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Introduction

Chapter one gives a brief overview of educational psychology and its relationship with psychology.

Chapter two discusses the various perspectives in educational psychology- their advantages and disadvantages while **chapter three** explains various strategies used to enable people engage in active learning. **Chapter four** elaborates on Bloom's Taxonomy and its application teaching. **Chapter five** highlights on relationship between constructionism and constructivism. It also discusses how constructivism can be applied in teaching. **Chapter six** deliberates on different styles of learning, the concept of metacognition and what it constitutes. It also gives a detail explanation on the theory of Multiple Intelligence. **Chapter seven** gives a final conclusion of my perception on what kind of methodologies educators should adopt in teaching and learning.

Chapter One

1.0: What is Educational Psychology?

Educational Psychology can simply be defined as the process by which psychological findings, techniques and principles are applied in the field of education to discover solutions to educational problems in teaching, learning, assessment and classroom management.

1.1: The relationship between Psychology and Educational Psychology.

Psychology is the scientific study of the human mind and behaviour. Educational psychology is a part of the parent discipline which has relevance to education and it provides concepts and ideas derived from the mainstream psychology and from educational research thereby illuminating the work of teachers. We can differentiate between psychology and educational psychology in terms of level of analysis. Teachers and educational research workers seek explanations of pupils' behaviour in everyday terms such as teaching methods, children's attributes (intelligence and personality) while psychologists are more interested in fundamental explanations of general phenomena such as memory and physiological bases of motivation. Their level of analysis involves the examination of the human being as a responding organism. In addition, studies carried out by educational psychologists normally examine accepted practice. They do not allow them to determine what might be better approaches to teaching and learning except in a very limited way; it is barely possible to make extreme changes in the classroom to find out what might happen. Psychological experiments do not have the same restrictions. There is much more freedom to systematically vary certain aspects of the learning situation. However, educational research and psychology provide complementary sets of ideas from which a sound understanding of relevant aspects of education can be developed even though it cannot provide ready-made answers for teachers (Entwistle, 2013).

Chapter Two

2.0: Perspectives in Educational Psychology

Perspectives in educational psychology seeks to help educators understand how people learn and retain information. It also explains the individual differences in learning.

2.1: Behaviourist Theory of Learning

Behaviourism focuses mainly on the conditioning of observable human behaviour. J. B Watson, the father of Behaviourism, defined learning as a sequence of stimulus and response actions in observable cause and effect relationships (Forrester & Jantzie, 2001). In simple terms, behaviourist theory of learning is the process whereby learning takes place as a result of associations between stimulus and response.

In behaviourist theory of learning, learners learn through positive and negative reinforcement.

Motivation to learn is extrinsic as learners depend on rewards, praise, etc. They are considered as 'blank slate' (tabula rasa) who learn through repetition and produce output based on specific skills reinforced by the teacher. Instructional designs used in behaviourist theory of learning include drill and practice, rote learning, multiple choice tests.

Some of the disadvantages of behaviourist theory of learning is that learners are usually passive because teachers dominate the learning state leaving little opportunity for learners to explore and discover knowledge for themselves.

I can apply the behaviourist theory of learning especially when teaching the times table fact. It can also be used in subject areas which involves learning of procedures and recalling of key facts.

2.2: Constructivist Theory of Learning

Behaviourist theory of learning had served its purpose and its goals and approaches were becoming outdated. Thus, constructive theory of learning sought to improve on what behaviourist theory of learning had already established. According to constructivists, learning has to do with much more than memory. Teachers cannot simply give students knowledge. Students need to construct knowledge in their own minds. The teacher can enable this by teaching in ways that make information meaningful and relevant to students, giving them chances to discover or apply ideas themselves and teaching students to consciously use their own strategies for learning. In doing this, they give students ladders that lead to higher understanding, even though the students must climb these ladders themselves.

This forms the hallmark of **constructivist theory of learning**. The theory states that learners must individually discover and transform complex information, checking new information against old rules and revising rules when they no longer work (Slavin, 2019).

In my field of work as a Year 1 teacher, the Montessori methodology is skewed towards the constructivist theory of learning. This enables me guide learners in building their own understanding and knowledge. Learners become actively engaged in their learning process as compared to behaviourist theory of learning where learners are passive. It also allows differentiated instructions to all learners.

