HIGHER-ORDER THINKING SKILLS AND STUDENT ACHIEVEMENT

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Abstract Cognitive abilities may be considered to be some of the chief characteristics which distinguish human beings from other species; we have to employ our powers of thinking and reasoning for creating and inventing things. In the learning process students can utilize high-order thinking skills understand how to analyze and evaluate complex information, categorize, manipulate and connect facts, troubleshoot for solutions, understand concepts, connections and big picture thinking, problem solve, ideate and develop insightful reasoning .... The powers of thinking and reasoning thus considered to the essential tool for the welfare and meaningful existence of the individual as well as society. In this very competitive society, creative thinking and critical thinking are in demand more than ever.

Key Words: Cognitive Abilities, Critical thinking, Creative thinking, Achievement

Introduction

All the societal changes shape the vision of today's students; schools have begun to embrace the need to instill "higher-order thinking" to prepare the 21st century. No longer is it enough for students simply to know basic facts, knowledge, and skills. To be successful, students must master decision-making, critical and creative, prioritizing, strategizing and collaborative problem solving**...** Knowledge is the cognitive perspective which includes both subject specific understandings and general cognitive abilities. According to Ngussa (2017) the world is shifting from knowledge based to effective learning methods that engage learners to specific skills to execute tasks. In the implementation of learning, higher order thinking skills cannot be directly taught to students, instead students should be trained about higher order thinking skills as a skill through learning activities that support its development.

The general cognitive abilities are planning, solving problems, and comprehending language. So there are different kinds of knowledge, some is **domain specific** (information that is useful in a particular situation or that applies mainly to one specific topic) that pertains to a particular task or subject. And some knowledge on the other hand, is **general** (information that is useful in many different kinds of tasks: information that applies to many situations.) it applies to many different situations. That means how to read or write or use a computer is useful both in and out school. But there is no absolute line between general and domain specific knowledge. For example when we observe the very basic learning process we were the first attempt to read about the letter sound which specific to domain of reading, but at the same time utilize the both knowledge about sounds and the ability to read in more general ways.

The information processing theory, the most common theories of memory explain in detail about the processing of learning and memory. Information is encoded in sensory memory where perception and attention determine what will be

held in working memory for further use. In working memory, new information connects with knowledge from long-term memory. Thoroughly processed and connected information becomes part of long- term memory, and can be activated to return to working. Implicit memories are formed without conscious effort. From the above said aspects of learning pictured a very clear understanding about behavioral and information processing of what and how people learn. These also focus on the individual and what is happening in his "brain/head". The most important educational goals are also include to promote retention and to promote transfer of knowledge. Retention requires that students remember what they have learned, whereas transfer requires students not only to remember but also to make sense of and be able to use what they have learned. The process of **complex cognitive** process is very essential in students to accomplish his/her studies. To be successful, students must master decision-making, critical and creative, prioritizing, strategizing and collaborative problem solving. It gives positive and reliable improvements in students' well-being.

Why do we need higher order thinking?

Today we have a tendency to push toward higher-order thinking skills in the classroom because they have enormous benefits to our students. The reasoning here is similar to the rationale for pushing knowledge into our long-term memory. First, information learned and processed through higher-order thinking processes is remembered longer and more clearly than information that is processed through lower-order, rote memorization. Critical thinking is the active, persistent and careful consideration of a belief or form of knowledge, the grounds that support it, and the conclusions that follow. It involves analyzing and evaluating one's own thinking and that of others. Critical thinking is convergent whereas creative thinking is divergent, Creative thinking tries to create something new, critical thinking seeks to assess worth or validity in something that exists; whereas creative thinking is carried on by violating accepted principles, critical thinking is carried on by applying accepted principles**.** Creative thinking and critical thinking are not an inborn ability. It can be developed though creating appropriate situations. Some people born to think creatively but that doesn't mean others can't be creative. It is a skill so it can learn.

Higher order thinking skills and Student achievement

Higher order thinking skills are the tools students use to transfer their knowledge into actual use. These include problem solving, analyzing, evaluating, imaging and making connections, amongst many other strategies. Higher-order thinking skills are part of the 21st century skills. High-order thinking skills are a series of important competencies students can make use of in order to improve learning progress and critical thinking. In the learning process students can utilize high-order thinking skills understand how to analyze and evaluate complex information, categorize, manipulate and connect facts, troubleshoot for solutions, understand concepts, connections and big picture thinking, problem solve, ideate and develop insightful reasoning etc.

