

Learning practical skills in a clinical environment



Introduction

“ For the things we have to learn before we do them, we learn by doing” (Aristotle). Everyone goes through the phase of learning by doing. The more you practice, the better you get at the task. But, what about the first time you learn a skill? And if you were to teach a practical skill, what approach do you adopt to make it an effective teaching experience?

I work in a modern teaching hospital in the National Health Service as a senior registrar. The NHS provides a challenging work environment, an environment for learning and teaching, and importantly, a place for healthcare professionals to constantly adapt to the evolving changes in practice. Historically, health care education has revolved around lectures, case based discussion, bedside teaching and demonstration. Whereas transfer of knowledge could be aided by lectures or case-based discussions, transfer of practical skills has been increasingly difficult, especially in an era where time is of essence. From teacher’s perspective, it is imperative to pass on essential information and skill to the learner, and in order to achieve this; he/she could use various pedagogical methods or aids to make the most of the teaching experience. Transfer of knowledge and information from the teacher to the learner not only resides within the teacher and teaching techniques, but is also intrinsic to the learner himself. In this assignment, I will explore some of the teaching theories and practices needed to achieve skills in clinical environment, which have been reflected in my teaching techniques.

Learning practical skills

Practical skills in medicine vary from simple to very complex procedures. Traditionally, clinical skills learning have been an apprenticeship, where most of the practical procedures are learnt on patients in a clinical environment. From personal experience, learning a practical skill was based on the principle of 'see one, do one, and teach one'. Infact, I learnt my first eye block using the same principle. It is a known fact that clinical experience is the gold standard for medical learning. However, in the 21st century, nobody (trainee, trainer, or the patient) should be submitted to the dangers of experimental learning.

Theories of learning styles had been put forward since early 1900s. Kolb (1984) coined the term 'Experiential learning' which he described as 'learning by means of reflection on what we are doing'. Kolb considered learning as knowledge created through transformation of experience. He suggested that new knowledge, skills and attitudes are achieved through interaction amongst four modes of experiential learning. 1) Concrete experience 2) reflective observation 3) abstract conceptualisation and 4) active experimentation. Honey and Mumford (1982) put forward a similar theory on learning by means of 1) Having an experience (activist) 2) reviewing the experience (reflector) 3) concluding from the experience (theorist) and 4) planning the next steps (pragmatist). Applying these learning styles to practical skills, every learner will go through all these styles based on the circumstances and the experience. For example, my first eye block involved 1) observing the teacher perform an eye block on a patient, as he taught me the various steps (theorist), 2) supervise me doing

an eye block (activist). 3) Having had the experience, I went through the steps of the procedure and compared it to the standard techniques mentioned in the textbooks (reflection) and made a few changes to my technique. 4) I had to practice it for a length of time in order to perform eye blocks with ease and anticipate the next steps or deal with any difficulties I encounter (pragmatist). This might be true for my experience; conversely learners might prefer one of these learning styles better than the other. Theorists might want to know every step in detail before they embark on a practical skill, where as an activist might get perturbed by a lengthy explanation and would actually benefit from performing the skill. If we consider all these learning styles as being related to one another and forming a vicious cycle, every learner will go through all the stages of learning styles, but the preferred style might be different and they might move from one style to another based on the circumstances. Laurillard (1993) describes a four-pillared framework for the teacher-learner process. This involves a complex interaction between the teacher's concepts and constructed learning environment on the one hand, and the student's concepts and specific actions on the other. She recognises the importance of the student's own experience in the understanding of academic concepts and processes. Laurillard argues that the pedagogical strategies should encompass four main activities - discussion, adaptation, interaction and reflection. All these theories do apply to a learner needing to gain practical skills in a clinical environment. However from a teacher's perspective, recognising different learning styles in students and catering to the different needs of the learners is a difficult task.