However, running a constructivist classroom involves a lot of work and preparation by teachers in order to give learners the chance to explore information, understand then and build their own knowledge. In situations where learners have limited amount of time to get through tasks makes the learning process stagnant especially for learners who lack intrinsic motivation to learn. In other words, students who need extrinsic motivation to learn do not perform well in a constructivist

classroom and usually need constant promptings to be able to keep up with work. Thus, learners can succeed in a constructivist classroom if they possess a high level of self-management or maturity. Furthermore, it is difficult for teachers to assess learners' understanding of new information as compared to a behaviourist classroom where a teacher can assess if a learner has grasped a concept using observable behaviour.

2.3: Cognitivist Theory of Learning

Cognitive theories of learning became popular in the early 1970's and 1980's with psychologists such as Jean Piaget, as a response to behaviorism. It explains the mind as the interaction of mental representations and the processes that operate on them. It originated from cognitive psychology. There are two components of cognitivism. They are cognitive psychology (mental processes) and information processing (cognition as computation). Cognitive psychology is the study of mental processes. These are called schemas. According to cognitive theorists, for learning to occur, when presented with new information, learners must:

- Actively engage with, and organize, information to give it meaning.
- Practice and rehearse information.
- Make connections to what is already known and be in an environment that supports learning.
- Finally, take on tasks within their zone of proximal development (Alahmad, 2020).

Cognitive theorists seek to understand how the human mind works while learning. They investigate how information is processed, stored and retrieved by the brain. They believe individuals differ in mental processes and there are internal and external factors which influences individual learning.

One advantage of cognitivism is that, it has many practical applications. Cognitive tests could be used again to help determine if somebody has autism, whilst the knowledge that people with autism or Asperger's syndrome lacking theory of mind can help us better understand what autism consists of and how to accommodate this into school or work situations. The cognitivism heavily relies on experiments as its main research method and these experiments allow for cause and effect to be established. This permits high control over confounding variables.

Just like other theories, cognitivism has also been criticized. Behaviourists have asserted that the nature of thought processes are abstract and thus hard to define. What one researcher may self-critic, another may comment as rational. Furthermore, there is no universally accepted definition or application of the theory. It also usually refers to cognitive processes which we cannot directly observe. Other critics have also raised issues with regards to the theory undermining the effect of social, educational and cultural background on cognitive processes (Alahmad, 2020).

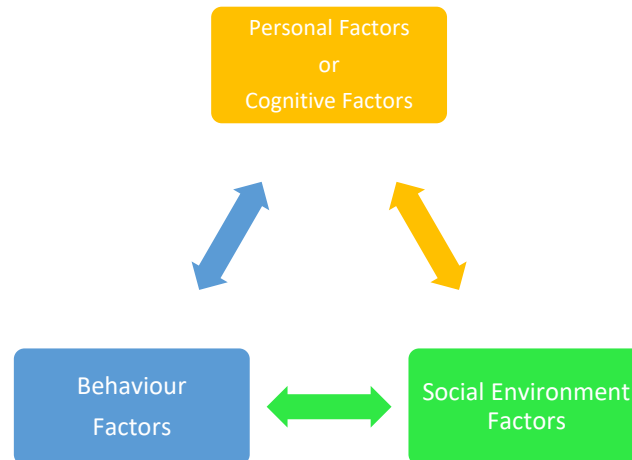
2.4: Social Cognitive Learning Theory

Social learning theory was propounded by Albert Bandura. The theory explains that people learn through the social processes of observing, imitating, and modelling the behaviours of others (Middleton, Hall, & Raeside, 2019).

However, Bandura (1986) adapted **social learning theory** as **social cognitive theory** to include determinants of learning that are neglected in its predecessor: *cognitive* elements significant to the learning process, such as thought (for example, anticipated outcome expectations) and feelings (for example, anxiety), are also considered.

There are interactions between social and cognitive factors of learning as determinants of behaviour and this forms a distinctive feature of Social cognitive learning (Pálsdóttir, 2013). This is known as

‘reciprocal determinism’ which states that, a person's behavior both influences and is influenced by personal factors and the social environment (Bandura, 1971). This is depicted in the diagram below.



Interaction among the personal factors, behaviour factors as well as the social environment factors determines human behaviour and learning.

This implies that learning is a social process which represents the primary focus of social cognitive theory. The theory suggests that knowledge and skills come through ‘enactive mastery experience’, (Gong, Huang & Farh, 2009: 767). In SCT the mastery of new skills and knowledge are of greater interest than the outcome or objective of the learning process.

One of the strengths of social cognitive theory of learning is a well-established theory that acknowledges the role of environment and other people on how a person learns. However, it is weak because it does not take into consideration the trait or biological aspects of learning. It also attributes the process of learning to a person rather than the sum of his or her learning.

