

A Reflection on the Dominant Learning Theories: Behaviourism, Cognitivism and Constructivism

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Abstract: “This is the best lecturer that I have got in my life”. The greatest satisfaction that a lecturer can have is that each time students come out of his class, they have the above feeling. However, in a classroom of about sixty students of different knowledge, skills and attitude, this is quite difficult. To be able to achieve this, it is of utmost importance that we, lecturers, understand the learning process of our students and are able to motivate them. Furthermore, we should ensure that our classroom has the ideal environment that supports the acquisition and sharing of knowledge. This paper presents a reflection on the three dominant learning theories: behaviourism, cognitivism and constructivism and analyses their strengths and weaknesses. It then presents some practices and principles that focus on the strengths of these learning theories while minimising their weaknesses.

Keywords: Learning Theories, Behaviourism, Cognitivism, Constructivism, Principles, Practices

Introduction

THE BASIC FRAMEWORK of any learning includes the learner(s), an instructor and a particular problem. Learners need to acquire information in order to solve the problem, and this is accomplished by interaction with the instructor, with peers and with course materials. As instructors, we encounter these situations by examining our students, the resources, the problems to be solved and what prior knowledge is required by the students to tackle the problem. We always answer the fundamental pedagogical question: “What will our students know and be able to do as a result of our interaction on each unit?” But, how do we ensure that we are adopting the right teaching strategies and the right assessment method to detect learning? To be able to answer this question, it is vital that we understand and are able to facilitate the learning process of our students.

Literature Review

The psychological definition of learning is the modification of behaviour through practice, training, or experience (Dictionary.com). Philosophers and researchers have proposed different definitions of learning by considering the different ways through which the learning process occurs. Three fundamentally different schools of thoughts have emerged into the learning theories known as behaviourism, cognitivism and constructivism.

Behaviourism

Behaviourism is a theory of animal and human learning that only focuses on objectively observable behaviours and disregards mental activities (On Purpose Associates, 2001). Be-

haviourists hence believe that if a new behavioural pattern is repeated, it eventually becomes automatic. They view the learning process as a passive activity and believe that knowledge is given and absolute (Marton & Booth, 1997). Behaviourists regard learning as a direct result of experience or practice that leads to a change in behaviour. They also believe that behaviours can be modified by consequences such as positive or negative feedback and rewards or punishments (Pintrich & Schunk, 2002). Behaviourists propose that the amount of learning that takes place can be measured by observing behaviours. Moreover, they argue that learning and knowledge can be measured by observing the amount of correct answers (Fornataro). Students are given knowledge and asked to reproduce what they have learnt to the teacher. Therefore, behaviourists describe learning as nothing more than the acquisition of new behaviour and view the mind as a black box and concentrates only on responses to stimulus that can be observed and completely ignore the possibility of thought processes occurring in the mind (Meesing, 2004). Pavlov, Watson, Thorndike and Skinner were the main psychologists who widely promoted the behaviourist theory (Mergel, 1998).

Cognitivism

Cognitive psychologists use observable behaviours as an indication for deducing what is going on in a person's mind (Gage & Berliner, 1988). They lay emphasis on the active mental processing on the part of the learner. This means that different types of tasks will incur different cognitive processes. For example, learning to talk a language will require different processes from learning to spell, and cognitive psychologists suggest that it is very important to appreciate those processes to eventually understand how the learner engages in the learning process such that this learning process may be enhanced. Hence, cognitive psychologists view the learner's role as an active and creative activity rather than a passive one (Reid, 2005). Cognitive theory usually relates to the role of information processing. The aspects involved in processing such as memory, organisation and neurological connections are viewed as central in the cognitive theories. Bruner et al. (1956) found that learners tend to formulate a hypothesis about the rule underlying a particular concept. Rules can be expressed in the if-then form, for example: "If an animal that has four legs, fur, whiskers, a tail, is relatively small and vocalises 'meow', then it is a cat" (Shchunk, 2004). Cognitivists' concept is fundamentally different from the behaviourists' view of learning. However, similar to behaviourists, cognitivists also agree that knowledge is given and absolute, but the cognitivists focus and emphasise on the internal mental processes of the learner during the learning process.

Constructivism

Constructivism is a learning theory that is actively constructed in the mind of the learners out of their experiences in the world. Each learner generates his own rules and mental models through experiencing things and reflecting on those experiences (Bruning et al, 1999). Learning, as described by constructivists, is simply the process of adjusting our mental models to accommodate new experiences (On Purpose Associates, 2001). The principle is that the learners start with a complex problem and work out to discover the basic skills required to solve the problem. This method of learning involves cooperative learning, experimentation, open-ended problems and real life scenarios in which the learners discover

learning on their own through active involvement with concepts and principles (Bruner et al, 1956). The role of the instructors hence changes from teachers who give didactic lectures to cover a particular lesson, to facilitators who help the learners to get their own understanding of the content (Rhodes & Bellamy, 1999). Facilitators motivate their students to find solutions by exploring, collaborating, inventing, and experimenting (Fornataro).

