THE CONTRIBUTION OF BEHAVIOURAL THEORIES OF LEARNING TO EDUCATION

Abstract

The paper focuses on behavioural theories of learning. The theory of behaviourist concentrates on the study of overt behaviours that can be observed and measured. Some key founding fathers of behaviourist theory such as Pavlov, Thorndike, Watson, and Skinner are given their deserved attention in the paper. In terms of Pavlov, discussion centres on his best known work on classical conditioning or stimulus substitution. Recognition is also granted to Thorndike's application of "methods of exact science" to educational problems by emphasizing his "accurate quantitative treatment of information". It will be shown that Watson employed Pavlov's ideas in some of his works. The premise of his behaviouristic psychology proposes that all behaviour is established through stimulus-response associations through conditioning. Like Pavlov, Watson and Thorndike, it will be shown that Skinner believed in the stimulus-response pattern of conditioned behaviour and completely ignored the possibility of any processes occurring in the mind. His behaviouristic insights on the principles of operant conditioning in social institutions, of which education is not an exception, are also explored. Among the major contributions the theory of behaviourist has made to education are; the provision of behavioural objectives to the instructional process, the importance of the creation of favourable environments for learning, the enhancement of the 'behaviour modification' technique to the educational process, assessment in schools, the 'drill and practice' technique as a behavioural teaching methodology, the control of the learning environment through the right use of behavioural reinforcement techniques, the teaching of lesson content that is more 'life-like' and the restoration of self-esteem in maladjusted children in academic contexts.

Introduction

Behavioural and cognitive theories of learning are frequently portrayed as competing, opposite models. However, it is more precise to see them as complementary rather than competitive. This is so because they all aim at tackling problems (Kazdin, 2001; Miltenberger, 2001). Learning is usually defined as a change in an individual caused by experience (Ariscoll, 2000; Hill, 2002; Schunt, 2004). It occurs when experience causes a relatively permanent change in an individual's knowledge or behaviour. The systematic study of learning is relatively new, not until the late nineteenth century was learning studied in a scientific manner. Using techniques borrowed from the physical sciences, researchers began conducting experiments to understand how people and animals learn. One of the early researchers, Evan Pavlov is believed to be the fore founder of behaviourist theory. Among later researchers, B.F. Skinner was important for his studies of the relationship between behaviour and consequences. These researchers developed the behavioural theories of learning. There are three main learning theories in education namely; behaviourist, cognitivism and constructivism. Our main concern in this paper are the behavioural theories of learning.

Behavioural Theories of Learning

Learning engrosses the acquisition of abilities that are not inborn . Learning depends on experience, including feedback from the environment. Discoll (2000), Hill (2002) and Schunt,

(2004) define learning as a change in an individual caused by experience. According to Westen (2002), learning refers to any enduring change in the way an organism responds based on its experience (Westen, 2002). Learning theories presume that experience shapes behaviour, is adaptive, and that only systematic experimentation can uncover laws of learning.

According to Slavin (2009) behavioural theories centre on the ways in which pleasant or distasteful consequences of behaviour change individual behaviour over time and ways in which individuals model their behaviour on others. Woolfolk et al. (2008), on the other hand, state that the behavioural view generally assumes that the outcome of learning is change in behaviour and it emphasises the effects of external events on the individual.

According to Miltenberger (2001: 2) "in general, behaviour is what people say and do". The theory of behaviourist concentrates on the study of overt behaviours that can be observed and measured (Good and Brophy, 1990). It views the mind as a "black box" in the sense that response to stimulus can be observed quantitatively, totally ignoring the possibility of thought processes occurring in the mind. Behaviourists believe that all theories should have observable processes such as actions. For them, only overt behaviour should be studied and recorded because inner states like motives or mental states cannot be measured objectively.

Unlike the other theorists, learning theorists have ***not*** developed a stage theory of human development. Instead, they have formulated laws of behaviour that can be applied to any individual at any age, from foetus to octogenarian. The basic laws of learning theory explore the relationship between stimulus and response that is between any behaviour or event (the stimulus) and the behavioural reaction (the response) that it brings out. Some responses are automatic, like reflexes. If someone suddenly waves a hand in your face, you will blink; and if a hungry dog smells food, it will salivate. However, most responses do not occur spontaneously, they are learned.

The learning process called conditioning occurs in two basic ways – classical (in which neutral stimuli can acquire the capacity to evoke behavioural responses through their association with unconditioned stimuli that trigger reflexes) and operant (in which reinforcers and punishment shape behaviour). There are quite a number of theorists who have taken the behavioural view of learning such as Pavlov; Watson; and Skinner.