2.5: Theory of Multiple Intelligences

According to Howard Gardner, human intelligence should not dwell solely on linguistic or logical-mathematical intelligence alone. He identified a total of eight different intelligences that humans may possess. These include:

- Linguistic intelligence
- Logical-mathematical intelligence
- Spatial intelligence
- Musical intelligence
- Bodily-kinesthetic
- Naturalist Intelligence
- Interpersonal intelligence
- Intrapersonal intelligence

This theory provides a more holistic view of the intelligence of humans. Howard Gardner asserts that we may all attempt to develop each of these intelligences to our best level. However, we may be more proficient in only certain of these intelligences. However, we may seek to develop the remaining intelligences through practice. Furthermore, research has proven that the use of technology especially, the computer has enormous potential in developing the different forms of intelligences proposed by Howard Gardner.

Chapter Three

3.0: How do people learn?

To facilitate learning as a teacher, students must do more than just listen: They must read, write, discuss, or be engaged in solving problems. Students must engage in such higher-order thinking activities as analysis, synthesis, and evaluation. This can be termed as active learning.

3.1: Defining Active Learning

Active learning is classroom-based activities designed to engage students in their learning through answering questions, solving problems, discussing content, or teaching others, individually or in groups (Prince & Felder, [2007](#); Smith, Sheppard, Johnson, & Johnson, [2005](#)). Several studies have revealed that presenting active learning activities before lectures results in deeper understanding and application of transfer of knowledge.

3.2: Examples of Active Learning Activities

Classroom Discussion

This can be used as in - class or online activity. It can be conducted with any class size even though it is usually effective with small group sizes. Learners discuss material constructively and intelligently. They think critically on the subject matter and reason to evaluate their ideas as well as others in the group. This method enables learners discover diverse perspectives and increases intellectual agility. It also gives learners the opportunity to express their opinions and show respect for other learners' ideas (Brookfield, 2005).

Think-Pair-Share

With this method, learners take a minute to contemplate at the end of a lesson. They then discuss it with one or more of their peers and eventually shares it with the class as part of a formal discussion.

During this formal discussion, the facilitator clarifies misconceptions. "Think-Pair-Share" exercise is useful in situations where learners can identify and relate what they already know to others.

Nevertheless, students need a background in the subject matter to converse in a meaningful way.

Thus, preparation is key. Facilitators must prepare learners with sound instruction before they discuss it on their own.

Think-pair- share is time effective and keeps students prepared and highly engages them in class discussions. Unfortunately, is ineffective in situations where the class size is large (Bonwell and Eison, 1991).

Learning Cell

Learning Cell was developed by Marcel Goldschmid of the Swiss Federal Institute of Technology in Lausanne. This is a process of learning whereby two learners asking and answering questions on a generally read material. To prepare for the activity, learners read extensively on the material and write down questions they wish to ask about what they have read. In the next lesson, the facilitator pairs learners and they alternate in asking and answering questions on what they have read. The facilitator moves from group to group to give feedback and answer questions.

Short Written Exercise

This is an exercise conducted by the facilitator at the end of the lesson to enable learners to review materials and give feedback where necessary. This method gives the facilitator the opportunity to directly assess learners if they have understood concept taught.

Collaborative Learning Group

With this method, the facilitator assigns tasks to groups of 3-6 people. They are expected to work to work on together. These tasks could be either to answer a question by presenting to the entire class or a project.

Class Game

It is an active and fun way of engaging learners to review what has been taught. Examples of class games include, jigsaw puzzles, crosswords on a subject matter and riddles. These actively engages the mind of learners on the subject matter discussed in a lesson. Fortunately, educational technology has introduced numerous educational games on subjects like History, Geography, Math, Science and many others which engages learners in and out of the classroom.

Learning By Teaching

With this method of active learning, learners fervently research on a topic, prepare information and materials so that they can teach the class. This provides learners to learn their researched area very well and this enables them communicate even better with their classmates than the teacher.

