

Forming a Unified Theory about Biological Ideas, Using Narrative Storytelling Strategy

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Abstract

The study aimed to reveal the appropriateness of using the narrative storytelling strategy to allow forming a unified theory concerning biological concepts and principles. The sample consisted of (58) female sixth grader students in Amman, Jordan; students were assigned randomly for experimental and control groups (29) students each.

The results of the study showed that there were statistically significant differences at ($\alpha \leq 0.05$) in students' ability to generalize their unified everyday life concerning biological ideas, for the benefit of the experimental group. The results also showed that there were statistically significant differences at ($\alpha \leq 0.05$) in understanding anabolism function than catabolism functions in living organisms in experimental group.

Keywords: Narrative storytelling strategy, unified theory, anabolism, catabolism.

Introduction

The goal of teaching biology is to understand its concepts and generalize them into everyday life (Science Teaching Reconsidered, A-Hand book, 1997).

However, Teachers found that despite their efforts, students are unable to generalize fundamental biological ideas to a meaningful task (Science Teaching Reconsidered A-Hand book, 1997). Besides offering information, teachers must show students the reasoning processes in a linear systematic way that leads to generalizations of their concepts. In teaching biology, students are getting partially correct ideas isolated from others, and this shortcoming can interfere with subsequent learning (Science Teaching Reconsidered A-Hand book, 1997).

The work of Bernard, and his students Pasteur, revolutionized the way people understand the function of the cell in relation to a whole living organism. Bernard set a new way of understanding living organisms, which was later called "homeostasis", by canon. The coordinated physiological process which maintains the steady state of the living organism is so complex and so peculiar to life, it requires that the brain, nerves, heart, lungs, kidneys, and spleen all work in union. Animals are not just consumers (Catabolism processes); animals' bodies are able to change protein into glucose. The process of metabolizing is not just burning organic stuff as in machine, the process is controlled by the brain in every cell. Animals can engage in both anabolism and catabolism processes (degradation and recombining of food molecules), (Lanham, 1968).

The discovery of the function of DNA voids any rationale to divide biology into various themes, it provided a unifying theme for which permits both the study within the cell and understanding species' organization (Mayr, 1982).

The lack of a unified, coherent philosophical approach to unified biological themes had its impact on current biological textbooks; students study about digestive system without connected it to circular system; they study about respiratory system without connected it to the work of circular system and the work of the cell; students study components and the functions of the cell, without connecting them to the functions of the living organisms' systems; they study the function of DNA in the cell, without connection to the effect of such function on the variation of species (Mayr, 1982).

Methodology

The study hypothesized that keeping the traditional conventional way of presenting biological concepts isolated from each other; cell, tissues, systems, species, photosynthesis, respiration, ecosystem, organic systems, and adaptation... prevent students from forming a unified theory to allow the generalization of biological phenomena into everyday life.

The study hypothesized that using a linear story telling strategy in which the related concepts would be presented in a systematic comprehensive way, would enable students to generalize their biological ideas.

The Scientific Material: The study prepares scientific material in the unit of "from the body of living organism to the cell" to sixth grade students in one school of Amman. The study readjusted the material in textbook to present it in a harmonize storytelling systematic way, in which the function of the system on a macro level is connected to the cell components on the microlevel; beside, the function of every system is connected to the function of the other in the living organism as a whole; in addition, the material relates the differences in the functions of various organisms to the variation of DNA components in the cell; which leads students to form a coherent understanding about the way ecosystem as a whole works. The study used McFadden & Yager Science Plus textbook (1993) to assess the collection of suitable information concerning such issues.

The Test' Item. The test consisted of 30 items; 15 of them were dealing with anabolism issues..., the other 15 items were dealing with catabolism issues. The items presented incidents from everyday life, that require students to deal with, depending on their ability to generalize their knowledge of everyday life situations.

The Sample: the sample of the study was consisted of (58) female sixth grader students in a school in Amman, Jordan; students were assigned randomly for experimental and control groups (29) students each.

The Treatment: Both groups in the sample were pretested first; the experimental group was then taught using the linear storytelling strategy in a systematic way. The control group was taught by the teacher in a conventional way.

Both groups were post-tested after the instruction had taken place.

Data Analysis: The study used covariance statistical analysis to examine the presence of statistical differences between the experimental and control group due to the treatment.

The study used t test to examine the presence of statistical differences between the mean scores on the test items that deal with anabolism' concepts, and the mean scores on the test items that deal with catabolism concept.

The Results and the Conclusion

The results of the study showed that both groups showed a low potential to generalize their knowledge in the pretest, 12% for experimental group, in opposite to 11% for control group. However, both groups had higher scores after instruction; 72% for experimental group, in opposite to 50% for control group.

There were statistically significant differences at ($\alpha \leq 0.05$) in students' ability to learn the function of the cell, for the benefit of the experimental group in covariance test.

The results also showed that students in experimental group made better in questions that deal with anabolism' issues, 78%, than with catabolism issues, 66%; there were statistically significant differences at ($\alpha \leq 0.05$) in understanding anabolism concepts than catabolism concepts in experimental group for the benefit of the anabolism concepts.

These results show that using story telling strategy had helped students to form a unified theory about the functions of the cell, besides connecting these functions to the functions of the living organism and the ecosystem as a whole; these results agree with those founds by Al-Omari, 2017, Al-Inizi, 2017, Al-Ghafria, 2014 of the benefits of using story telling strategy in teaching scientific concepts.

The improvement in students' ability to comprehend anabolism issues than catabolism ones, could be due to the nature of treatment (systematic linear storytelling) which helped students to form a comprehensive idea about the anabolism issue.

The study suggests that curriculum developers should work on building biological curriculum in a way that helps teachers move linearly and systematically into various biological issues to present ideas in storytelling way.

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