Theories of Learning

In psychology and education, learning theories are used to describe how people learn. Therefore, they help psychologists and educationalists to understand the complex process of learning. There are four major theories of learning namely behavioural, Cognitive, Social cognitive and Humanistic. Our concern in this article is the behavioural theory of learning.

The Main Founding Fathers of Behavioural Theories of Learning

In the field of psychology, there are a good number of personalities who can be perceived as major contributors to the development of the theory of behaviourist. One of them is the Russian psychologist known as Pavlov (1849-1936). He began to study the link between stimulus and response. According to Dembo (1994) Pavlov is best known for his contribution to the theory of behaviourist mostly through his work in classical conditioning or stimulus substitution. According to Western (2002), in classical conditioning, a conditioned response is an

environmental stimulus that leads to a learned response through pairing of unconditioned stimulus with previously neutral conditioned stimulus.

Concepts in Classical Conditioning

Classical conditioning - Ivan Pavlov's method of conditioning in which associations are being made between a natural stimulus and a learned, neutral stimulus.
Stimulus - Anything that elicits a response.
Unconditioned stimulus - A stimulus that automatically elicits a response, such as meat causing salivation.
Conditioned stimulus - A previously neutral stimulus that has been associated with a natural (or unconditioned) stimulus; a response to a stimulus that is brought about by learning, e.g. salivation at the word lemon.

Pavlov's most famous experiment involved a dog, food and a bell. While doing research on salivation in dogs, Pavlov had noted that his experimental dogs began to salivate not only at the sight of food. Eventually, the dogs salivated at the sound of the approaching attendants who brought the food. This observation led him to perform his famous experiment in which he taught a dog to salivate at the sound of a bell. Pavlov began by ringing the bell just before feeding the dog. After several repetitions of this routine, the dog began salivating at the sound of the bell even when there was no food.
In his experiment;

> *before conditioning, ringing the bell caused no response from the dog. Placing food in front of the dog enabled it to salivate. During conditioning, the bell was rung a few seconds before the dog was presented with food. After conditioning, the ringing of the bell alone produced salivation* (Dembo, 1994: 12).

Therefore, from Pavlov's experiment four stimulus and response items can be distinguished. It can be stated that the 'food' is an unconditioned stimulus; 'salivation' is an unconditioned response because it is natural or not learned, the 'bell' is a conditioned stimulus and finally 'salivation' is a conditioned response only to the bell.

This simple experiment in learning was one of the first scientific demonstrations of *classical conditioning* (also called respondent conditioning). This is when an animal or person comes to associate a neutral stimulus with a meaningful and then responds to the former stimulus as if it were the later. In this case, the dog associated the bell (the neutral stimulus) with food and responded to its sound as though it were the food itself. This part of the conditioning is called *learning by association*. This is a condition under which one thought becomes connected or associated with another to account for learning and memory (Westen, 2002).

There are many everyday examples that indicate classical conditioning in our experiences, for example, seeing someone peeling a lemon may make you to salivate, exam schedule might make your palms sweat. In each of these instances, the stimulus is connected, or associated with another stimulus that produced the physiological response in the past. It thus remains true that in conditioning, an association is made between two events by repeatedly having them occur close together in time.

The above observations are not the only ones made by Pavlov as there are others that resulted

from the second phase of his experiment. Evident from the second phase of his experiment are terms such as 'stimulus generalisation'. Here he states that after learning to salivate to the sound of the bell, the dog can still salivate to similar sounds. The other observation he made is known as 'extinction'. The principle at play here is that if the pairing of the bell and food is stopped, salivation in response to the food eventually ceases. Under 'spontaneous recovery', he states that extinguished responses can be recovered but can be extinguished again if the dog is not presented with food. Furthermore, under 'stimulus discrimination', the dog could learn to discriminate between similar bells or stimuli hence able to know which bell would result in the presentation of food and which would not. Finally, 'higher-order conditioning' is yet one of the discoveries made by Pavlov. Here when the dog is conditioned to associate the bell with food, a different unconditioned stimulus can be presented at the same time as the conditioned bell. This later enables the dog to salivate to the new unconditioned stimulus alone. In this case, it also becomes a conditioned stimulus.