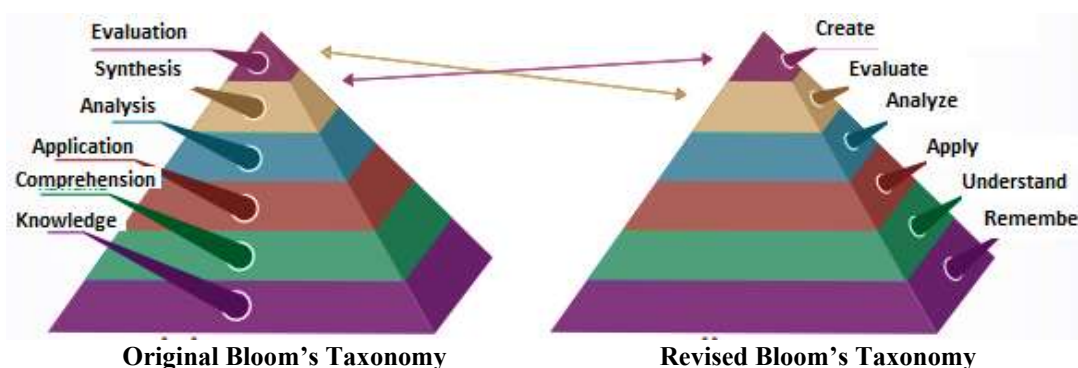
Chapter Four

4.0: Bloom's Taxonomy

Bloom's taxonomy was first described as a hierarchical model for the cognitive domain in 1956 (Bloom et al., 1956). These are planned skills that are required in learning environments usually used for classifying educational learning objectives into levels of difficulty and specificity. Bloom's taxonomy of learning identified three domains of learning activities: cognitive, affective and psychomotor. This model was revisited in 2001 by Anderson and a team of cognitive psychologists. As a result, a number of significant changes were made to the terminology and structure of the taxonomy (Anderson et al. 2001).

4.1: Difference Between Original Bloom's Taxonomy and the Revised Version

The original has cognitive domain which contains six main categories in cognitive areas such as knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom, 1956; Bloom, 1976). With the revised version, "knowledge" category changed with "remember" and all categories were converted from noun forms to verb forms (e.g. Application becomes Apply). "Comprehension" category named "understand", "synthesis" and "evaluation" categories are replaced, and also "create" category is placed to the top of taxonomy (Anderson, Krathwohl and Bloom (2001),



(Krathwohl & Anderson, 2010).

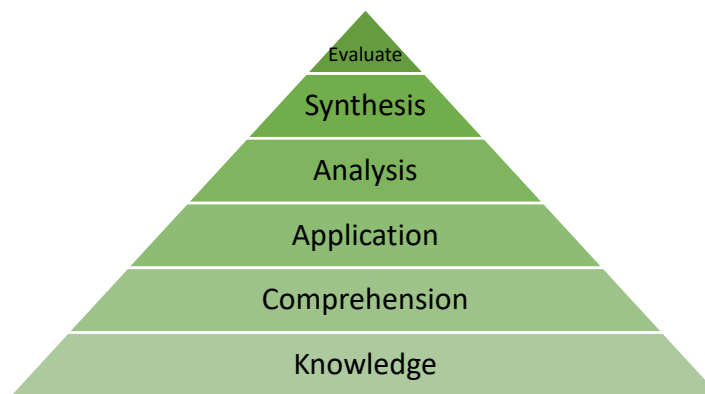
4.2: Teachers' Application of Bloom's Taxonomy

Bloom's Taxonomy is made up of three main domains namely, **cognitive, affective** and **psychomotor**.

1. Cognitive

This domain is made up of 6 levels. It begins from the lowest order and moves to the highest order.

This is depicted in the figure below.



Original Bloom's Taxonomy

Knowledge

Learners demonstrate the memories of what they have learnt through recalls or recounts of facts, terms and definitions. It also includes outlining sequences, classifications and categories, criteria and methodologies. At this lowest level on the hierarchy, teachers may ask questions like:

What are weather instruments?

Comprehension

To exhibit the understanding of ideas and facts, learners need to organize, interpret, translate, compare and give descriptions on concepts taught. Example of question a teacher may ask at this level is:

Differentiate between the barometer and the wind vane.

Application

Learners solve problems in new situations by applying acquired knowledge, skills, techniques and rules they have learnt. Questions asked at this level may include:

Ann is travelling towards a stormy region in the country. Which two weather instruments can she take with her?

Analysis

Learners critically examine information and break them into sections by spotting the causes or reasons and searching for evidence to support it. Teachers may ask questions like:

Mention three weather instruments you could use in a windy town and explain which of them can measure wind better. Give evidences to defend your answers.

Evaluation

Teachers need to present information to learners and expect them to defend by making sound judgment based on given criteria. Questions asked at this level may include:

Barometer and hygrometer: which one would you prefer to use as a meteorologist gathering information on air?

Synthesis

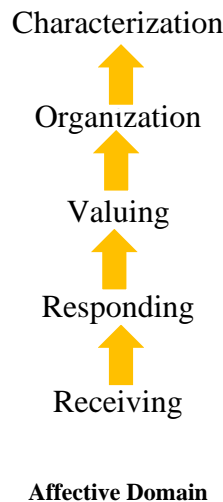
Learners propose alternative solutions to given problems by creating new patterns or models. To achieve this, teachers may ask questions like:

As a meteorologist residing in a rainy town, your rain gauge was ruined by a storm.

