Using Cognitive Constructivism In Planning Lesson.

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This lesson plan is for teaching medical undergraduates a specific topic, providing the students a structure under which the learning process will unfold (Wilson, 1981). Constructivist approach has proved to behelpful for long term and deep learning, treating knowledge as something discovered, as indiscovery learning (Dewey, 1916/1997, Piaget, 1954, 1973) andusing props to trigger association of ideas. New knowledge is about making a relationship between what is known and what is being learnt (Resnick& Ford, 1981). In fact, most constructivist strategies are excellent for learning clinical knowledge. A good strategy for developing the clinician mind-set is case based instruction, a constructivist strategy (Savin Baden & Major, 2004).

I use several strategies that make the lesson plan internally consistent with constructivist learning. These include small group learning, enhanced discovery learning, problem based learning, project based learning and step by step discussion with thinking time. At the end of the session there will be an assignment given, encouraging reflection and advising the student to summarize the constructed learning.

The flow of the lesson should attempt to steer the learners in a direction which allows them to gradually reach new knowledge in a way that is "progressively constructed" (Papert, 2000).

An additional role that can beincluded in planning the lessoncan be reached by understanding of the role metacognition plays in expert learners (Nickerson, 1985, Nilson, 2010). Studies show that conveying information on how to integrate reflection with this kind of learning is vital. This would not only be limited to individual reflection, but also to "team processing" (Savin-Baden and Major, 2004) leading to a co-operative understanding of what has been learned.

The lesson plan is clearly structured to allow a progressive building up of ideaswhile allowing a lateral progression from beginning to the end of the time allotted to this teaching session. However there may be knowledge overflow in different parts of the session. Again, this fits the constructivist learning model. Constructivism holds that information cannot be divided into separate units, but rather form part of a whole (Anglin, 1995).

Now let us plan a lesson on above lines (using cognitive constructivism) on intestinal obstruction for the students of third year MBBS at Muhammad Medical College, Mirpurkhas.

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The duration of the lesson is of two hours in total.

I would give some time to preparing the resources I need for the lesson plan. I would like to look at the space I am going to teach in. I would like to alter the seating arrangement to my liking. The other thing I would like to prepare are the "triggers" for the constructivist session I have planned. These triggers include the following objects: a plastic model of the anatomy of the intestine, case files of a patient with a typical diagnosis of intestinal obstruction, the surgical kit required in the treatment of obstruction, radiographs and blood tests of past patients with obstruction, and a video of a surgeon operating on a typical patient. I should also like to manoeuvre matters towards having an actual patient present at some point in the session. There will also need to be a multimedia Powerpoint presentation to remind myself of the phases of teaching. And for personal reasons a watch would be useful, to keep me time conscious.

At the end of the lesson there will be some things I will expect the students to do. One thing is a continuation of the reflection process. It is my hope that this session on intestinal obstruction can in itself become part of the prior knowledge the students can build future surgical learning on. It is easier to navigate the abdomen from a surgical perspective knowing some of the key things that have been learned in this session. In order for such future learning to succeed, this experience needs to be reflected on and thought about mindfully. I would do this by encouraging the students and reminding them about our conclusions on learning and metacognition.

The lesson plan is for a group of six to ten students. While six to eight is optimum for small group discussion (Exleyand Dennick, 2004), there may be slight student overflow. Small group learning is good for the kind of learning generated by my lesson plan because for an effective constructivist learning students need opportunities to interact and work on tasks. In small groups ground rules need to be discussed and established. The way I intend to do that is by asking the students themselves what they would like to see as their ground rules (Kustra& Potter, 2008).

Constructing knowledge in a topic unfamiliar to students just starting out in a clinical setting would likely require students to step out of their comfort zones and partake in a discussion they might feel they do not know enough about. In order to encourage discussion and healthy interaction I would create an environment where the students feel emotionally safe and involved (Rogers 1983). I would have them sit in a circle and encourage strategies such as talking it out through the learning process. This is crucial as the constructivist approach gives

rise to multiple perspectives, requiring an environment open to co-operative learning.