John Watson and Emotional Conditioning

Several years after Pavlov's early experiments, psychologist John Watson (1878 – 1958) appeared on the scene. In line with the other behaviourists, Watson argued for the value of psychology which concerned itself with behaviour in and of itself, not as a method of studying consciousness. This was a major break from the introspective methods of structuralist psychology which considered the study of behaviour valueless. According to Kazdin (2001) Watson studied the adjustment of organisms to their environments, more specifically the particular stimuli leading organisms to make their responses. Influenced by the ideas of Pavlov, Watson held the view that behaviour is established through stimuli-response associations through conditioning. He demonstrated classical conditioning in an experiment involving a baby called Albert and a rat. Initially, when he presented the rat to Albert, he was not afraid in that he actually touched it. Afterwards Watson created a sudden loud noise which Albert was afraid of whenever he presented the rat to him. Since little Albert was frightened by the loud noise, suddenly he became conditioned to fear and avoided the rat. The fear Albert developed for the rat was generalised for other small animals. At the end of the experiment, Watson extinguished the fear by presenting the rat without the noise to Albert. Hence, from the experiment above, we see a confirmation of the claim made by Mergel (1998: 4) that "Watson believed that humans are born with a few reflexes and emotional reactions such as those of love and rage". It is important to state that Watson is credited with coining the term 'behaviourist'.

Based on his observation, Watson eventually decided that it seemed to be that the rat's complex behaviour actually resulted from little more than a series of stimuli and responses rather than from some complicated concepts such as intelligence. He went on further to suggest that at the human level "deep emotions" are also just the result of association and learning. One of his most famous experiments involved trying to get a human to spread (or generalize) the emotion of fear from one object to another.

Little Albert

Watson put a white laboratory rat into the room with Albert. Albert loved the fury creature and played with it. While Albert played, Watson sneaked up behind him and smashed a steel bar with a harmer near the boy's ear, creating a horrible startling noise. Albert fell forward, crying and burying his face in a mattress on the floor. The next time Albert reached for the rat, Watson repeated the crashing noises. Little Albert became terrified of the rat. His work in this area has

concerned many people because of the ethics involved in how he dealt with a child. His research would never be allowed today.

An illustration of Watson's emotional conditioning

Loud sound (UCS) ⟶ Fear (UCR) followed by the association phase:
Rat (CS) ⟶ Loud sound (UCS) ⟶ Fear (UCR), which becomes:
Rat (CS) ⟶ Fear (CR)

Key
CS = Conditioned Stimulus; UCS = Unconditioned Stimulus;
UCR = Unconditioned Response; CR = Conditioned Response

Watson then went on to demonstrate what is called *stimulus generalization* which means that a response can spread from one specific stimulus like the white rat to other stimuli resembling the original one in some way. To show this Watson brought in a white rabbit, which also frightened Albert. Before the mother discovered all this, Watson had shown two things; conditioning of emotions to neutral objects is possible and that a conditioned emotion can generalize to other objects of similar characteristics.

B.F. Skinner and Operant Conditioning

The most influential contemporary proponent of learning theory is B.F. Skinner. Skinner agrees with Pavlov that the processes of classical conditioning explain some behaviour, especially behaviour that is reflexive. However, Skinner believes that another type of conditioning – *operant conditioning* (the use of pleasant and unpleasant consequences to change behaviour) plays a much greater role, especially when trying to explain more complex learning (Slavin, 2009). The term *"operant"* comes from the Latin word meaning work, and is intended to emphasize the work done to get a particular response.

Illustration of Skinner's operant conditioning

Before conditioning

Unconditioned stimulus (meat) ⇨ Unconditioned response (salivation) and ⇨ Neutral stimulus (bell) ⇨ No response

During conditioning

Conditioned stimulus (bell) paired with ⇨ Unconditioned stimulus ⇨ Unconditioned response

After conditioning

Conditioned stimulus (bell) ⇨ Conditioned response

Source: Slavin, 2009, Educational Psychology:Theory and Practice, 9th ed)

Whereas in classical conditioning, the animal is merely responding to prior cues, in operant conditioning, the animal learns that a particular behaviour produces a particular response and then performs that behaviour to achieve that response.

Reinforcement

In operant conditioning, the process whereby a particular behaviour is strengthened, making it more likely that the behaviour will occur more frequently, is referred to as *reinforcement*. It is an important ingredient in operant conditioning. It is something that follows a response and strengthens our tendency to repeat that response in the future. A stimulus that increases the likelihood that a particular behaviour will be repeated is called a *reinforcer***.** However, it should be noted that one can only notice the effectiveness of the reinforcer only after it has been demonstrated (Slavin, 2009). Therefore it is difficult to presuppose that a particular consequence is a reinforcer until we have evidence that it strengthened the behaviour for a particular individual.

