons. It provides free exchange of ideas and documents to commence feedback and interaction among the participants. This forms a very strong evidence of on-going learning that is occurring in my practice.

In the Twitter account I would create notes on cases seen that pose a diagnostic dilemma with digital images or videos and post them on the Twitter account to show my clinical practice. Obviously all confidential data is preserved so as not to breach any data protection issues. These bits of information are also used as learning bites for my undergraduate and postgraduate teaching. There can be engagement with others who follow me on Twitter and this provides for learning and teaching. Outcome of my surgical practice are documented through images and videos and posted on the Twitter site.

Evernote has been a very useful tool for my continuous learning process. Its add-in to within the browser allows for me to collect and collate and store learning that is occurred through my web surfing. It also allows for me to record any learning points during attending conferences of taking snapshots of events including what is written on this whiteboard as notes and evidence of my learning. To enhance this process the notes would have added tags and annotations to show reflection and learning. By being present on multiple devices Evernote allows me to be able to collect and collate evidence anywhere and at any time. Its features of syncing to the cloud ensure that all evidence is ubiquitous. I am able to access them on the desktop laptop and my phone and can share this evidence with whoever

requires it. I am also able to drag and drop camera uploads from a smart phone to my Evernote folder of all digital imaging that had been utilised as part of my evidence collection for my portfolio.

This portfolio that I maintain is an evidence for my revalidation requirements of the general medical Council United Kingdom, which can be considered as a form of formative assessment of my continuous learning. It shows the process of learning through reflection, through understanding through errors and successes. It shows the journey of learning rather than the endpoint which would be a summative assessment. Assessment is in the form of the knowledge testing through recall like an exit examination, be either multiple choice or assignments, look at an endpoint rather than the whole process of learning. Portfolio allows for formative assessment and over an extended period of time showing evidence of deep learning and of a behaviour of self-directed and lifelong learning.

So the portfolio not only documents achievement but also self-evaluation and also analyses a learning process through analysis of the reflections that are maintained. It also collects evidence when failure has occurred and sees whether learning has occurred in those instances. It assesses the role of metacognition of learning by showing how, when, who, where and why, one has learnt. It would be difficult to establish portfolios as a summative assessment as it would be expensive in terms of time and resource management and there may be issues of reliability in terms of grading and standards. However this can be overcome by ensuring assessors have exemplar to work with and comprehensive and robust rubrics for grading.

Keeping this portfolio has been assisted by having a clear purpose of this. In my case this portfolio is part of the process of revalidation. So the evidence that is collected is clear and well defined. The time required to maintain this portfolio has been made easy by the use of electronic tools like Evernote, LinkedIn and Twitter and the use of ubiquitous devices. I've been assisted by the clearly defined domains required by the general medical Council in helping me choose the content that is needed to maintain my portfolio. The good medical practice guidelines that were issued by the general medical Council in 2013 establish clear performance indicators that are required to be met in the evidence.

original research

The use of qualitative research criteria for portfolio assessment as an alternative to reliability evaluation: a case study

E Driessen,[1] C van der Vleuten,[2] L Schuwirth,[2] J van Tartwijk[3] & J Vermunt[3]

AIM Because it deals with qualitative information, portfolio assessment inevitably involves some degree of subjectivity. The use of stricter assessment criteria or more structured and prescribed content would improve interrater reliability, but would obliterate the essence of portfolio assessment in terms of flexibility, personal orientation and authenticity. We resolved this dilemma by using qualitative research criteria as opposed to reliability in the evaluation of portfolio assessment.

METHODOLOGY/RESEARCH DESIGN Five qualitative research strategies were used to achieve credibility and dependability of assessment: triangulation, prolonged engagement, member checking, audit trail and dependability audit. Mentors read portfolios at least twice during the year, providing feedback and guidance (prolonged engagement). Their recommendation for the end-of-year grade was discussed with the student (member checking) and submitted to a member of the portfolio committee. Information from different sources was combined (triangulation). Portfolios causing persistent disagreement were submitted to the full portfolio assessment committee. Quality assurance procedures with external auditors were used (dependability audit) and the assessment process was thoroughly documented (audit trail).