Unfortunately, you need to provide information on rainfall to the meteorology department as soon as possible. What can you do to solve this problem?

2. Affective Domain

The affective domain refers to the manner in which we deal with things emotionally such as feelings, values, appreciation, enthusiasm, motivation and attitudes. It is made up of five major categories which are listed from the simplest behavior to the most complex (Krathwohl, Bloom, & Masia, 1973). This is shown in a diagram below.



Receiving: This is the lowest level. It is the awareness of feelings and emotions. It involves passively paying attention and being aware of the existence of certain ideas. Without the concept of receiving, learning cannot occur

Responding: At this level, the learner is actively involved in the learning process through conversations, group discussions and presentations as well as carrying out instructions.

Valuing: At this level, the learner acknowledges the worth of what they are learning or have learnt and then ascribes value to it. To enable learners to add value to what they have learnt, a teacher may propose a plan to improve team skills.

Organization: At this level, the learner focuses on comparing, relating and assessing values to create an exceptional value system. For example, a learner may spend more time in studying than going out with friends because he or she acknowledges the need to maintain a balance between work and socialization or adequately manages time effectively to meet goals.

Characterization: This is the highest level of the affective domain. Here, the learner internalizes values he or she has set for himself and allows his or her behaviour be guided by them. For example, a learner stays away from bad friends and decides to associated with those who will influence him or her positively.

3. Psychomotor Domain

Bloom and his colleagues unfortunately did not create subcategories for the psychomotor domain. However, Simpson (1972) included physical movement, co-ordination and use of the motor-skill areas. Development of these skills requires more practise and it is measured in terms of speed, precision, distance, procedures or techniques in execution.

He categorized the progressive levels of behaviors from observation to Mastery of a skill. Simpson (1972) built this taxonomy on the work of Bloom and others. They are:

- Perception: Learners use sensory cues to guide motor activities. For instance, a learner adjusts the heat of the stove based on the smell and taste of the food.
- Set: This refers to the physical, mental and emotional readiness of learners to react. It may be termed as mindset and is usually a predetermination of a person's response to situations.
- Guided Response: At this stage, a person learns a complex skill through imitation as well as trial and error. Performance is usually achieved through constant practise.
- Mechanism: A person is at the intermediate stage in learning a complex skill. Their responses become habitual and they can perform movements with more confidence.
- Complex Overt Response: A person at his stage performs complex skillful movement patterns with much ease or no hesitation (automatic performance).

- Adaptation: At this stage, a person's skills are well developed and thus he or she can adjust movement patterns to suit exceptional requirements.

For example, a person may operate a machine to solve another problem that it was not originally intended to do: machine is not damaged and performing the new task is safe.

- Origination: At this stage, a person creates a new movement pattern to fit into a unique situation or problem. For example, a learner creates a new gymnastic movement based on what he had been previously taught.

Chapter Five

5.0: Constructionism Versus Constructivism

Constructionist theory of learning by Seymour Papert was developed based on the constructivist theory of learning by Jean Piaget. Constructionists and constructivists believe that knowledge is created by the learner in the active process of interrelating with the surrounding world.

Constructivist highlights interests and abilities of children to achieve specific educational goals at different ages whilst Constructionism focuses on the form of learning. In other words, constructivists pay more attention to skills of children at different stages of development whilst constructionists pay more attention to individual learning.

5.1: Application of Constructivist Learning

Hein (1991) asserts that as an educator, there are guiding principles which one needs to bear in mind when applying constructivist theory of learning. These include:

1. During learning, learners use sensory input and construct meaning out of it. To enable learners to be active, they need to engage with the world or their environment.
2. Learning consists both of constructing meaning and constructing systems of meaning. For example, if we learn the dates on the timeline of the Earth, we are simultaneously learning the meaning of a timeline. Each meaning we construct makes us better able to give meaning to other sensations which can fit a similar pattern.
3. When learners are constructing, they do it mentally: it happens in the mind. Physical actions, hands-on experience may be necessary for learning, especially for children, but it is not sufficient; we need to provide activities which engage the mind as well as the hands. Dewey called this reflective activity.

4. Learning involves language. Language used has an influence on learning. Researchers have noted that people talk to themselves as they learn. On a more general level, there is a collection of arguments, presented most forcefully by Vygotsky, that language and learning are inextricably intertwined.

