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Cognitive Mapping as Model for Evaluation

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Abstract

In the present study, Researcher has tried to explain the utility of cognitive mapping as an evaluation tool. For the same researcher, has developed a model and tried to find the correlation of the test with achievement test which is usually taken by the teacher to evaluate a learner. As per researcher just one way to evaluate the achievement or learning level of a learner in cognitive domain is insufficient. Apart from developing the evaluation technique scoring technique for the same is also developed. If this can be incorporated in evaluation system, it could bring much stabilized analysis of any learner's achievement in terms of cognitive domain.

Key Words: Cognitive Mapping, Achievement, Learner

Introduction

- **What is Cognitive Mapping?**

The Cognitive Mapping technique is a two-dimensional, guide-like method of presenting the conceptual structure of a topic order. Normality in objects or events designated by a certain mark, as defined by Novak, is a notion. Cognitive Mapping is a technique for communicating to data in graphs. Conceptual systems are represented using information diagrams. Hubs (focus vertices) and connections make up systems (arc edges). Concepts are represented by hubs, while relationships between concepts are represented by connections.

There are names for the concepts and connections. Connections can be made in one of three ways: none, unit, or bi-directional. Concepts and connections may be arranged, they can be basically associated, they can be indicated, or they can be segregated into groups, for example, easy-going or worldly relationships, and so on. As a result, Cognitive Maps are diagrammatic representations of essential connections between concepts, which serve as suggestions to the viewer. Ideas for suggestions are at least two concept marks connected by phrases that provide information on connections between concepts or depict correlations between different concepts.

Cognitive Maps compose information into a progressive structure in which subordinate concepts are subsumed under super ordinate concepts. Repetition learning would be only a progression of recommendations that are remembered, yet not identified with one another. With mapping, new concepts



and recommendations are associated into an entire test significant system.

Cognitive Mapping is a 20-year-old scientific education study and evaluation method. The system developed by Novak (1972) and his Cornell University alumni students as a vehicle for investigating crucial learning acquired through sound instructional exercise guidance in grade school science was originally intended to investigate important learning obtained through sound instructional exercise guidance. Since then, various instructors have embraced it, employing it at all stages of discovery and assessment, instructional planning, and educational programme development, as well as more recently as a meta cognitive guide to assist students in 'figuring out how to learn' (Novak 1990).

Novak and his colleagues experimented with the assumption that new concept implications were learned by osmosis into old concepts/propositional structures, in accordance with Ausubel's absorption hypothesis of cognitive learning (Ausubel, 1968). The additional ideas from Ausubel's hypothesis, such as the notion that cognitive structure is sorted out gradually and that the majority of new learning occurs through subsidiary or correlative assumption of new concept implications under existing concept/propositional thoughts, were used to construct the possibility of various levelled depictions of concept/propositional systems. Later, he and his colleagues (Novak 1977) were shown as cognitive maps.

Novak and his partners have discovered that all areas of information can be spoken to by Cognitive Maps. There is no space of information for which Cognitive Maps can't be utilized as an authentic way for teaching learning.

It is Important to Examine your knowledge and look for misunderstandings. The use of Cognitive Maps can also assist instructors in evaluating their teaching methods. They can assess students' progress by identifying misunderstandings and missing ideas. Cognitive Mapping can be used to test or analyse a student's achievement. Cognitive Maps may also be used to develop educational programmes (Cliburn 1986), as instructional tools for lauder planning and research facility replies, to reduce misunderstandings, and as evaluation tools.

Therefore, the Cognitive Maps, drawn by the student, can turn into a depiction of that students' mind, as new concepts were worked into their previous conceptual plan. Thus, it tends to be accomplished for a few purposes: to produce thoughts; (conceptualizing, and so forth.) to plan a perplexing structure (long messages, hyper media, huge sites and so on.) to impart complex thoughts; to help learning by



unambiguously incorporating new and old information; and to survey understanding or analyse misconception.

Rationale of the study

- What is the practicality of cognitive mapping as an evaluation tool?

Objectives of the Study:

- To develop a test and model of scoring a cognitive mapping-based test
- To study the effect of cognitive mapping-based test in learning science.
- To study the correlation between achievement test scores and cognitive mapping test scores in students in learning science.

Research Question

- How effective is cognitive mapping-based test in comparison to achievement test?
- Are the results of both the test comparable?

Review of related literature

A few studies used for referral point of view came out to be the ones which used cognitive maps as teaching learning tool or as tool to check previous knowledge.

Meena Kharatmal (2009) conducted a brief study on concept maps in scientific education in an Indian school environment, using a depiction of a contextual analysis. For motivating understudies' information structure of school science, two various tactics for speaking to information, such as representation and idea maps, were examined. When the understudies used the idea mapping approach, the number of concepts and genuine relationships increased dramatically. It was discovered that concept maps aided in the review and administration of concepts, and that they might be used to organise information for substantial learning.

M. Kharatmal and G. Nagarjuna (2006) investigated the influence of concept mapping on Cell Biology information coordinators. They discovered that idea mapping is an effective teaching tool.



Ahuja Amit (2007) obtained favourable findings when he compared the practicality of idea mapping as an instructional apparatus in learning and sustaining concepts among understudies to normal directing strategies.

Mary, R. Sahay, and **Raj, I. Paul** studied the appropriateness of concept mapping as a tool to improve the presentation of B.Ed. Learners in Environmental Studies (2007). Positive outcomes were taken into consideration.