Reinforcers (which are events that follows a behaviour and increases the chances that the behaviour will occur again) may be either positive or negative. A *positive reinforcer* is something pleasant – a good feeling, say or the satisfaction of a need, or something received from another, such as a chocolate, or a word of praise. Positive reinforcement in other words, occurs when something the organism wants (such as food) is added on after an action. *Negative reinforcement* on the other hand occurs when something unpleasant (negative) is stopped or taken away when the organism does something, In other words, a negative reinforcer is the removal of an unpleasant stimulus as the result of a particular behaviour, e.g. when a student's anxiety about test-taking is reduced by extra preparation, the reduction of anxiety is a negative reinforcer of such behaviour (Westen, 2002).

There are, however, two broad categories of reinforcements; one type of reinforcement is called primary reinforcement whereas the other, secondary. The word *primary* means "of first and greatest importance". Thus a primary reinforcer is something that is absolutely necessary for survival, such as food and water. The possibility of obtaining one of these when you perform an action is the strongest incentive to learn. Secondary reinforcement on the other hand, is anything that comes to represent a primary reinforcer, e.g. because money can buy food and drink, it represents these primary reinforcers (Slavin, 2009).

Negative Reinforcement and Punishment

Negative reinforcement is often confused with punishment. As noted above, the process of reinforcement whether positive or negative always involves strengthening behaviour. Punishment however, involves decreasing or suppressing behaviour. This differs from a negative reinforcer, in that a punishment is an unpleasant event that makes behaviour less likely to be repeated. In other words, punishment is an attempt to weaken a response by following it with something unpleasant, not to strengthen it (Westen, 2002).

However, there are two types of punishment - positive and negative punishment. Positive punishment takes place when an operant (voluntary behaviours emitted by a person or an animal) is weakened by the presentation of an event following it whereas negative punishment occurs when an operant is weakened by the removal or postponement of a reinforce (Westen, 2002).

Generalization

This is a behaviour that spreads from one situation to a similar one. This as highlighted above, also happens in classical conditioning, where a conditioned response can spread or generalize to similar stimuli. However, generalisation cannot be taken for granted this is because, for example when a classroom management programme is successfully introduced in one setting, student behaviour does not automatically improve in other settings, instead they learn to discriminate

among settings. (Slavin, 2009). For generalisation to occur, it must be planned for; It should also be noted that generalisation to a higher extent is more likely to occur across similar settings or concepts.

Discrimination Learning

Learning to tell the differences between one event or object and another, i.e. the reverse of generalization. Discrimination is the use of cues, signals, or information to know when behaviour is likely to be reinforced. For instance, in a class, for students to learn discrimination, they must have feedback on the correctness or incorrectness of their responses (Slavin, 2009).

Extinction

Often, when a response is no longer followed by a reinforcer, a person will gradually stop making that response; it is the weakening and eventual elimination of a learned behaviour as reinforcement is withdrawn (Westen, 2002). Extinction occurs when enough conditioning trials pass in which the operant is not followed by the end result previously related with it. This, as noted above, happens also in classical conditioning.

Shaping and Chaining

These are two major techniques to teach complex or complicated responses.

(a) Shaping

The term shaping is used in behavioural learning theories to refer to the teaching of new skills or behaviours by reinforcing learners for approaching the desired final behaviour (Bigge & Shermis, 2004; Driscoll, 2000). Shaping is an important tool in classroom instruction.

The method of successive approximations, is the process of gradually refining a response by successively reinforcing closer approximations of it. For example a grade nine pupil looks at the results of the last English test and says:

> *"I got nearly half of these marked wrong because I made one simple mistake in each question. I hate English"!*

(b) Chaining

This involves reinforcing the connections between different parts of a sequence, that is, each part or link is connected to the other by reinforcement. In other words, chaining involves putting together a sequence of existing responses in a narrative order.

Schedules of Reinforcement

There are different methods of providing reinforcement during operant condition. So far, we have focused on continuous reinforcement which means each time behaviour occurs, reinforcement is given.

Schedules of Reinforcement: Different Methods of Reinforcing

Positive reinforcement schedule – reinforcement is not given each time an act is performed.

Variable ratio schedule – Reinforcement occurs after a desired behaviour occurs, but a different number of the desired acts is required each time, e.g. pigeon gets food after five pecks, then seven,, then three, etc. Once you stop the reinforcement, the pigeon will peck over 10,000 times before it finally gives up.