RESULTS A total of 233 portfolios were assessed. Students and mentors disagreed on 7 (3%) portfolios and 9 portfolios were submitted to the full committee. The final decision on 29 (12%) portfolios differed from the mentor's recommendation.

CONCLUSION We think we have devised an assessment procedure that safeguards the characteristics of portfolio assessment, with credibility and dependability of assessment built into the judgement procedure. Further support for credibility and dependability might be sought by means of a study involving different assessment committees.

KEYWORDS education, medical, undergraduate/*methods; educational measurement/*methods; curriculum/ standards; reproducibility of results; clinical competence/*standards; students, medical/*psychology; mentors.

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[1]Department of Educational Development and Research, Maastricht University, Maastricht, The Netherlands
[2]ICLON, Leiden University, Leiden, The Netherlands
[3]IVLOS Institute of Education, Utrecht University, Utrecht, The Netherlands

Correspondence Erik Driessen, Department of Educational Development and Research, PO Box 616, 6200 MD Maastricht, The Netherlands. Tel: 00 31 43 388 5774; Fax: 00 31 43 388 5779; E-mail: e.driessen@educ.unimaas.nl

INTRODUCTION

The use of portfolios as an assessment tool has gained rapid popularity. As has happened with many assessment instruments, the term 'portfolio' has become a container concept covering a diversity of methods.[1,2] At the heart of every portfolio is information collected in evidence of the owner's learning process and/or competence levels. The evidence is often organised by competencies and may be supplemented with reflections on educational achievement and personal and professional development.[3] Portfolios were primarily introduced to assess performance in authentic contexts and encourage learners to reflect on their performance.[4] When portfolios are used for summative rather than formative assessment, the psychometric

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AMEE GUIDE

Portfolios for assessment and learning: AMEE Guide no. 45

JAN VAN TARTWIJK[1] & ERIK W. DRIESSEN[2]
[1]Leiden University, [2]University of Maastricht, The Netherlands

Abstract

In 1990, Miller wrote that no tools were available for assessment of what a learner *does* when functioning independently at the clinical workplace (Miller 1990). Since then portfolios have filled this gap and found their way into medical education, not only as tools for assessment of performance in the workplace, but also as tools to stimulate learning from experience. We give an overview of the content and structure of various types of portfolios, describe the potential of electronic portfolios, present techniques and strategies for using portfolios as tools for stimulating learning and for assessment, and discuss factors that influence the success of the introduction. We conclude that portfolios have a lot of potential but that their introduction also often leads to disappointment, because they require a new perspective on education from mentors and learners and a significant investment of time and energy.

Introduction

Today's doctors find themselves confronted not only with patients who are increasingly knowledgeable and assertive, but also with pressure to apply new findings and evidence in day-to-day practice, and with the necessity to collaborate with other health professionals in ever larger teams and communities. To deal with these complexities, doctors need generic competencies to enhance effective communication, organisation, teamwork and professionalism. These generic competencies are sometimes labelled as doctors' 'soft skills' in contrast to 'hard clinical skills'. In recent years, learning, teaching and assessment of these generic competencies have gained unexpected urgency among politicians and the general public. Headlines decrying incidents involving dysfunctional doctors and hospital departments with dramatic impact on morbidity and mortality figures catapulted generic competencies to the forefront of attention as indispensable qualities for doctors. As a result, professional associations and governments began to voice increasingly urgent demands to include these generic competencies in education and assessment (General Medical Council 2000). At the same time, consistent with the general trend towards outcome-based education, the focus in medical education shifted from the educational process itself towards the competencies of doctors at the end of training and at important junctures during the training process (Norcini et al. 2008). The competencies described by professional organisations such as the Royal College of Physicians and Surgeons of Canada (1996) became the framework for assessment and, as a consequence, for the content and organisation of programmes for medical education in many countries.