A Reflection on the Learning Theories

All psychologists believe that their theories propose the best way for a learner to acquire knowledge. Instructors should realise that all three schools of thought mentioned above have their importance in instructional systems. Behaviourism cannot cater for all kinds of learning since it disregards mental activities. It cannot also explain the recognition of new language patterns by children for which there has been no reinforcement mechanism. Also, research has shown that animals adapt their reinforced patterns to new information, for example, a rat can change its behaviour to react to changes in the layout of a maze it had previously mastered through reinforcements (On Purpose Associates, 2001). While constructivism calls for the elimination of standardised curriculum, grades and testing (McHenry et al, 2005) and proposes a curriculum tailored to the students' prior knowledge, this is not practical in real life scenarios. Continuous assessment and the end of academic year exams are realities in all universities and these can only be based on a standard curriculum.

This section highlights the main strengths and weaknesses of the different learning theories (Schuman, 1996).

Behaviourism

Strength: The learner is focused on a clear goal and responds automatically to the signs of that goal. The strong point with this learning theory is that it ensures that a person behaves in the same way whenever the same circumstance is presented, for example, it is important that a computer user runs the same query at the end of each month to produce the monthly sales report.

Weakness: The learner may find himself in a circumstance where he needs to respond, but the mental cues he receives do not match what he has previously learnt. This weakness can be critical in real time systems where a response to an abnormal behaviour is not obtained.

Cognitivism

Strength: The strength lies in situations where learners are to be trained such that they accomplish a task the same way on a number of occasions, for example, all members of a customer service department must be able to respond the same way to similar queries.

Weakness: The learner learns a way to accomplish a specific task but it may not necessarily be the best way or suited to that particular situation or learner, for example, in response to a programming question, students may produce different working versions of the system but some may be much less efficient than others.

Constructivism

Strength: The learner is better able to adapt to real life situations since he/she will be able to tackle new problems by relating them to similar difficulties solved in the past, for example, in the Structured Systems Development module, students are required to analyse a case study and work out a design proposal for that particular system. They are able to relate this particular case study to earlier ones that have been solved in the tutorial classes and come up with good solutions.

Weakness: This learning theory is not suited for circumstances where conformity in thinking and actions is required. For example, to assess a company CMM level in software engineering, there is a defined set of key performance indicators that all evaluators have to strictly abide to and cannot be based on the individual understanding of the assessors.

The Ideal Position of an Instructor

As an instructor, it is very important to understand the strengths and weaknesses of each learning theory in order to optimise its use in the classroom. The approach to be used at the start of a new topic of interest may not be efficiently stimulating for smaller issues at the end of that topic. Hence, the best practices of behaviourist, cognitivist and constructivist learning theories should be adopted. We feel that the instructor should use the behaviourist approach to learning at the start of a new topic. This helps the learners to acquire and master the basic concepts and facts about the new topic. Once the fundamentals concepts have been grasped by the learners, the instructor can then discuss some relevant scenarios and/or case studies to relate the topic to real life events. Here interactive sessions between the instructor and the learners are started where the latter can discuss their personal experience and the whole class is involved in the discussion. When it comes to things that the learners have not yet experienced, the instructor can revert back to the behaviourist teaching style by breaking down the problem into smaller steps and uses these to shape the learner's behaviour. While instructors tend to prepare students for the real world, they also have to take into account that those students are eventually asked to sit for the final exams.

Some Best Practices for Instructors

In the department of Computer Science and Engineering at the University of Mauritius, all the classes are equipped with overhead projectors and computers. So the lectures, tutorials and lab sessions are carried out using these equipment. This is often the case in other universities as well. Before starting with a class, instructors should provide an overview of the topic to be discussed and explain to the students how this topic will be helpful to them at work. Although not all the lessons are delivered in the same way, as far as possible, instructors should try to adopt the practices discussed below in their classroom.

Following the behaviourist approach, the instructor starts by defining the learning objectives of the lesson. These may be broken down into larger set of objectives which can later be used by the learner to evaluate his/her understanding of the lesson. The instructor should ensure that pre-requirements to the new lesson are well understood before moving forward. This can be carried out by doing a recap of what prior knowledge is required or by asking the students to work on an exercise that makes use of these pre-requirements.

At the start of a lesson, the focus should be on learning and understanding the foundations of the topic. The normal trend is to start from the lower level skill and build on this to move to higher level skills. Instructors should periodically reinforce desired behaviours and try to extinguish the undesired ones. Saying “That’s good Anne, you are doing well”, “Exactly”, “Excellent answer from our expert” after a student’s response, smiling after a joke, looking attentive during a student’s query are the positive reinforcements that can be used (Gage & Berliner, 1988). “If you don’t come to class, you won’t be allowed to take the exams”, “You don’t leave the lab until you have completed the assignment” are some examples of negative reinforcements. However, instructors should avoid ridiculing, shaming or laughing at students as a form of negative reinforcement.