5. Learning is a social activity in the sense that it is related with connecting with other human beings such as friends, teachers, family members and casual acquaintances. Learning becomes successful when we do not isolate the learner from social interaction but rather recognize the social aspect of learning and use conversation, interaction with others, and the application of knowledge as an integral aspect of learning.

6. Learning is contextual in that we do not learn isolated facts and theories in some abstract unearthly land of the mind separate from the rest of our lives. Rather, we learn in relationship to what else we know, believe and value. It becomes clear that this point is actually an outcome of the idea that learning is active and social. We cannot divorce our learning from our lives.

7. We need knowledge to learn. It is not possible to assimilate new knowledge without having some structure developed from previous knowledge to build on. The more we know, the more we can learn. Therefore, any effort to teach must be connected to the state of the learner, must provide a path into the subject for the learner based on that learner's previous knowledge.

8. Learning is a process. For significant learning to occur, we need to revisit ideas, ponder on them, try them out, play with them and use them. This cannot happen in the 5-10 minutes. If you reflect on anything you have learned, you soon realize that it is the product of repeated exposure and thought. Moments of profound insight, can be traced back to longer periods of preparation.

5:2: Application of Constructivism in Teaching

Discovery learning

Discovery learning is one of teaching and learning methods which is based on the contextual phenomenon (Syam, 2021) and considered a constructivist-based approach to education. This was propounded by Jerome Bruner. It is the kind of learning that happens by discovering and which prioritizes reflection, thinking, experimenting and exploring (Bruner, 1961). Through discovery learning, students are required to think in higher order thinking skill, be brave to do the experiment and explore the study (Juhaeni, Jazilah, Isnaini & Khoiru Fadilah, 2020).

However, the principle of learning that appears in Discovery Learning is that, the material is not delivered in a final form, but students as learners are encouraged to identify what they want to know followed by looking for information themselves (Kemendikbud, 2012). Discovery learning presents questions and activities that challenge students to utilize their prior knowledge in order to build upon and improve their current understandings (Schunk, 2008).

It is important to note that, learners need prior information or knowledge to be able to effectively engage in discovery learning. For instance, if a teacher wants learners to discover which materials will be most effective for osmosis, they must have first-hand knowledge on what osmosis is and how it occurs. Afterwards, learners may be allowed to explore how different materials react to osmosis. As

a result, learners are more likely to remember concepts if they discover them on their own as opposed to those that are taught directly (Bruner, 1961).

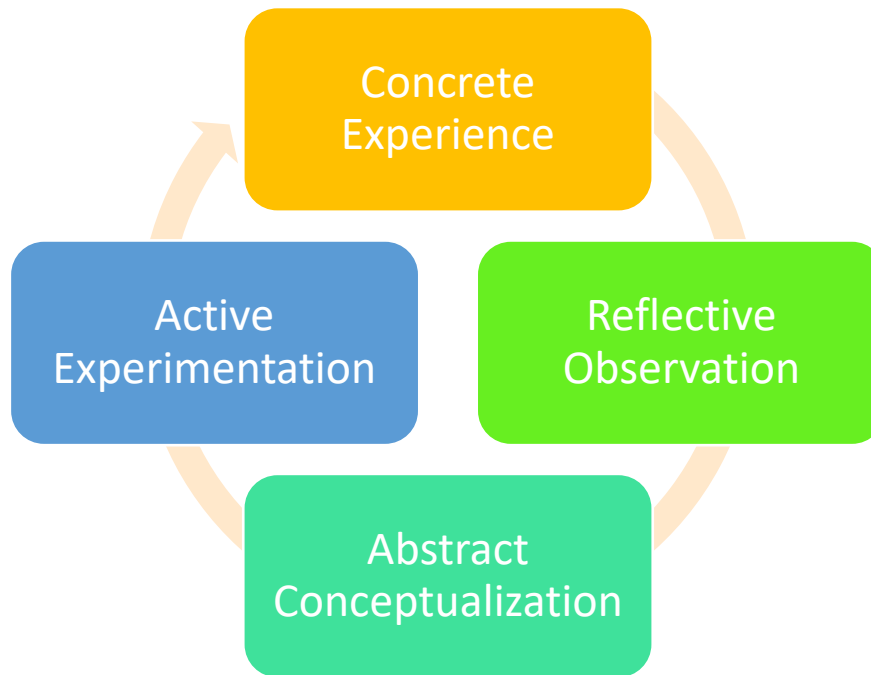
Enhanced Discovery Learning

The drawbacks of discovery learning have been raised by scholars (Paas, Renkl, & Sweller, 2004). This led to the introduction of enhanced discovery learning by Robert J. Marzano. With this method of learning, the teacher does not only prepare the learners for the discovery learning task by preparing the vital knowledge needed to complete the task but also gives assistance throughout the task.