Constructivism and practical skills

Knowledge and skills are developed by interaction between the learner and environment. This explains constructivistic theory by Paiget wherein he tries to explain how the learners attain knowledge (Paiget 1985). Paiget put forward the concept of accommodation and assimilation. Accommodation is the process of having a mental framework of how the external world works. Assimilation is a process of incorporating new experience into already existing framework, which is the internal mental model of the external world. By constantly interacting with the external world, knowledge is assimilated on the pre-existing framework. This knowledge accumulated will form a basis for future interaction with the external world so that such interactions are filled with fewer failures. For example, while learning a practical procedure, by learning a new technique you are creating a framework as to how the technique works. With repeated practice and experience, you might assimilate new knowledge on to the existing framework thereby improving your skills and performance, so that your future tasks have fewer failures. Schunk (2004) describes three different types of constructivism - endogenous (learning by interactions between structures in the external world), exogenous (learning by interactions between cognitive structures) and dialectical (constructions not entirely based on external or internal environments). Constructivists emphasise that knowledge is not received only from external sources, but is generated, often by contact with external stimuli, from individual understanding. From this knowledge base, and the changes brought about within it by constantly evolving experience, stems understanding of the world. Most constructivistic theories are based on 'learning by doing' or 'hands-on problem solving' strategies. Learners gain

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knowledge by experimentation, and the teacher's responsibility is to assess that the knowledge and skill transferred are those which they had intended. Errors are bound to happen and it is up to the teacher to correct them, re-direct and engage student in active discussion in order to promote transfer of knowledge (DeVries 2004). If the principle of constructivism were to apply to the teaching of practical skills in a clinical environment, it might be beneficial to the trainee with regards to the skills gained by active experimentation, however you cannot neglect the dangers imposed on the patients, especially if the trainee is a novice. Such is the argument against constructivism especially with regards to novice students who do not possess a mental model of how to perform a particular task (Sweller 1999, Kirschner, Sweller, and Clark, 2006). Jonassen (1997) proposed that all novices ought to be taught in well-designed, well-structured learning environments. Kirschner and colleagues (2006) regarded constructivistic approach as an unguided method of instruction. However, teaching practical skills in a clinical environment, even in a well-designed guided system does not completely eliminate the dangers imposed on patients.

Constructive alignment, as described by Biggs (Biggs, 2006) represents a marriage of constructivism and instructional design. It involves using constructivism as a framework to guide decision making at all stages in instructional design. The learner brings with him an accumulation of knowledge, beliefs and assumptions, on which new information is assimilated which forms a basis for future learning. The learner is clearly aware of what the objectives and goals are. The teacher contributes to the process by alignment between the learning activities and learning outcomes, and also

provides feedback to the learner based on the assessment criteria.

Constructive alignment provides a different attitude towards the teaching process and represents a symbiotic relationship between the learner and the teacher in order to get the best out of the learning experience. This should form a good foundation for teaching practical procedures where there are set goals and objectives to be achieved in a clinical setting, but the question of patient safety is of primary concern.

Aids to teaching practical skills

Many students feel very anxious about learning practical skills in a clinical environment. The presence of a patient puts them into a difficult position, as they have to interact with the patient as well as concentrating on learning the skills. Teaching practical skills requires precise instructions to the learner in order to perform the skill. With the evolution of information technology over the last two decades, teaching and learning techniques have reached new levels. Historically teaching practical skills has mainly been through lectures and live demonstration of the skill. With the advent of technology, both lectures and demonstration are available as videos and globally via Internet. Videos form a useful tool especially for teaching practical skills, as it links both audio and visual information to provide the learner with a multisensory experience (Hampton, 2002). There is no uncertainty that practical skills are best gained by active experimentation. Most of the practical skills are now practiced on mannequins or simulators. Practicing clinical skills on a mannequin or a human patient simulator provides a realistic health care situation, without the fear of causing any harm to a real patient. However, simulation should augment clinical practice, and not

replace it (Rauen, 2001). For the novice, skills should first be attempted in a secure environment such as on mannequins or simulation centre, and then practiced until such time as they or their trainers feel they are competent to perform the skills on real patients. This could be supervised by a trainer and could be paired up with assessments before the student performs the skills on patients. Issenberg (1999) suggested that such assessment should be based on the level of competency of the trainee or learner. ' One may have no skill, some skill, or complete mastery. Therefore, when teaching or testing a skill, the level of acceptable mastery must be defined based on the training level.' Simulation technology has been shown to be an effective educational tool that is well accepted by students and results in significant improvements in skills training and proficiency. Integrating information technology and simulation along with regular assessments form an ideal platform for teaching practical skills in a clinical environment.