Variable interval schedule – Reinforcement occurs after varying amounts of time if a desired act occurs.
Fixed interval schedule – A reinforcement is received after a fixed amount of time has passed if desired act occurs. It has an interesting effect on the behaviour of the organism. They become casual until just before the interval is over. In a classroom situation, this happens when students are given tests once fortnightly.

Another major contributor to the development of the theory of behaviourist is Thorndike (1874-1949). He is best known for his emphasis on the application of the methods of 'exact science' to educational problems. Due to this, he advocated for an accurate quantitative treatment of information. In line with Thorndike's notion concerning accurate quantitative treatment of information, Rizo (1991: 9) argues that "anything that exists, exists in a certain quantity and can be measured". His major contribution to behaviourist is his theory of 'connectionism', which states that learning involves the formation of a connection between stimulus and response (Dembo, 1994:15). Later, Thorndike developed three laws based on his stimulus-response hypothesis. The first of these laws is the 'law of effect' which states that the connection between stimulus and response is strengthened when it is positively rewarded and weakened when negatively rewarded.

The second law is the 'law of exercise'. Central to this law is the premise that the more the stimulus response (S-R) bond is practiced, the stronger it becomes. The third and last law developed by Thorndike is the 'law of readiness' which holds that due to the structure of the nervous system, some conduction units, in given situations are more predisposed to conduct than others. According to Saettler (1990) Thorndike was convinced that a neutral bond would be established between the stimulus and response when the response was positive. Another aspect central in the work of Thorndike is that learning takes place when the bonds between stimulus and response are formed into patterns of behaviour.

Some Contributions of Behaviourist Theories to Education

Since education is an act of teaching and learning, then it can be stated here that learning takes a pivotal role in the whole educational process. What is learning? Learning can be defined differently depending on which perspective one takes in defining it. The complex process of learning is defined according to behaviourist, cognitivism and constructivism. According to a behaviourists, learning can be defined as "a relatively enduring change in observable behaviour that occurs as a result of experience" (Eggen and Kauchak, 2001: 214). Although the cognitive theorists accept most behaviouristic concepts, they define learning differently. They view learning as the acquisition or reorganisation of cognitive structures through which human beings process and store information (Good and Brophy, 1990:189). Moreover, learning for the constructivists is the construction of personal perceptions of reality according to one's personal experiences (Jonasson, 1991). It can be stated here that although learning is defined differently, the overall objective of it is some form of behavioural display by the learner. It has been shown in this article that for the behaviourists, learning is said to have taken place when the learner shows change in behaviour. For the cognitive theorists learning occurs when the learner portrays the behaviour of ability to process cognitive structures. For the constructivists, the final end of the construction of personal perceptions of reality is some particular behavioural disposition that goes with the way one perceives reality. Therefore, it can be stated with confidence that the whole educational complex process of learning is anchored on behaviourist in one way or

another.

Essentially, another aspect that can be perceived as a contribution of behaviourist to education is the use of lesson objectives during the instructional process. It is vital to state that learning objectives are actually behavioural objectives in that they set standards on how the learners are expected to behave at the end of the learning experience. Behavioural objectives show the overall purpose of any learning experience such that without them, a lesson can be said to have no direction or an intended goal. A behavioural objective states learning objectives in "specified, quantifiable, terminal behaviours" (Saettler, 1990: 288). Moreover, the ABCD mnemonic device is used to sum up behavioural objectives (Schwier, 1998:12). For instance, the ABCD mnemonic device can be clearly portrayed in the following behavioural objective. *'At the end of the lesson, students should be able to answer correctly 85% of the questions on the post test'*. In the behavioural objective above, we see that "A" implies the 'audience' which in this case comprises the students, "B" implies the 'behaviour' which further implies to answer correctly, "C" implies the 'condition' evidenced by the statement, 'at the end of the lesson, on the post test' and finally "D" implies the 'degree' shown by the figure 85% correct. Therefore, as portrayed above by the ABCD mnemonic device, to develop behavioural objectives a learning task must be broken down through analysis into specific measurable tasks. Moreover, it is very important at this point to state that learning success may be measured by tests developed to measure each objective of the lesson.