Experiential Learning

Experiential learning profoundly drew its work from Jean Piaget, John Dewey and Kurt Lewin. It was popularized by David Kolb. This method of learning refers to the learning process of an individual where he constructs knowledge, skills, and value from direct experiences (Jacobs, 1999).

An example of experiential learning is driving a car. Using David Kolb's learning model (ELM), at the concrete experience stage, the learners physically experience the car presently. This will form the basis of observation and reflection. He then decides what is working or failing at the reflective observation stage. He finds ways to improve on his next attempt at driving during the abstract conceptualization stage. All new attempt to drive is informed by a cyclical pattern of previous experience, thought and reflection; this refers to the active experimentation stage. The diagram below depicts the ELM learning model.



David Kolb's ELM learning model

Chapter Six

6.0: Learning Styles

Learning style and cognitive style are, on some occasions, used interchangeably, whilst at other times they are afforded separate and distinct definitions. Cognitive style is described by Allport (1937) as an individual's typical or habitual mode of problem solving, thinking, perceiving and remembering, while the term learning style is adopted to reflect a concern with the application of cognitive style in a learning situation (Riding & Cheema, 1991).

Learning styles can be simply understood as the various techniques that students prefer to use to perceive and process information as well as interact with the learning environment. Identifying the various dimensions of learning styles provides educators with a greater awareness of the unique characteristics of learners. Educators can use this awareness to maximize student learning and support effective education by developing teaching methods that incorporate various learning styles (Moussa, 2014). There are various types of learning styles namely visual, auditory, reading and writing and kinesthetic learners. Many term it as VARK model. Felder & Soloman (2000) proposed ways in which educators can help the students with different learning styles.

Visual Learners

Visual learners are able to process and retain information when it is presented in graphical form such as arrows, charts, diagrams and symbols.

As a teacher to help visual learners in my class I need to use diagrams, sketches, schematics, photographs, flow charts, or any other visual representation of course material that is predominantly verbal. I may also see if any videotapes or CD-ROM displays of the course material are available for use when teaching a concept. I may also prepare a concept map by listing key points, enclosing them in boxes or circles, and drawing lines with arrows between concepts to show connections. I may also

encourage my students to colour- code their notes with a highlighter so that everything relating to one topic is the same colour.

Auditory Learners

Auditory learners are able to process and retain information when it is presented to them vocally. They may also read aloud to themselves. They are sometimes referred to as ‘aural learners’.

A teacher may help auditory learners by using audio texts for all comprehension passages and subject notes.

Reading and Writing Learners

Learners who belong to this category process and retain information that is written on worksheets, presentations, and other text-heavy resources. These learners are note-takers and perform strongly when they can reference written text.

A teacher may encourage learners to write summaries or outlines of course material in their own words. Working in groups can be particularly effective: they gain understanding of material by hearing classmates’ explanations. They learn even more when they do the explaining.

Kinesthetic Learners

Kinesthetic learners take a physically active role in their learning. They are usually hands-on and thrive when engaging all of their senses during course work. These learners tend to work well in scientific studies due to the hands-on lab component of the course.

A teacher may get learners up and moving. He can also create learning games that encourage these types of learners to move about the classroom at different points in the lesson.

6.1: Metacognition

Metacognition was propounded by an American developmental psychologist named John Flavell (1979) as replacement for higher level cognition. John Flavell originally coined the term ‘metacognition’ in the late 1970s to mean “cognition about cognitive phenomena,” or more simply “thinking about thinking” (Flavell, 1979, p. 906)

Veenman, Van Hout-Wolters, and Afflerbach (2006) defined metacognition as “a higher-order agent overlooking and governing the cognitive system, while simultaneously being part of it” (p.5).

Veenman et al. (2006) argued that if metacognition is a set of self-instructions to regulate task-performance, then cognition is the vehicle for these self-instructions.

Kuhn and Dean (2004) also explained that, metacognition is what enables a student who has been taught a particular strategy in a particular problem context to retrieve and deploy that strategy in a similar but new context.

6.2: What Constitutes Metacognition?

Flavell (1979) classifies metacognition into three types:

(1) Person Knowledge.

This includes anything one believes about the nature of human beings as cognitive processors.

(2) Task Knowledge

It includes knowledge about the demands of different tasks.