Need for assessing practical skills

Most clinical practitioners believe that assessment forms an important part of continuing medical education and also improves performance by motivating the learners. Love and colleagues (Love, 1989) designed a randomised control trial to assess teaching psychomotor skills in nursing. Second year nursing students were randomly assigned to either a control group, which was self-directed, or to an experimental group, which was taught clinical skills in a laboratory. He found statistically significant improvement in the performance of the experimental group in the objective structured clinical examinations (OSCE). He concluded that the act of testing may improve the performance by providing an incentive for learning the

skill. Brown (2008) and colleagues recently did a large study in New Zealand involving 3496 students based on the student's conceptions of assessment and their links to outcomes, and came to the conclusion that students who conceive assessment as a means of taking responsibility will demonstrate increased educational outcomes. He also proposed that teachers who take responsibility for assessment may be more effective classroom practitioners. Teachers assessing practical skills must be clear about the criteria being used for assessment and should provide regular feedback about the performance of the student. Outcome-based assessment can provide meaningful and useful feedback to the instructor regarding student achievement, assessment, and the quality of the instruction.

Practising clinical skills

Does practice make perfect? It is a known fact that with experience, skills and performance improve. Historically, the fact that engaging in a sufficient amount of practice, regardless of the structure of practice, leads to maximal performance has always been debated. Bryan and Harter (1899) studied skill acquisition in telegraphic language and found that after enormous amount of practice, skill acquisition plateaus. However, such skills could reach above the plateau by restructuring and re-organisation. Fitts and Posner (1967) proposed that 'Initial performance is mediated by sequential processes, which with additional practice are transformed into a single direct (automatic) retrieval of the correct response from memory' (Fitts and Posner, 1967). Bloom (Bloom, 1986) suggested that with regular practice of particular skills and sub-skills, there is development of automaticity. It is quite clear from these theories that practicing skills does help in improving

performance, however practicing skills without structure leads to a plateau in performance. Applying Biggs theory (Biggs, 1996) of constructive alignment, if the teachers were to provide a definitive structure and regular assessment, practicing clinical skills would improve performance. Gagne (Gagne, 1962) explained the importance of definitive structure and guidance in improving performance of practical skills quoting an example of gunnery in military training. Any practical skill should bring together both theory and practice, it is not just being able to do something, but also about understanding the rationale that underpins the action. Peyton (1998) described a widely advocated model for teaching clinical skills in a simulated environment. It is known as the 'four stage approach' based on the speed of performance, explaining every step of a skill and repetition of the procedure. He suggested that the students must be given constructive feedback and allowed time for reflection and practice of the skills to ensure learning takes place. Having read many of the articles which stress on the importance of proper structure in practicing a skill, I have to agree with Ericsson (1993) and conclude that 'How expert one becomes at a skill has more to do with how one practices than with merely performing a skill a large number of times'.

Conclusion

Confucius, a well know Chinese philosopher quoted ' I hear and I forget. I see and I remember. I do and I understand'. There is no substitute to practicing clinical skills, and such skills should be based on sound knowledge in order to gain mastery over performance (Gomez and Gomez, 1987). With conflicting viewpoints regarding theories of learning and teaching, the traditional role of a teacher as a person delivering information to the learners has been

questioned. From a teacher's perspective, the focus is to coordinate and transfer valuable information, as well as to encourage novel thinking in order to facilitate learning (Rogers, 1967). Mastery over a skill is only acquired by repeated practice, and so the facilitator must provide precise instruction and regular feedback to the learner as to what constitutes a minimal standard of practice in order to ensure the safety of the patient in a clinical environment. This will require the learners to keep an open and active mind, as well as be motivated and self-evaluative in order to make their own inferences from the experiment (Linderman, 1925). With innovations in Information technology and simulators, practicing clinical skills has been made trouble-free with no real harm to the patients, especially for novice students. However, not all practical skills can be practiced on simulators. Knowles, Holton and Swanson, 1998, described learning as a process of 'becoming' versus a process of being 'shaped'. 'Shaped' suggests moulding to a pre-defined standard, structure or belief, whereas 'becoming' implies a process of reflecting on the experience gained in order to instigate growth of knowledge and skill. From my understanding of learning practical skills, learners are subjected to both being 'shaped' and 'becoming'. There is an initial phase of transference of knowledge and skill from the teacher to the learner (shaped), and with repeated practice and experience, there is internalization of knowledge and skills wherein the learner critically examines his skills in order to improve performance (becoming). Every learner is shaped as a novice and with practice and experience, 'becomes' a master of the skill.