

# PUTTING LEARNING THEORIES INTO PRACTICE: CRITICAL APPRAISAL OF THE SELECTED ARTICLES

Asif Ali<sup>1,2</sup>, Usman Mehboob<sup>3</sup>, Syed Hamid Habib<sup>1</sup>, Mushtaq Ahmad<sup>4</sup>

## Affiliations:

<sup>1</sup>Institute of Basic Medical Sciences, Khyber Medical University, Peshawar

<sup>2</sup>Institute of Cancer Sciences, University of Glasgow, UK.

<sup>3</sup>Institute of Health Professions Education, Khyber Medical University, Peshawar, Pakistan.

<sup>4</sup>Department of Surgery, Medical Training Institute, Hayatabad Medical Complex, Peshawar, Pakistan.

## Address for correspondence:

Dr. Asif Ali

Email: draliasif7@gmail.com

## ABSTRACT

**Introduction:** It has long been argued that educational theories or any theory has limited influence on the 'practical' situations. However, educational theories could potentially play a significant role in 'practice'. In a leadership role, teachers are expected to evaluate courses, programs and design proposals. Thus teachers in every capacity are required to understand educational psychology and its applications.

**Methodology:** Six selected articles based on educational theories and their relation to practice in learning and clinical framework were used. The characteristics of papers were analyzed and a mind-map was constructed. Application of theories with examples from medical education were designed. Finally a reflection on the whole process was presented.

**Results:** Author details, publication dates, study types, key findings, application in medical education with examples from medical education and limitations of all six papers were profiled. The mind map revealed that behaviorist, cognitive, constructivist and social constructivist models were mostly used. The relationship of educational theories demonstrated among others many themes including learning climate, planning of curricula, internal motivation, self-efficacy, self-directed learning, reflective practice, instructional design, cognitive load and memory. Finally, a reflection of the whole process is presented.

**Conclusion:** The learning and teaching strategies, curriculum design and assessment technique should be in light of educational theories for better application in medical education.

This article may be cited as: Ali A, Mehboob U, Habib SH, Ahmad M. Putting learning theories into practice: Critical appraisal of the selected articles. *Adv Basic Med Sci*. 2018;2(1): 8-13.

## INTRODUCTION

It has long been argued that educational theories or any theory has limited influence on the 'practical' situations. However, educational theories could potentially play a significant role in 'practice'. Learning is a systematic process and teachers should understand how learning happens in a 'learning environment'. A teacher acquire essential skills and knowledge that is necessary to effectively teach, become a good facilitator and grade student performance. In a leadership role, teachers are expected to evaluate courses, programs and design proposals. Thus teachers in every capacity are required to understand educational psychology and its applications.

framework were used. The characteristics of papers were analyzed. Moreover, a mind-map was constructed to see the relationship of theories, themes and application in medical education. Application of theories with examples from medical education were designed. Finally a reflection on the whole process was presented.

## RESULTS

Following is a description of the characteristics of the selected six articles (Table 1). These characteristics include author details, publication dates, study types, key findings, application in medical education and limitations

## METHODOLOGY

Six selected articles based on educational theories and their relation to practice in learning and clinical

