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Learning Science

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Abstract: Learning Science is explained as attainment of facts, concepts, laws, theories and principles in science as well as the expertise in the science process skills. Over the past decade, researchers have also expanded their focus to the design of curricula, informal learning environments, pedagogical methods, and strategy innovations in the field of learning science. It is a multidisciplinary field. Major contributing fields include cognitive science, computer science, educational psychology, and applied linguistics. The aim of this paper is to describe learning science that focused on bringing multiple forms of learning and student centered approaches. Learning Science consisted of three major elements i.e. Cognitive, Metacognitive, Motivation. For developing students' comprehensive personality, teaching strategies with the learning science are very essential elements.

Keywords: Science, Learning, Learning Science, Metacognition.

I. Introduction

Learning science brings together educational research, instructional methods, administrative tools and data analytics to drive an ecosystem of continuous improvement. Its technique involves studying the learning process, developing methods to make it more effective and building tools to directly support students and educators both in and out of the classroom. Learning Science is an area of research which takes inspiration and contribution from psychology, education and computer science. In a typical piece of learning science research you might see a model taken from cognitive psychology and combined with resources and knowledge from education that is delivered through a custom technology developed using modern computer science.

Science-The study of science imparts training in " Scientific Method " and develops " Scientific attitude " in the learner. These qualities can be enlightened only through this subject which can qualify the learned to live as truly efficient citizen in a scientific society. The word Science comes from the Latin "Scientia" meaning knowledge. Science is a systematic enterprise that builds and organized knowledge in the form of testable explanations and predictions about the universe. In an older and closely related meaning, "Science" refers to the body of reliable knowledge itself, of the type that can be logically and rationally explained. According to Plato: "Science is nothing but perception". According to Spencer: "Science is organized knowledge". According to Dr. Sheldon Gottlieb: "Science is an intellectual activity carried on by human that is to discover the ways in which this information about the natural world in which humans live and to discover the ways in which this information can be organized into meaningful patterns."

Branches of Science: Science is a systematic study of the nature and manners of an object and the natural universe that is established around measurement, experiment, observation and the formulation of laws. There are three major branches of science; each branch is categorized in different type of subjects that covers different areas of studies. These branches include Natural, social, and formal science makes up the fundamental sciences, which form the basis of interdisciplinary and applied sciences such as engineering and medicine. The first branch of science includes natural science. Physical science, a major branch of science, has geology, physics, chemistry and astronomy as its categories. Life sciences comprise the branches of science that involve the scientific study of organisms– such as microorganisms, plants, and animals, including human beings. The second branch is the formal science which includes Mathematics and logic deals with abstract concepts. It goes hand in hand as both are needed in relation to finding out how social sciences and natural sciences work. They are also both needed in forming laws, theories and hypothesis.

Social science is one of the third major branch of science. This on the other hand is the study of the society and man's relationship to it. "Social science" is commonly used as an umbrella term to refer to a plurality of fields outside of the natural sciences. Mainly Sociology and Psychology included in it. Learning: Learning is central to human behavior and is a continuous process during the entire life span of the person. Learning is a personal process that is shaped by the context in which the individual is situated. Learning is a key process in human behavior. All living is learning. If we compare the simple, crude ways in which a child feels and behaves, with the complex modes of adult behavior, his skills, habits, thought, sentiments and the like- we

will know what difference learning has made to the individual. Learning is defined as "any relatively permanent change in behavior that occurs as a result of practice and experience".