(3) Strategy Knowledge

This is knowledge about the types of strategies likely to be most useful in performing tasks. Flavell notes that these different types of knowledge can interact, as in the belief that one should use strategy A (versus strategy B) to solve task X (rather than task Y).

6.3: Theory of Multiple Intelligence

In 1983, a psychologist and professor of neuroscience from Harvard University named Dr. Howard Gardner, developed the theory of Multiple Intelligences (MI). This theory challenged traditional beliefs in the fields of education and cognitive science. According to the theory, people are born with a uniform cognitive capacity which can be easily measured by short-answer tests. Multiple Intelligence reconsidered our educational practice of the last century and provides an alternative. According to him, human beings have nine different kinds of intelligence that reflect in different ways they interact with the world. Each individual has a unique profile. Although, we each may have all eight intelligences, no two individuals have them in the same exact configuration - similar to our fingerprints. The multiple intelligences include:

Linguistic Intelligence

Individuals with this kind of intelligence can communicate and make sense of their environment through language. Students who enjoy playing with rhymes, poems, who pun, who always have a story to tell, who quickly acquire other languages including sign language, all exhibit linguistic intelligence.

Logical-Mathematical Intelligence

Individuals with this kind of intelligence can use and appreciate abstract relations. These include scientists, mathematicians, and philosophers.

Musical Intelligence

This kind of intelligence allows people to create, communicate, and understand meanings made out of sound. Composers and instrumentalists clearly exhibit this intelligence.

Visual Intelligence

These people can perceive visual or spatial information, to transform this information, and to recreate visual images from memory. Well-developed spatial capacities are needed for the work of architects, sculptors, and engineers. For example, students who turn first to the graphs, charts, and pictures in their textbook, who like to “web” their ideas before writing a paper, and who fill the blank space around their notes with intricate patterns are also using their spatial intelligence. Though they are tied to the visual modality, spatial intelligence can also be exercised to a high level by individuals who are visually impaired.

Bodily-Kinesthetic Intelligence

Individuals use all or part of the body to create products or solve problems. Athletes, surgeons, dancers, choreographers, and crafts people all use bodily-kinesthetic intelligence. The capacity is also evident in students who delight gym class and school dances, who prefer to carry out school projects by making models rather than writing reports, and who toss crumbled paper with frequency and accuracy into wastebaskets across the room.

Interpersonal Intelligence

These individuals distinguish among their own feelings, to build accurate mental models of themselves and draw on these models to make decisions about their lives. Although it is most difficult to assess who has this capacity and to what degree, evidence can be sought in students' uses of other intelligences—how well they seem to be capitalizing on their strengths, how aware they are of their weaknesses, and how considerate they are about the decisions and choice they make.

Naturalist Intelligence

These individuals help to recognize and categorize plants, animals and other objects in nature

Intrapersonal Intelligence

They are usually geared towards understanding one's own interests and goals. These learners are to shy. They're in tune with their inner feelings; they have wisdom, intuition and motivation, as well as a strong will, confidence and opinions. They can be taught through independent study and introspection. Tools include books, creative materials, diaries, privacy and time. They are the most independent of the learners (Gardner, 2010).

6.4: Implication of Howard Gardner's Theory of Multiple Intelligence

The theory of Multiple Intelligence proposed by Howard Gardner has helped educators, psychologists and parenting experts better understand how children process and learn information. Today, many educators design lesson plans and teaching materials for teaching by incorporating this theory (Gardner, 2010).

Chapter Seven

7.0: Conclusion

Based on various theories of learning – behaviourism, cognitivism and constructivism, different educators have adopted any of these in their methodology as far as teaching and learning is concerned.

Academic discourse on each theory have highlighted on their pros and cons. In my experience as a teacher in the classroom for the past 10 years, I have observed that children learn differently. They are also motivated differently. For instance, child who is intrinsically motivated will do extremely well in a constructivist classroom because they are inherent independent learners. Other children who struggle to keep up with work and usually slag when it comes to completing given task may end up not doing nothing since they have the leisure to work at their own pace. Thus, such children may need extrinsic motivation to be able to keep up with their work; adopting both constructivism and behaviourism for such children may yield results. In addition, in situations where children are dyslexic or have learning disabilities, adopting only constructivism may be frustrating for them since they need one on one method of teaching and may not be able to make meaning of the available learning materials independently. Hence, adopting cognitivism and behaviorism methodologies will motivate and help them process, store and retrieve information.

Learning theories are not a ‘one size fits all’. Educators should perceive theories of learning not as an end in itself but as different processes or strategies that can be adopted depending on the needs of the learner.

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