Table 1: Study characteristics of selected articles

No	Author/ Year	Title	Study Type	Key Findings	Application in Medical Education	Limitations
1	David M Kaufman 2005 (2)	ABC of learning and teaching in medicine: Applying educational theory in practice	Review Article with opinion	<p>This article attempts to provide a link between educational theories, guiding principles of teaching and the actual practice in 'real life'. It emphasizes to bridge the gap between theory and practice.</p> <p>Principles of andragogy has been summarized as follows: learning climate; planning of methods and curricula; internal motivation; own learning objectives; resource identification; supporting learners; and critical reflection.</p> <p>It explains the concepts of self-efficacy, self-directed learning, constructivism and reflective practice to make better learners.</p>	<p><b>Example 1:</b> Learning microscopy in physiology The learning material should be provided at the start of the lab and students should be encouraged to read for 15-20 minutes. This will engage students in an active learning cycle. The role of tutor should be viewed as a facilitator. The learning environment should be such that each student feel included. This inclusion will drive internal motivation in students. Afterwards, a brief introduction of what the students should be doing in the next 2 hours with support from peers and tutors. Outcomes should be set for students e.g. 'students must identify a WBC under the microscope'. Finally, students should be encouraged to reflect.</p> <p><b>Example 2:</b> <i>Learning of a case of pleural effusion.</i></p> <p>Example 1 model with the exception that this should be done in a clinical ward.</p>	<p>The structure of the paper is not smooth and the headings are somewhat falling apart.</p> <p>Moreover, the boxes are very helpful but unfortunately they sometime duplicate the text.</p> <p>Literature back-up seem to be less.</p>
2	John Q. Young 2014 (5)	Cognitive Load Theory: Implications for medical education	Guidelines and opinion	<p>Cognitive load theory is based on human memory model and is divided into three type of cognitive load which influence working memory: intrinsic, extraneous and germane load.</p> <p>The learners ability to learn is impaired when the working memory is exhausted due to the cognitive load associated with a given goal or task.</p> <p>Effective learning requires adjusting for the various cognitive loads and careful designing of the instructional techniques (e.g. using the 4C/ID approach) and curricula.</p>	<p><b>Example 1:</b> A 3-hour lab session on cranial nerve (CN) anatomy</p> <p>The task of learning 12 CNs can be broken down into two lab sessions. One lab session should be divided into three small sessions of 1-hour with each small session dedicated to one CN. This will decrease <b>intrinsic load</b> and thus working memory will work effectively. To reduce intrinsic load due <b>element interactivity</b> the passage of a single cranial nerve through major passages and routes should be taught and shown in the skull initially. Moreover, during the learning process the tutor should try and minimize <b>extraneous load</b> through two strategies: bring crystalized instructional materials that students should be able to use during the sessions; and the learning tasks where the CN starts, CN route and its distribution should align with the instructional material to avoid distraction associated with the task. Adjusting the intrinsic and extraneous load will optimize <b>germane load</b>. Sufficient time for mental processes should be dedicated in lab for the learner. Thus learning tasks should be planned in the curricular content to avoid cognitive load.</p>	<p>The authors sometimes delve into details that an expert in the field would understand but not a lay but academic person from other specialty.</p>

3	Sarah Yardley 2012 (6)	Experiential learning	Guidelines and opinion	<p>Experiential learning is based on learning from a learner's experiences that is encountered in a learning environment.</p> <p>The foundation of experiential learning is <b>constructivism</b>. Kolb's learning cycle is the most influential.</p> <p>Learning is dependent on social context and is a process that is influenced from multiple dimensions that is underpinned by a collective experience.</p>	<p><b>Example 1:</b></p> <p>Passing I/V cannula</p> <p>A short description of the technique should be provided to the learners, followed by a video demonstration of passing I/V cannula. The students should then be allowed sometime for discussion. The tutor can then ask the students some questions to ensure that the knowledge is right. Afterwards, the tutor can demonstrate the passing of I/V cannula to a patient. This should now follow a practical and rehearsal on a Manikin. Students should be allowed to pass I/V cannula to a patient under supervision after Manikin practice.</p> <p><b>Example 2:</b></p> <p>Suturing of corneoscleral junction after cataract surgery</p> <p>Example 1 model should follow with the exception that now practice and rehearsal shall be done under the microscope.</p> <p><b>Example 3:</b></p> <p>Auscultating of heart sounds.</p> <p>Again example 1 model should follow.</p>	<p>Sometimes it is confusing to grasp the theoretical framework that the authors are proposing.</p> <p>Practical examples from medical education would have been a huge help.</p>
4	Denise Kay & Jonathan Kibble 2016 (1)	Learning theories 101: application to everyday teaching and scholarship	Guidelines and opinion	<p>Learning theories carries a significant impact on successful learning in basic science (and clinical) subjects if carefully employed</p> <p>In behavioral model the learner respond to the stimulus with or without paying attention to behaviors; in a cognitive model the learner is required to play an active role and should strive to retain the knowledge and skills for reproduction; in a constructivist model the learner interact with the learning climate (i.e. instructional designs and the expert educators)</p>	<p>A single theory is not perfect and thus a <b>panel-of-theory</b> approach could be adopted follows</p> <p><b>Example 1:</b></p> <p>How to check urinary sugar</p> <p>For prior knowledge a description of the practical should be distributed and students should be asked to become active learners through searching other resources they wish. On practical day, a one page handout of the schema for better mental procedures should be distributed followed by a 10 minutes description of the technique. Students should then be allowed to work in small groups for learning on how to check urinary sugar. Students should be asked to summarize and write down a report. Finally, a practical demonstration from the tutor.</p> <p><b>Example 2:</b></p> <p>Steroid injection to alopecia skin</p> <p>The model described in example 1 could be employed with a 2-stage design. Lab session in a wet lab and a clinical scenario.</p>	<p>The article should have given an example of how to use all major theories in one setting.</p>