Practice points

- The goals of working with a portfolio need to be clear.
- It is not problematic to use portfolios concurrently to formatively promote learning as well as for summative assessment. Summative assessment is important to ensure that portfolio learning maintains its status alongside other assessed subjects.
- The effectiveness of learning is enhanced when a mentor supports the portfolio process. Mentorship requires a substantial time investment but is crucial for the successful use of portfolios. The effectiveness of assessment can be enhanced by combining the portfolio with an interview.
- Use a flexible learner-centred portfolio format. A rigid structure in which every detail of portfolio content is prescribed will elicit negative reactions from portfolio users. Too much structure is a greater risk than too little structure, but learners do need clear directions and guidance to support the development and assessment of broad competencies. When there is too much obligatory content portfolios are bureaucratic, both failing to serve any educational purpose and forcing learners to search for content outside their direct and lived experiences.
- Working with a portfolio is time consuming both for learners and mentors. This is more of problem in postgraduate training and continuous medical education than in undergraduate education.

However, stimulating the development of competencies (Box 1) and the assessment of its result is complicated.

Correspondence: Jan Van Tartwijk, ICLON – Leiden University Graduate School of Teaching, Leiden University, PO Box 905, 2300 AX, Leiden, The Netherlands. Tel: 31 71 527 3845; fax: 31 71 527 5342; email: jtartwijk@iclon.leidenuniv.nl

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E learning Content Authoring Tools

An **authoring system** is a program which has pre-programmed elements for the development of interactive multimedia software titles. Authoring systems can be defined as software which allows its user to create multimedia applications for manipulating multimedia objects.

In the development of educational software, an authoring System is a program that allows a non-programmer to easily create software with programming features. The programming features are built in but hidden behind buttons and other tools, so the author does not need to know how to program. Generally Authoring Systems provide lots of graphics, interaction, and other tools educational software needs.

An authoring system usually includes an *authoring language*, a programming language built (or extended) with functionality for representing the tutoring system. The functionality offered by the authoring language may be programming functionality for use by programmers or domain representation functionality for use by subject experts. There is overlap between authoring languages with domain representation functionality and domain-specific languages.

The top-seven tools that people reported using, in order of most use to least, are:

1. Adobe Captivate
2. *Articulate Presenter*
3. *Articulate Engage*
4. Adobe Connect
5. TechSmith Camtasia
6. Adobe Presenter
7. Harbinger Raptivity

Free

CourseLab, Exe

Learning Management Systems

A Learning Management System (LMS) is a software application for the administration, documentation, tracking, reporting and delivery of e-learning education courses or training programs.

LMSs range from systems for managing training and educational records to software for distributing online or blended/hybrid college courses over the Internet with features for online collaboration. Colleges and universities use LMSs to deliver online courses and augment on-campus courses. Corporate training departments use LMSs to deliver online training, as well as automate record-keeping and employee registration.

http://en.wikipedia.org/wiki/Learning_management_system

MOODLE

Moodle (Modular Object-Oriented Dynamic Learning Environment) is a free software e-learning platform, also known as a Learning Management System, or Virtual Learning Environment (VLE). As of June 2013 it had a user base of 83,008 registered and verified sites, serving 70,696,570 users in 7.5+ million courses with 1.2+ million teachers.[3]

Moodle was originally developed by Martin Dougiamas to help educators create online courses with a focus on interaction and collaborative construction of content, and is in continual evolution. The first version of Moodle was released on 20 August 2002.

http://docs.moodle.org/25/en/Moodle_manuals

Resources for Digital Learning

Some URL to visit

Video Scribing

http://youtu.be/km-J9PnDOxE

Creating a video from PowerPoint tips

http://youtu.be/Y54EbT5WGn4

How to create a video form your PowerPoint 2010 and above

http://youtu.be/3a5cVEteyB8

Surgical Education (Pt 1)

http://youtu.be/IL3UwuDbSJg

Surgical Education (Pt 2) Constructivist Theory of Learning

http://youtu.be/ucb3AjtVWVY

The challenges of residency education short version

http://youtu.be/OCojpxpLzc8

RS Animate education (warning: strong language!)

http://youtu.be/QzJIcn7gj6k

Virtual Classroom Wiziq use in Surgical Education

http://youtu.be/sKheolkUjH0

Using Wiziq

http://youtu.be/z2Mf0htQJ_I

A Moodle site featuring Digital Learning

http://www.handsurgeryedu.com/