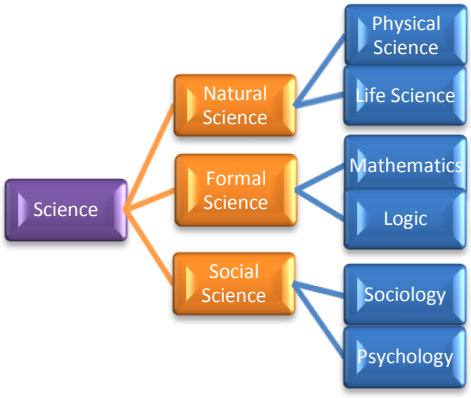

Fig. 1- Science

Yager (1991): Learning is an active process and requires students to construct their own personal schema to assimilate new concepts. To assist in this constructivist process, Learning science is a valuable process because they can be used to 'make sense of abstract, difficult and non-observable science concepts to accommodate the explainer, the audience, the content and the context. Learning Science: Learning Science is never only about learning to know the natural world. In conjunction with the proposed definition that learning in general is a measurable change of behavior, a further distinction between how one learns and what one learns is useful. It is of value to consider the processes of science as well as the product of science. Learning Science and the development of science process skills are integrated activities. Science process skills have profound influence on students in learning and in utilizing science to the optimum level in an academic career (Rao & Nagakumari, 2008). Science education should be aimed at preparing students for both types of learning. The child should gain not only knowledge of the content of science, but also worldly-wise in his use of the logical skills by which this content is accumulated. In effect, the child must learn 'how' to learn along with acquisition of facts and concepts in science.

Teaching was viewed mainly in terms of the scientific facts, concepts, generalizations, theories, etc. to the exclusion of how learners learn. The shift in emphasis from science as a body of knowledge to be mastered to science as a process revolutionized the idea of how students learn science. As well as becoming scientifically literate, today's students must be equipped with the skills that enable them to observe keenly, successfully communicate, reflect objectively and analyze logically. The process of learning science helps in developing these skills along with their understanding of subject content. If science teaching is really the transmission of a body of consensually accepted knowledge, the pedagogical danger is that teaching becomes an arid business of rote learning of standard facts, theories and methods (Sears & Sorensen, 2000). The focus may also be given to the processes through which science uncovers facts and develop models.

Fig.2- Learning skills

By integrating multiple fields, learning science extends beyond other closely related fields indistinguishable ways. For example, learning science extends linguistics, in that it also accounts for, as well as contributing to educational approaches to the study of learning. Similarly, learning science draws inspiration

from cognitive science, with the instruction and is regarded as a branch of cognitive science; however, it gives particular attention to improving education through the study, modify, and creation of new technologies and learning environments.

Educational Neuroscience also contain in it. Learning science is also considered by some as having some degree of overlap with instructional design. Psychology plays an important role in learning science. Various learning styles, constructivious approaches as well as theories provide different ways for learning in science. Child Psychology learns about the concept of individual difference in the classroom. It helps to provide a co-operative teaching learning process in the classroom.

II. Area's of Learning Science

Cognitive: The cognitive component includes two general types of learning process, which refer to as knowledge and understanding and application. Cognitive strategies include a wide variety of individual tactics that students and instructors use to improve learning. Knowledge about scientific facts, concepts, principles, laws, knowledge about science and social issues. Understanding & Application involve encouraging students in constructing knowledge through exploration, inquiry and discovering knowledge. Students are to be trained to inquire and discover knowledge. There are sixteen process skills: observing, collecting and recording data, classifying, measuring, comparing, Analyzing and interpreting data, experimenting, identifying and controlling variables, raising questions, generalizing, problem solving, formulating hypothesis and testing, making a conclusion, decision making, inferring and predicting and handling apparatus.

