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Teaching and Learning through Connectivity Part-IV: A Model Lesson for Teaching Metabolism

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ABSTRACT

Teaching without learning and inculcating creativity is a source of boredom for the students and ends up with traditional rote learning without any knowledge enhancement to the student. Through our this effort we aim at changing the scenario of teaching entirety. Concept mapping or teaching through connectivity is one of such steps that help the teacher and the learner in making the lectures easier, motivating and constructive. In this model lesson, we tried to make metabolic process and its interrelated variables simple and understandable.

Keywords: Teaching, Students, Chemistry, Conectivity.

INTRODUCTION

Traditional method of teaching is prone to inefficient delivery. It is practiced by teaching the context without any meaningful learning outcome. The learner would not be able to relate the existing knowledge with the previous information on the subject and thus would be unable to apply the knowledge in a purposeful way. It is therefore desired to deliver the context through connectivity in a meaningful, easier and thoughtful way. Concept mapping is a methodology for the delivery of facts, concepts and skills in one package. It makes teaching and learning; easier and purposeful. Teaching and Learning through connectivity is a basic idea of teaching by an arrangement of concepts or issues through interacting systems in which all relationships between concepts and issues are made clear, up front, to the leaner using a concept map-like representation. It involves establishing a hierarchy of concepts striving for underscoring a more or less closed system of concepts to clarify the interrelationships among concepts. Lesson modeled on the basis of connectivity diagrams help to overcome the traditional snags. To Ausubel (Ausubel, 1963), meaningful learning is a process in which new information is related to an existing relevant aspect of an individual's knowledge structure and which, correspondingly, must be the result of an overt action by the learner. Teachers can encourage this choice by using tools such as concept maps. Some theories postulate that continued learning of new information relevant to the previous information produces constructive changes. Michael (Michael, 2001), stated that meaningful learning occurs when the learner interprets, relates and incorporates new information with existing knowledge and applies the new information to solve novel problems. Meaningful learning presupposes that the learner has a disposition to relate the new materials to his or her cognitive structure and that new material will be potentially helpful for the learner. Concept mapping is a device that can be used to communicate to the learner as well as providing a vehicle to help the learner with meaningful learning tasks. It provides the basis of relating new knowledge to previously assimilated knowledge in a systemic way (Naqvi, *et al*., 2012). Concept mapping also incorporates a strong element of constructivism; in the sense that a student can

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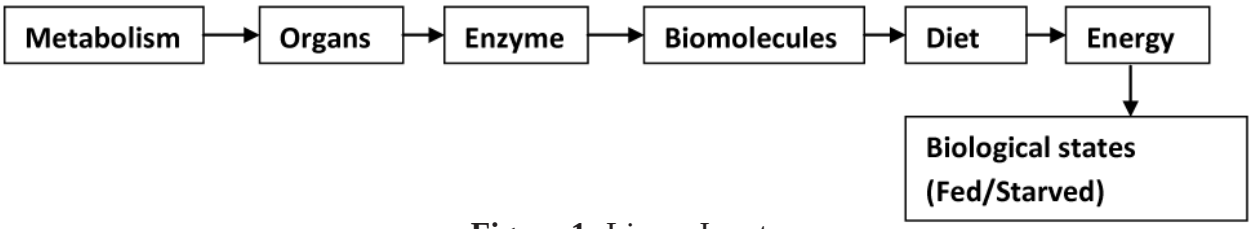

Figure 1: Linear Inputs

build his/her understanding of new concepts on that which he/she already has a deep familiarity.

A number of issues pertaining to chemistry have been thus addressed in our previous discourses (Nazir and Naqvi, 2011; Shazia and Naqvi, 2002). A lesson model for teaching biochemistry has been developed and presented herein.

"Metabolism" is one of the most difficult and conceptually hard contexts of biochemistry which often causes the student to get confused or withdraws them. It involves different terms which themselves have to have a detailed mapping of their own like organs, enzymes, biomolecules, energy, nutrition or diet and nutritional states (fed/starvation) etc. Figure 1 outlays the related material in a linear way.

From here we redirect our presentation such that teaching metabolism through concept mapping like that in Figure 2 makes it easier for the students and it will provide them meaningful and purposeful outlays. Figure 2 highlights the connectivity of metabolism with the each of the stake holders that contribute to the thought process behind this subject of vital importance. Students usually have previous knowledge regarding organs, diet, and energy. However, they may or may not have concepts developed enough to approach enzymes and their functions in the body, formation of biomolecules and the response of body in different biological states (fed/starved). In figure 2, these vital contributors towards the life process are indicated and highlighted for ensuring a lively classroom discussion. Through this connectivity diagram the student understand metabolism better and let him/her delve into the beneficial effects leading towards a better comprehension.