Another contribution made to education by behaviourist is the behaviouristic belief that the teacher has the duty to create a favourable environment for learners. Hence, teachers who accept this behavioural perspective believe that the behaviour of students is a response to their past and present environments and that all behaviour is learned. To enable effective learning, the teacher should control the learning environment in order to ensure that the environment is conducive for learning. This emphasis on the importance of the teacher in ensuring a favourable learning environment is highlighted by Skinner (1968: 64) when he states that;

> *the application of operant conditioning to education is simple and direct. Teaching is the arrangement of contingencies of reinforcement under which students learn. They learn without teaching in their natural environments, but teachers arrange special contingences which expedite learning, hastening the appearance of behaviour which would otherwise be acquired slowly or making sure of appearance of behaviour which otherwise would never occur.*

It should also be stated that in their endeavour to create a favourable environment for learning, teachers are advised by behaviouristic principles to reinforce appropriate behaviours only and extinguish inappropriate behaviours. The maintenance of a favourable environment for learning by the teacher is not only advocated for by Skinner but many other behaviourists as well. They stress the importance of a favourable environment in fostering effective learning. For instance, the point above is clearly evident in Darby (2003: 5) when she states that;

> *classical conditioning suggests maintaining a positive environment, or the possibility arises of pupils developing a negative attitude towards a subject because of the unpleasant*

feelings associated with how it was learned.

A controlled environment was considered by Skinner to be the prerequisite for total behaviour modification. Therefore, the emphasis on the importance of maintaining a favourable learning environment in school contexts is a behavioural contribution to education.

The use of 'behaviour modification' in the classroom is yet another vital contribution of behaviourist to education. According to Congelosi (2000: 42) “behaviour modification refers to the behaviourist approach by which students’ environments are manipulated to increase the chances of desired behaviours being rewarded while undesired behaviours go unrewarded”. We therefore, see that through behaviour modification, students are thus conditioned towards being on task in the class room. There are different behaviour modification methods used in the classroom. For example, “student behaviour can be modified through shaping, chaining, extinction, positive and negative reinforcers, discipline plans and token economies” (Eggen and Kauchak, 2001: 36). These behaviour modification methods are common practices in primary schools. The most widely used methods are the two types of reinforcers above (positive and negative reinforcements) and token economy.

In case of positive and negative reinforcers, Skinner highlighted the importance of generalised reinforcers such as giving praise, stars and points to the student immediately after their performance of desired behaviours. This enables students to repeat the desired behaviour. In line with reinforcement, he discouraged the use of punishment in class in favour of merely ignoring inappropriate behaviour as the best way of extinguishing it. Behaviourists believe that “punishment is less effective in terms of terminating inappropriate behaviour because it only suppresses behaviour temporarily” (Darby, 2003: 4). Moreover, the removal of punishment allows the behaviour to reappear. Furthermore, we see that punishment is also known to have unpleasant side-effects such as group hate and group unhappiness. Token economy is simply a system of exchange. Here the teacher offers a reward to a student when desired behaviours are attained as a conditioned reinforcer. The teacher has to be committed to dispense tokens quickly after desired behaviours. Tokens can be things such as stickers, money and so on.

In any educational context, it is very important to assess the learners. This fundamental educational technique is based on the principles of behaviourist. From a behaviourist perspective, learning is defined as a relatively enduring change in observable behaviour that occurs as a result of experience (Saettler, 1990). It therefore follows that assessment or indeed evidence of learning must be some capturing of that change.

Hence, assessment is a purely behavioural activity because its main objective is to show whether there has been change in the learner's behaviour after a learning experience. Without the behavioural educational technique of assessment, it would be very difficult to know whether learning has taken place. Students should be assessed by observing behaviour. Educators cannot assume that students are learning unless they observe that behaviour is changing through assessment. Assessment therefore acts as a vital instrument through which educators can receive feedback vis-a-vis progress of learning in the classroom.

It can also be stated that behaviourist has made a major contribution to education in the area of teaching methods. According to Driscoll (2000:16), one major contribution of behaviourist to education is the use of the 'drill and practice methodology' during the instructional process. The

central principle in this teaching methodology is that the teacher presents the stimulus to the learners and what is expected from the learners is to respond to it through constant practice. This teaching method is commonly used in language lessons where it is known as the 'audio lingual method'. Here, the teacher presents the stimulus to the learners in form of a word inscribed on the chalk board and reads it aloud. The learners are expected to actively respond to the stimulus by reading the word after the teacher in a chorus form repeatedly until the time they are told to stop doing so by the teacher. In this context, the intention is to make the word sink in the minds of the learners. It is believed that in the 'drill and practice' teaching method, the repetition of the stimulus response habits can strengthen those habits. This belief is also evident in yet another belief among educators that the best way to improve reading is by encouraging students to read more and more in order to strengthen the link between the stimulus (material to be read) and the response (ability to read).