Step by step discussion, with thinking time given after each discussion. The step by step discussion method has the advantage of keeping the dialogue structured and organized, without depriving the students of autonomy. To establish that everyone is on the same page a baseline foundation of unanimously agreed upon knowledge needs to be verbalized. The students in the group are third year medical students and have a working knowledge of the anatomy and physiology of the intestine already. However I think it best to go over the facts that will be the building blocks of the constructivist learning session ahead. This revision will be the skeleton forming an existing cognitive structure. This is relevant to the new knowledge which the students will construct for themselves in fulfilment of the learning objectives. I will deliver this in a lecture format. This will simply be a briefing exercise. This kind of lecture works better with learners who have some background knowledge in what they are now learning (McKeachie, 2002). In the step by step discussion I will be posing questions designed to both stimulate self-directed learning as well as to anchor down the discussion and help it along to the conclusion of a specific learning outcome. During this step by step discussion thinking time will be essential as the students individually construct meaning from the knowledge given to them. This will form a useful preamble to the discussion session, in which students will share individual ideas and form a consensus. I will ask a volunteer student to write the consensus of knowledge down.

This kind of discussion runs several risks. Kirschner, Sweller and Clark (2006) state that giving learners minimal instruction, before setting them loose to construct meaning, is not helpful. They also cite other difficulties they observe with constructivism, including cognitive overload and lack of satisfactory results due to “unguided instruction”. I would watch for and combat these risks by employing enhanced discovery learning (Marzano, 2011) during the tasks. This way the student has the advantage of retaining new knowledge obtained by discovering and constructing it independently, yet at the same time, is given access to the knowledge necessary to accomplish given tasks. For example, when discussing the anatomy and physiology of the intestine, I will give a short lecture regarding the key points it is necessary for the class to know in order to construct surgical aspects of obstruction. This enhanced discovery learning (as opposed to minimal instruction or unguided discovery learning) also provides an opportunity to give guidelines. For example, before I ask the students to construct for themselves the possible causes of intestinal obstruction, I could tell them that it is useful to categories these causes based on whether they arise inside the lumen, within the wall, or externally block the intestine. Using this strategy would eliminate the risks involved in radically constructivist learning. Enhanced discovery learning would help ensure that the explorer does not fall off a cliff. While this can be said to be a sort of cognitive constructivism, I believe it still falls under the scope of constructivist theoretical perspective. Another advantage of enhanced discovery learning in the context of a constructivist learning approach is that it helps learners in adapting the ability to integrate new knowledge to what they already know. This is especially useful for beginner students and those not experienced in constructivism. As the facilitator I would remind the learners of what we discussed in reflection and metacognition at the beginning of the lesson.

The enhanced discovery learning process will have two phases. In the first part, the students will be encouraged to puzzle out how a patient with intestinal obstruction will present, using their knowledge of the anatomy and physiology of the intestine as a baseline. For this, as a learning aid, the K-W-L chart will be used. What we “Know”, what we “Want to know” and what we have “Learned” will be demarcated in a table.

Students should be able to construct symptoms of intestinal obstruction such as constipation and abdominal distension from the prior knowledge that the function of the intestine is to pass along digested food. Other symptoms, like abdominal pain, should also be discoverable from the discussion of the innervation of the bowel and surrounding structures. The knowledge of peristaltic movement being blocked may lead students to intuit that such a patient can present with vomiting.

Props and objects stimulating discussion and forming reference points to construct learning from are helpful in this context. For example, giving the group radiographs of both a normal abdomen and the abdomen of a patient with intestinal obstruction would allow the students to compare and catalogue the differences, discovering on their own what a typical case of obstruction looks like and how to diagnose it. Radiographs are a typical point of confusion. Comparing the differences between what a normal abdomen looks like and cases of intestinal obstruction look like will help learners elude common pitfalls. Plus, a point of reference to describe the radiograph, removing to a degree that awkward silence many medical undergraduates present with on being confronted with radiographs.