We expect that when taught this way, student will be able to appreciate the role of each of the identified components that controls metabolic processes. The important issues related to metabolism are expressed

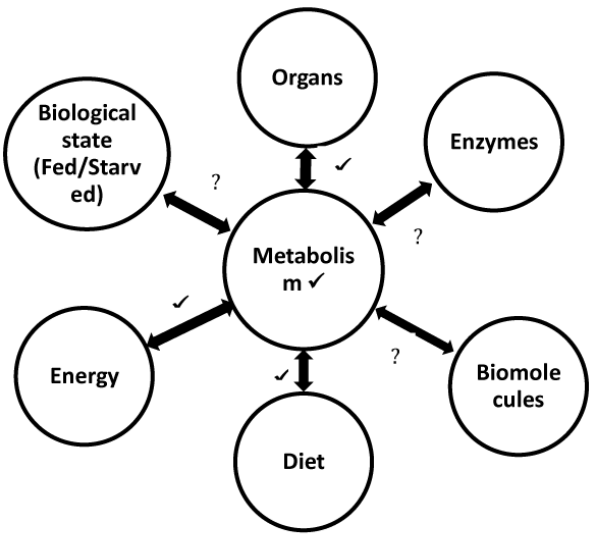

Figure 2

through a concept diagram as shown in Figure 2. He/she will be able to understand how our body organs work, where different enzymes are located and how they perform their actions, what are biomolecules and what are their nutritional importance in the diet, they will also appreciate the route through which the body can get necessary energy when taking particular amount of biomolecules in the diet, further to that student will be able to understand effects of nutritional status (fed/starvation) on our body organs. Through the

discussion involving interconnectivity of the individual unfamiliar contents on the face value, students will be able to grasp metabolism. Following the discussion on this pattern the connectivity diagram (Figure 2) is modified as in Figure 3.

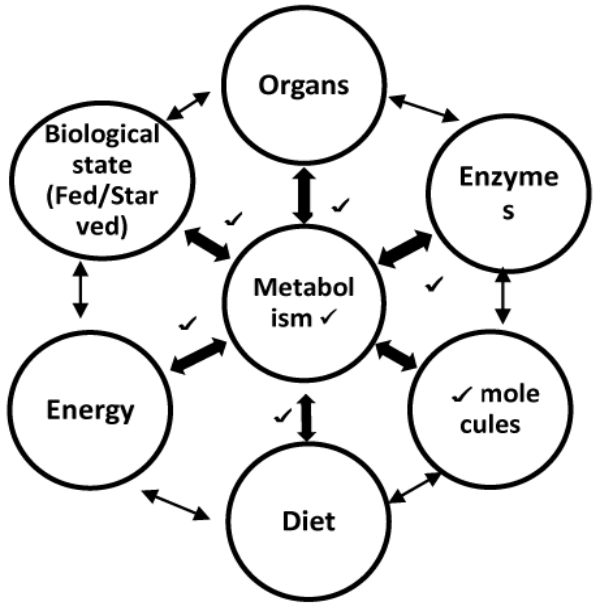

Figure 3

This amply illustrates the correlation of salient variables that relate to the metabolism and their interrelationship. Clarifying all the individual contributors to the metabolism by the teacher through this connectivity diagram will let the students to correlate each concept with the other and hence they will be able to understand and value each of the individual parameter that is important for the regulation of metabolic processes in the body. This will also help the student to recognize that when a person takes in diet or in the fed state; organs will respond by activating particular enzymes which act on different biomolecules present in the diet and provide energy & also initiate anabolic process of metabolism. The students also grasp the fact that in starvation condition the organs of our body respond differently by activating different enzymes leading to the catabolic processes of biomolecules to provide energy to the body.

SUMMARY

The implementation of teaching through connectivity assists to deliver the concepts of underlying metabolic process in an effective and meaningful way. Concept mapping provides a better understanding of the basics of metabolic reactions, their importance in the regulation of body's function and in understanding the associated diseases developing out of improper metabolic reaction. This teaching technique will open new thinking approach and develop interest in students, they will not get confused and worried of learning. Teaching through connectivity will let the comprehension of basic concepts in an excellent way and students will be able to correlate it to the related issues and will be able to clarify them at a glance.

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