These skills which go beyond memorizing information or regurgitating stories—skills at the bottom of the Bloom's Taxonomy hierarchy—and emphasize the development of analytical skills. High-order thinking skills

are thought to be harder to teach and learn than mere facts, but are ultimately more important for developing critical thinking and analytical faculties. So these skills are thought to be increasingly important in students from primary to higher education. The kinds of higher-order thinking that should be stated or implied in state content and classroom learning objectives. Mental reflection which indicate those that define higher-order thinking in terms of **transfer**, in terms of critical thinking and in terms of problem solving. The cognition relating to critical thinking as "artful thinking" , which includes reasoning, questioning and investigating, observing and describing, comparing and connecting, finding complexity, and exploring viewpoints.

The cognitive reflection of problem solving works in a way that a student incurs a problem when the student wants to reach a specific outcome or goal but does not automatically recognize the proper path or solution to use to reach it. Vijayaratnam (2012) states that high order thinking needs to be possessed and developed by students to generate original ideas in solving all problems. The problem to solve is how to reach the desired goal. Because a student cannot automatically recognize the proper way to reach the desired goal, s/he must use one or more higher-order thinking processes. As we explore new domains in students, they need to remember information, learn with understanding, critically evaluate ideas, formulate creative alternatives, and communicate effectively i.e. problem solving process that applying each situation which continue to learn their own, this will promote student achievement in vice versa.

Bloom's Conceptual Description of Higher Order Thinking	
Putting things together; Creative thinking	Create
Making Judgment	Evaluate
Breaking things down; Critical thinking	Analyse
Using knowledge in new situations	Apply
Understanding	Understand
Recall	Remember

The teaching purpose behind any of the cognitive taxonomies is equipping students to learn and be able to do transfer knowledge. During and after learning students can apply the knowledge and skills they developed during their learning to new contexts. The notion of new knowledge and application- means the student has not thought of before, not necessarily something universally new. Higher-order thinking is conceived as students being able to relate their learning to other elements beyond those they were taught to associate with it. In higher

order thinking process student is able to prepare and ready to do their own thinking, in various contexts, without depending on the teacher to give them a task to do. Sot student life outside of school is better characterized as a series of transfer opportunities than as a series of recall assignments to be done. This cognitive indication smoothen the progress of student achievement.

When learning activities focus on Higher order thinking skills development targets, it greatly affects learning activities that are more effective, the intellectual abilities of teachers and students become more trained. Evaluating higher order thinking skills requires questions that cannot be answered simply by students which will certainly have an effect on improving the quality of education.

In order to make easy about student's higher order thinking, teachers have to make their teaching-aim to provide a meaningful learning among students. This approach has well-versed their construction of the cognitive dimension of the revised Bloom's taxonomy. For many teachers, operating with their teaching plan and curriculum documents, higher-order thinking is approached as the top end of Bloom's or any other taxonomy: analyze, synthesis, evaluate, and create as higher-order thinking conceived as of the top end of a cognitive taxonomy. The division behavior of learning reveals that learning for recall and learning for transfer is very connected chain of thinking but it could be a bottom to top cognitive effects. Learning for recall certainly requires a type of thinking, but it is learning for transfer requires meaningful learning.

Conclusion

Many Research studies clearly give the associated relationship of higher order thinking skills and achievement of students. Higher order thinking has a vital role in improving student learning ability, speed of learning, including the effectiveness of the learning process (Heong et. a., 2011) so that it leads to an increase in student academic achievement (Ramos, Dolipas, & Villamor, 2013).The higher order thinking in students require a high intellectual work and critical thinking is associated with increased student achievement. These increases have been shown on a variety of achievement outcomes, including standardized test scores, classroom grades, and research instruments, as the studies described here illustrate. These increases have been demonstrated in languages, mathematics, science, and social studies etc. Teaching learning strategies has a great role for acquisition of skills among students. Anupamamol & D Bindu (2018) Nivya & D Bindu (2015) The study conducted by D Bindu & Soumya, 2015 reveals that Generative learning strategy has effective in enhancing critical thinking and problem *solving* among students. According to Retnawati et al., teachers' knowledge about higher order thinking skills and its teaching and learning techniques are the key to successful education. The findings of Sinelnikov et al. and Pratama and Retnawati showed that the growth in teachers' content knowledge on Higher order thinking skills leads to a better understanding of teaching and learning of the subject which ultimately improves students' performance.

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