Instructors should also try to reinforce progress in learning and behaviour by periodically sitting with the students to review their work and point areas of improvement. Instructors can also motivate the students by creating a healthy competition between them. An example can be: “Those who are able to answer the same question using the lookup function instead of IF will have five bonus marks.”

At this stage, instructors may use multiple choice, fill-in the blanks and past exams questions to assess the students. This helps the instructor to determine how well the learners have been able to understand basic concepts and consequently prepare the students for the end of year examinations. The one-minute paper or one sentence summary techniques can be used to gather feedback from students which can eventually help the instructor to clarify issues that are not well understood.

Some cognitive practices must also be introduced in the classroom by asking students to read lecture notes and additional materials found in textbooks and to actively get involved in research on the Internet. Students should be encouraged to work on additional sets of exercises which involve analysis, assessment, evaluation and innovatively transforming information. Students can be asked to react, respond and make a report on the materials. In such exercises, emphasis is particularly laid on the mental states of the learners such as emotional states, memory and connections. For example, when asked the following question: “Recall how the queuing system in a customer service department works and explain the rationale behind the First In First Out queuing system.”, students make connections to previous knowledge by recollecting relevant information from past experiences and reflect upon them based on some new information. Students should also be encouraged to develop a mode of talking, listening, questioning, and discussing issues (Pintrich & Schunk, 2002). This is usually carried out through class discussions, presentations and reciprocal teaching activities.

Usually towards the end of a lesson, instructors should adopt the constructivist approach to learning. It is vital to provide the learners the opportunities for reflection. A number of ways can be used to achieve this in the classroom. Firstly, the instructor presents to the learners his/her own thinking and reflection and ask them to make comments. Secondly, the students are asked to solve case studies and work out hands-on experiments, usually in collaboration with their friends. Here, the instructor can organise the classroom into small groups for collaboration and cooperation among students. Thirdly, the instructor can make use of an e-learning platform to design a set of multiple choice questions whereby if an incorrect answer is provided by the student, a feedback, usually in the form of a tool tip, appears, giving hints about the correct answers and/or the methods of obtaining them.

It is also very important to make use of real world problems and assessments in the classroom since such authentic problems are more meaningful to the learners and will increase

their interest and eventually lead to better learning. An example would be: “Analyse the system from CDNOW, draw the logical view of the system and design a new system using the techniques taught in the module”. Here, the primary focus is on the learners’ motivation to learn and apply what they have learnt to real world cases. For instructors, it is very important to show to students the relevance in what they are learning by applying those concepts to real world cases.

While answers to multiple choice or fill in the blanks questions can be either correct or wrong, at this stage of a lesson, the instructor should encourage and appreciate the learner’s autonomy and initiative. When formulating assessment questions, instructors should give students the opportunity to create relationships and construct new understanding and acquire new skills. Hence “analyse,” “predict,” and “create” types of questions should be set towards the end of the lesson. Tasks that engage students in experiences that might be contradictory to what have been previously learned must also be introduced. This shall encourage discussions from the part of the learners whereby the instructor seeks the students’ initial responses before sharing his/her view of the counter-examples presented.

Moreover, a number of learning tools can be used to support the student learning when working on challenging tasks. For example, instructors can extensively use the forum/discussion facilities available on e-learning platforms. “According to you, which might be the possible means by which you can speed up your computer system at home?” is a typical example of questions that can be set on forums. Instructors should also ensure that their students participate in discussions by allocating a small percentage of the coursework to active involvement in class discussions and forums.

Last but not least, it is of utmost importance that the atmosphere prevailing in the class is suitable for the students to be willing to learn. A culture of learning and respect should be created. In the classroom, there would be somewhat different levels of knowledge, skills, beliefs and attitudes. To be able to implement the above mentioned practices, there must be respect for other people’s ideas and beliefs. A classroom where students are afraid of expressing their concerns for fear and embarrassment will not be conducive to the use of the above principles. Hence, it is the duty of the lecturer to set up these norms and expectations which will eventually help in terms of student’s motivation.

Conclusion

In conclusion, we believe that an ideal learning environment should incorporate the best practices of behaviourism, cognitivism and constructivism. In some cases, instructors are only using the behaviourism approach to teaching, but we believe that it is high time that instructors include the benefits of the other approaches to learning. A behaviourist classroom tends to be boring and unpleasant to the learners. Our feeling is that a learning environment should include the direct instruction of the behaviourist classroom, the students’ thinking process developed in the cognitive classroom and the art of discovering learning through constructivism. This paper highlights some practices and principles that capitalise on the strengths while minimising the weaknesses of the three learning theories behaviourism, cognitivism and constructivism.

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