The Pavlovian classical conditioning is not an exception to but an exemplification of several educational implications. As pointed out earlier, if learning is indeed the goal in any classroom, educators need to create an environment conducive to learning. Classical conditioning advocates for the creation of an environment conducive to learning. The point at hand comes out clearly in Edwards (2000: 24) under the sub heading 'educational implications of classical conditioning' when he states that "students should experience academic tasks and contexts that cause or encourage pleasant emotions". The implication of this is that students should be able to feel enthusiasm, excitement or enjoyment in their learning context rather than being in contexts that cause anxiety, disappointment and anger. In the classroom context, mathematics anxiety is a good example of classical conditioning that can be mitigated with classical conditioning.

Focusing more specifically on academic learning in terms of the 'content' of the lesson, we see that the theory of behaviourist has made some fundamental contributions to education through Thorndike's 'Theory of Transfer of Identical Elements'. Thorndike's theory represents one of the most important behavioural principles that;

> *the amount of learning that can be generalized between a familiar situation and an unfamiliar one is determined by the number of elements the situations have in common (Schweiso, 1989: 121).*

Thorndike concludes in his theory that education does not easily generalise what is taught to the learners. He further stresses that if education is to be preparation for life beyond the school, it should be as life-like as possible. His theory has had a tremendous influence in the introduction of life or social oriented themes in most subjects on the school curriculum. Moreover, he encouraged educators to introduce skills to learners when they are still conscious of their ability to perform them correctly. The best time for this is usually after positive reinforcement.

The behavioural experiments of Skinner are seen as a highly rich source of educational implications. We see that regarding the lesson material, Skinner specified that “to teach well, educators must decide exactly what it is they want to teach” (Darby, 2003: 6). It is only then that they can present the right material to the learners and know what responses to look for. When educators present the right material to the learners they can know what responses to look for and hence know when to give reinforcement that usefully shapes behaviour. Skinner (1968) advocated for effective learning in school institutions. In his endeavour to ensure effective learning in schools, he suggests three principles to be used by teachers when he states that;

> *information to be learned should be presented to the learners in small behaviourally defined steps ... rapid feedback should be given to pupils regarding the accuracy of their learning and that pupils should be allowed to learn at their own pace.*

We also see that building on the three principles, Skinner proposed a different teaching method which he called 'programmed learning or instruction' and a 'teaching machine' that would present programmed material. Two techniques of teaching emerged from programmed learning. The first is the linearly structured technique where all pupils follow the same sequence of learning steps and the second technique involves the creation of different paths for different pupils according to their answer at each frame. It is vital here to state that studies have shown that "both teaching techniques are as effective as conventional teaching" (Schunk, 1996: 91). From the programmed instruction portrayed above, it is evident that based on operant conditioning, Skinner's teaching machine requires the learner to complete or answer a question and then immediately receive feedback on the correctness of the response.

In school contexts, there are a number of issues that affect the educational achievement of the learners. One of the issues that has a direct impact on the educational achievement of the learners is lack of self-esteem. According to Blascovich and Tomaka (1991: 4*)* self-esteem is;

> *an individual's sense of his or her value or worth, or the extent to which a person values, approves of, appreciates, prizes or likes him or herself.*

The problem of lack of self-esteem in schools is most evident in children with learning difficulties or needs. A child with learning difficulties or needs is "continually seeking help in gaining self-esteem and a feeling that somebody cares about him" (Wheldall, 1981: 39). In order to give such children more direct help in terms of enhancing their self-esteem, educational psychologists have turned to behavioural techniques.

According to De Klyen (1976) research has provided evidence that behavioural changes brought about by the use of behaviour modification produces higher self-steem in children with learning difficulties or needs. The major findings from research with children with learning difficulties or needs show that "a substantial and sustained increase in positive reinforcement enhances self-esteem as reflected in both verbal reports of self-esteem and overt behaviours considered to be related to self-esteem. Reinforcement is defined as anything which increases the probability of a response or particular behavior" (Green and Hicks, 1984: 32). Moreover, we see that positive reinforcement occurs when something rewarding happens after the behaviour. Therefore, in the case at hand, we see that children with learning difficulties or needs in schools are beneficiaries of a behavioural modification technique of positive reinforcement.