5	John Sandars 2009 (7)	The use of reflection in medical education	Practice Guidelines and opinion	<p>Reflection plays a key role in personal and professional development through knowing and appraising one-own-self that helps in continuous development.</p> <p>At each level of education and career, reflection facilitates the outcome if properly employed through feedback, guided reflection and determined by user.</p> <p>This facilitates a therapeutic relationship of the learner with his outcome.</p>	<p><b>Example 1:</b></p> <p>Genomics lectures.</p> <p>After covering the topic through any modality of learning and teaching the tutor should reflect. The do, review and plan model is highly effective in improving one+s development in a role.</p> <p><b>Example 2:</b></p> <p>A surgeon reflecting on his/her surgical practice.</p> <p>This will have real life implications. For example an ophthalmologist can reflect in a formal way on his/her surgical practice by first compiling the data of visual complications and then delving and reflecting deeply on his -self (as a surgeon) and on his-situation (complications and outcome of surgery). This self-regulation will clearly help in life -long learning.</p>	<p>A practical example at the end of article will facilitate better understanding.</p> <p>During reflection it is natural to over-rate one+s own self. But this can be controlled though guided feedback.</p> <p>Reflection can be influenced by the social environment</p>
6	Jeroen-van Merrienboer 2010 (8)	Cognitive load theory in health professional education : design principles and strategies	Review with opinion	<p>The assumptions underlying the human cognition are that working memory has a natural limit, whereas, long term memory has potentially unlimited capacity to store and retrieve information.</p> <p>Guiding principles should be used to adjust for the cognitive loads on storing and retrieving information in memory; though guidelines are different for naïve and experienced learners.</p>	<p><b>Example 1:</b></p> <p>Preparing a presentation on breathing difficulty,</p> <p>To decrease extraneous load students at the start of the lecture could be asked to come-up with a differential diagnosis of breathing difficulty followed by providing a scheme or flow chart of differential diagnosis developed by the tutor.</p> <p>To manage intrinsic load, start from a description of a simple diagnosis (bronchitis), to a relatively difficult diagnosis (Pneumonia) and finally a more complex diagnosis (lung cancer).</p> <p>To optimize germane load show the student animation of a diagnosis e.g. what happens in pneumonia and how it affects the breathing and what are the radiographic findings.</p> <p><b>Example 2:</b></p> <p>Breast lump excision</p> <p>The strategy in example 1 should be used</p>	<p>A further coherent discussion on table 1 would have been beneficial</p> <p>Evaluation of CLT in basic science and clinical science subject separately would have helped us.</p>



medical education. Though a significant challenge but I believe this was a very important learning exercise as all of us are in teaching positions and introducing us to educational theories and then applying them to medical education was the most effective learning experience. While I was reading my selected articles and then writing the key findings; my impression was that it will be quite difficult to translate these theories to medical education. It was hard to make practical examples from educational theories. However, when I started thinking about examples it was a valuable experience. During making of examples and their potential application in medical education, I realised that the theories play a significant role in the way things happen in a learning environment.

The example that I devised and enjoyed most was “A 3-hour lab session on cranial nerve anatomy”. It was amazing to note that how a learning session can be made more effective through application of learning theories.

I think I will continue with the same practice in my career and I will try and devise my learning and teaching strategies through educational theories application.

### CONCLUSION

The learning and teaching strategies, curriculum design and assessment technique should be in light of educational theories for better application in medical education.

### REFERENCES

1. Kay D, Kibble J. Learning theories 101: application to everyday teaching and scholarship. *Advances in physiology education*. 2016 Mar;40(1):17-25.
2. Kaufman DM. ABC of learning and teaching in medicine: Applying educational theory in practice. *Bmj*. 2003;326(7382):213-6.
3. Crosby RMHJ. AMEE Guide No 20: The good teacher is more than a lecturer - the twelve roles of the teacher. *Medical teacher*. 2000 2000/01/01;22(4):334-47.
4. Nezhad AS, Vahedi M. The Role of Educational Psychology in Teacher Education Programs. *Procedia - Social and Behavioral Sciences*. 2011 2011/01/01;30:327-30.
5. Young JQ, Van Merriënboer J, Durning S, Ten Cate O. Cognitive Load Theory: implications for medical education: AMEE Guide No. 86. *Medical teacher*. 2014 May;36(5):371-84.
6. Yardley S, Teunissen PW, Dornan T. Experiential learning: AMEE Guide No. 63. *Medical teacher*. 2012;34(2):e102-15.
7. Sanders J. The use of reflection in medical education: AMEE Guide No. 44. *Medical teacher*. 2009 Aug;31(8):685-95.
8. van Merriënboer JJ, Sweller J. Cognitive load theory in health professional education: design principles and strategies. *Medical education*. 2010 Jan;44(1):85-93.