Case-based instruction is considered key to developing applied reasoning skills. Following this theoretical perspective a few case based scenarios have been included in the lesson plan. The problems can form a “convenient peg” on which the learner hangs new knowledge, or as a kernel around which a “growing web” of learning can be built around (Margetson 1998). One way I will implement this is to include typical patient case files in the lesson. This gives students an insight on how their reasoning matches real life scenarios. I intend to have a phase of discussion, before the case files are introduced. After that students will look at the case files, which will detail a real patient’s history and findings. Following that an enlightened discussion can take place regarding learner insights and new thoughts.

Another method I intend to use is to have a patient with experience of intestinal obstruction into the classroom. This allows students to discover what such a case looks like, and forms a bridge between classroom learning and application in the clinical environment. Utilizing a patient in teaching inspires students and heightens interest as it "embodies the activity they perceive as representing the ultimate aim of their education" (McLead& Harden, 1985). One advantage of using a patient in the classroom setting is that the learners have the opportunity to focus solely on the theoretical side, not being distracted by the rush that accompanies clinical life. This in itself is a kind of briefing that will prove useful in the clinical setting and in ward teaching.

In 2008 the GMC commissioned a research to evaluate teaching strategies applied to medical undergraduates. One of their findings was while PBL is a good method of teaching maintenance of patient care it did not significantly improve diagnosis and initial management of disease. This is a curious finding and one I feel important for me, as a teacher applying PBL, to remember in order to circumvent risk. Reflective questioning, enhanced discovery learning and project based learning are ways which I will fill in any possible gaps left by the problem. The lesson I am teaching is mostly about diagnosis and management, more about the theory behind care than the actual practical care. My lesson is not being conducted in a ward setting. My responsibility here is to mesh the clinical scenario with reflective questioning. In particular the initial phase of linking the anatomy and physiology of the intestine with how an anomaly would present would result in enhanced discovery learning which the student can, hopefully, retain for longer.

An additional way to combat this is by using Project Based Learning (Nilson, 2010). I would ask the group to split in half and to create a clinical scenario, a "problem", as to how patients with intestinal obstruction would present. In this they would be confronted with the several creative questions that would (hopefully) give them pause for reflection. For example, when inventing the biodataand history of this fictional patient, they would have to consider the age, sex and background of the type of person who commonly presents with intestinal obstruction. They may have to invent reasons for the obstructions, such as tuberculous adhesions or hernias.

For this to succeed the briefing phase of the experience cycle is essential, else the risk of this project based learning failing is high. The advantage of doing this via co-operative learning comes in.

Then there is the Experience and Explanation Cycle (Cox, 1993). This strategy again taps into the constructivist phases of briefing the learner, allowing the learner to construct learning, and then a debriefing. First the students learn enough to make sure they can benefit from the use of a patient. This is a phase of preparation. Then comes the actual interaction with the patient, where the students can take a history, examination, and construct new knowledge on the basis of what they already know. Then there is a final phase where I would clarify any misconceptions and summarize the important details. In the Explanation Cycle students reflect on this new experience. I would ask them to reflect on it and compare it to other clinical experiences. What would change if they see another patient of intestinal obstruction? What would remain the same?

Summarizing key points at the end of each "journey" would also eliminate error and boost learning. This would be done in a way in which the learners' conclusions will be respected. I would do this in a way that allows the students to tally what they have learnt with the summarized points, rejecting wrong knowledge and highlighting learning objectives. Studies have shown that the most effective summary is the one the student comes up with on their own. However, additional points can be added by the teacher allow the student to re-evaluate his or her position, which is what I intend to do. Linda B. Nilson (2010) writes something pertinent to step by step discussion:

Before moving the discussion onto the next topic, be sure the current one is settled. You might ask if anyone has something to add or qualify. If no one does, ask a student to summarize the main points made during the discussion of the topic. Then move on, making a logical transition to the next topic.

Another summary at the end of the lesson would be required to conclude the lesson on the note required by the learning objectives.

This lesson, being designed with constructivist learning as the theoretical approach behind it, will itself be used by me as part of future sessions on surgical management of the abdomen. As students familiarize themselves with the mind-set and perspectives required for effective learning in this context, there should be further success in helping them on the way to life-long learning.

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