Weaknesses of Behavioural Theories of Learning

Despite its great positive contributions to education, the theory of behaviourist is not an exception to some critical responses from different scholars in academia. For instance, in educational contexts the use of generalised reinforcers such as the giving of praise, stars, points, tokens and so on can be useful but just like other methods of behaviour modification, can have its own failures. It is believed that external rewards may create some unexpected problems in the classroom because they "may undermine intrinsic motivation and cause children to loose interest

in learning without rewards being supplied" (Edwards, 2000: 64).

Some critics of behaviourist have argued that it is very difficult for a teacher to give constant reinforcement to one particular student because there are too many other students in the classroom in need of the teacher's reinforcement. It is also common for critics to argue that behaviour modification techniques ignore the causes of behaviour. This is because behaviour modification techniques only focus on how behaviour can be changed or completely extinguished. Moreover, one requirement for negative reinforcement is the presence of the disliked activity in order for the child to be excused from it. Here the problem is that "the disliked activity might have negative effects upon the child, as in the case of punishment" (Darby, 2003: 5).

From a humanist perspective, behaviourist is found wanting in the area of the relationship between the teacher and the pupil. This is because behaviourists believe that the teacher knows best when to decide what is rewarded or punished. The teacher justifies his or her actions as being in the interest of the child. To the humanists, the behaviourist relation between the teacher and the pupil is unequal therefore contrasts with the humanist approach.

Behaviourist as a theory in itself has been criticised of lacking detail in its account of the learning process. For instance, Bransford et al. (2000) argue that;

> *behaviourist does not capture the complexity and breadth of learning and it fails to acknowledge the subjective, creative and intuitive dimensions and prior learning.*

As noted above, behaviourist theory cannot stand on its own as a theory of teaching and learning. Hence, it is best used in conjunction with other methods. Moreover, since behaviourist is based on memorisation of tasks by the learner, it is not useful in the teaching of complicated subject matter. This is because a learner cannot rely on memorisation in the learning of complicated subject matter. The point here is that behaviourist is not appropriate for all subject matter.

Conclusion

In conclusion, it can be stated that the main difference between behaviourist theory and other learning theories is that, it concentrates on overt behaviours that can be observed and measured. To the behaviourists, objectivity is very important. It is because of this reason that behaviourists place primacy on overt behaviours over inner states such as motives or mental states. They argue that inner states such as motives or mental states cannot be measured objectively. It can be stated here that although other learning theories use introspective methods in their endeavour to explain how learning occurs, the principles upon which they are based are linked to behaviourist in one way or another. This is because, the final end in all of them is an objective observation of behavioural change as a reliable indicator of whether learning has occurred or not.

Although behaviourist theory has been criticised in certain cases, we see that it has made numerous contributions to education. As portrayed by the paper earlier, the complex process of learning is mostly based on the principles of behaviourist. It was shown that the instructional process in schools is guided by behavioural objectives. Behavioural objectives give direction to the lesson and make it possible for educators to set clear goals for their lessons. Since learning is the main aim of education, it is important for educators to create a conducive environment for learning. We saw that a conducive learning environment can be achieved through the correct use

of behavioural control techniques by educators. The control or creation of a favourable environment for learning is a purely behaviouristic technique. It was portrayed vividly that the fundamental educational process of 'behaviour modification' is a behavioural technique borrowed from behaviourist theory.

The paper has shown that assessment in schools is a behavioural technique in that it is based on capturing change in the behaviour of learners after a learning experience. Moreover, in terms of teaching methodologies in educational contexts, behaviourist has contributed to the 'drill and practice' methodology which is being highly utilised in the teaching of language. In line with the behaviourist principle of creating a favourable environment for learning, it was shown that behaviourist theory encourages educators to control the learning environment through the right use of reinforcement techniques. Still under this aspect, behaviourist advises educators to create learning environments that encourage the learner's enthusiasm, excitement or enjoyment rather than negative feelings in order to ensure effective learning.

In terms of lesson content, this article has shown that behaviourist theory favours the teaching of lesson content that is more 'life-like' in order to enable the learners to easily apply what is learnt in class to real life experiences. Furthermore, it was also shown that to ensure effective teaching, teachers need to decide exactly what it is they want to teach. This helps the teacher to master the subject matter and to know what responses to look for from the learners. Finally, it can be stated that behaviourist has provided a lasting solution in terms of ensuring the restoration of the much needed self-esteem in children with learning difficulties or needs in academic contexts. The issues above are just a few among the numerous major and minor contributions behaviourist theory has made to education.

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