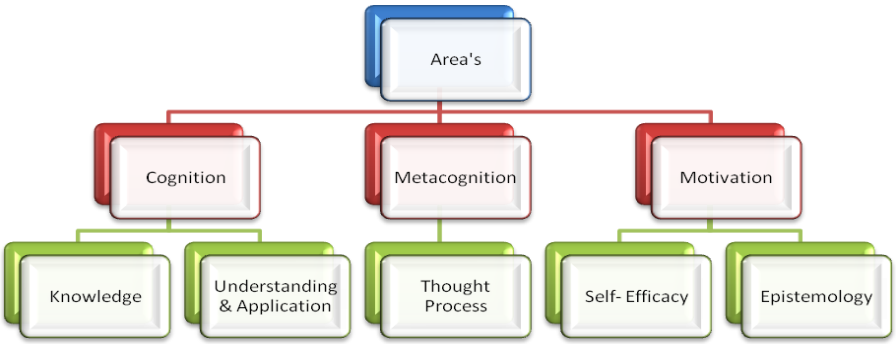

Fig.3- Areas

Metacognition: Thought process is the most important component of metacognition. It includes two main subcomponents generally referred to as knowledge of cognition and regulation of cognition (Schraw & Moshman, 1995). Knowledge of cognition refers to what we know about our cognition, and may be considered to include three subcomponents. Declarative knowledge: It includes knowledge about ourselves as learners and what factors affect our performance. For example, most adult learners know the limitations of their retention system and can plan accordingly. Procedural knowledge, in contrast, refers to knowledge about strategies and other approach. For instance, most adults possess a basic repertoire of useful strategies such as note-taking, slowing down for important information, skimming unimportant information, using mnemonics, summarizing main ideas, and periodic self-testing. Conditional knowledge includes knowledge of why and when to use a particular strategy. Individuals with a high degree of conditional knowledge are better able to assess the demands of a specific learning situation and, in turn, select strategies that are most appropriate for that situation.
Motivation: It includes two important subcomponents, consisting of self-efficacy and epistemological beliefs. Self-efficacy refers to the degree to which an individual is confident that he or she can perform a specific task or accomplish a specific goal. Self-efficacy is extremely important for learning science because it affects the extent to which learners engage and persist in challenging tasks. Students with higher self-efficacy are more likely to engage in a difficult task and more likely to persist at a task even in the face of initial failures compared to low-efficacy students. Higher levels of self-efficacy are related positively to school achievement and self-esteem. The trends observed with respect to student self-efficacy also generalize to teachers and even schools. Teachers with higher levels of teaching self-efficacy, for example, set higher goals and standards, give more autonomy to students, and help students reach higher levels of achievement than do teachers with lower levels of self-efficacy.

Epistemological beliefs are those beliefs about the origin and nature of knowledge. Researchers have focused on two aspects of epistemological beliefs in the past decade. One aspect concerns the number of distinct beliefs. Schommer (1994) created a taxonomy of four beliefs she refers to as,

(a) Quick learning, i.e., something is learned immediately or not at all.
(b) Innate ability, i.e., learning is constrained by native ability.
(c) Simple knowledge, i.e., most important ideas are really quite simple.
(d) Certain knowledge, i.e., most important ideas do not change over time.

Contributions of teachers' professional capabilities and integrity in learning science:
Teachers capabilities, both in terms of their values conceptions, practices and classroom action are always playing an important role in learning science. The basic instructional core of learning science, how to promote student learning in the best possible way. There are six important approaches explained as follows for enhancing better learning science.

Table 1- Processes

	Cognitive Processes	Metacognitive Processes	Motivational Processes
Inquiry	Promotes creative thinking through experimentation and demonstration	Improves precise planning, examine, and analysis	Provides specialist modelling
Participation	Model strategies for beginner	Models, self reflection and full involvement	Provides social support from peers and others
Strategies	Provides a variety of strategies	Helps students develop conditional knowledge	Increase self- Efficacy to learn
Mental models	Provides explicit model to analyze	Promotes explicit reflection	Conceptual change
Technology	Feedback, use of innovative technology	Test, Evaluate and revise	Informational resources
Empirical Beliefs	Increase engagement among students	Promotes Reflection	Promote epistemology characteristic

III. Role of Learning Science in Student's Life

Learning Science greatly influences the life of students. Engaging in science involves being inventive, creative, systematic, reflective, sharing, and collaborating. Personality traits develop like Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism that can be used to describe the human personality. Openness to experience refers to engaging in idea-related behavior such as intellectually, creatively, unconventionality, and innovation. Conscientiousness refers to engaging in task-related behaviors such as being organized and disciplined and adherence to plans, schedules, and requirements. Engage in authentic scientific inquiry. Sharing, collaborating, and contributing are essential components of constructing scientific arguments and engaging in a scientific community.

IV. Conclusion

Such thinking promoted effective teachers as those who recognize that learning is constructed, recognize and respond effectively to student learning needs, invest time in student learning, attend to the importance of oral language and alternative perspectives and strive to interest, motivate and intellectually sophisticated by learning science. Learning Science provides more opportunities for students to approach their

learning based on their individual skills. It is valuable for teachers professional development workshops and then to include best practices in their pedagogy. Cognition, metacognition and motivation are the major area's of the learning science. There are various strategies playing an important role in developing scientific attitude among students like inquiry, problem solving ability, decision making thinking as well as productive thinking etc.

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