Chandra Dinesh Mayuri (2008) looked at the impact of idea mapping on optional understudies' science success, logical fitness, and critical thinking ability, and found that it was helpful.

Research gap

Cognitive mapping is not attempted much as an evaluative tool for evaluation on day to day basis. Henceforth with this strategy of teaching and evaluation researcher is also trying to fulfil all the criterions given by Bloom's Taxonomy required for a superior cognitive domain learning. Progressively trying to develop alternate way of evaluating students and proper process is developed for this cognitive mapping-based test so that these can be adopted in future classroom process of evaluation.

Preparation of Cognitive mapping Test

For the purpose of definite research work outcome having only achievement test was not enough. And as research work revolves around cognitive mapping researcher decided to assess students based on cognitive mapping teaching learning process. To do that was apparently a vague idea as there was not proper base of what is supposed to be done. as per the expert guidance it was decided that a test should be prepared where maps can be scored. So the researcher tried giving one cognitive map test after completion of one chapter. To quantify the results of cognitive mapping test marking system for the same need to be decided.

For the purpose of quantifying test results, researcher prepared a sample whereas per weightage of chapter in CBSE spilt-up syllabus cognitive mapping test of 50 marks was prepared where components of cognitive mapping like cognitives, propositions, cross-link branches etc were marked as per there importance in a map. The map will be a blank format where few links or cognitive will be given the rest is to be filled by students in experimental group. The draft model is shown below.

• **Scoring model of cognitive maps (Sample)**

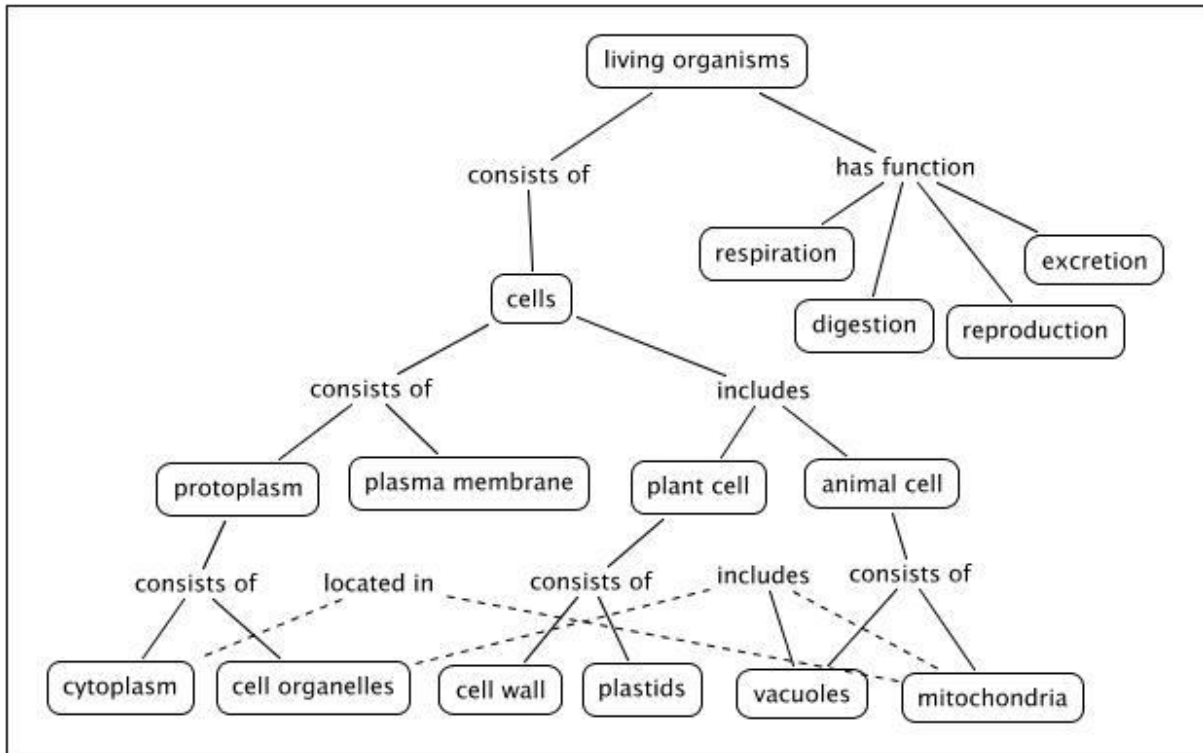


Image 4.1 Scoring Model of Cognitive mapping Based Test Developed by Researcher

Cognitives: - (Living organism, cell, respiration, digestion etc.) **1*10 cognitives =10points**

Propositions: - (Living organism consists of cell, cell consists of protoplasm etc.)

1*10 propositions= 10 points

Branches: - (Protoplasm consists of cytoplasm and cell organelles etc.)**1*5 Branches= 5 Points**

Hierarchy: - (3 level of Hierarchy) **5* 3 level of Hierarchy=15 Points**

Cross-link: - (2 Doted line Cross-link)**10* 1 cross-link= 10 Points**

Examples: - (No Examples) used **1*0= 0 Points (If examples are present 1 marks will be allotted and adjustment in cross-link as per requirement was done)**

Total Score= 50 Points

This cognitive mapping exam was administered to the group of students who had appeared for achievement test for same content on which cognitive mapping test was prepared.

One of the cognitive map test samples are shown below handmade format to ease the practical aspect of taking test.

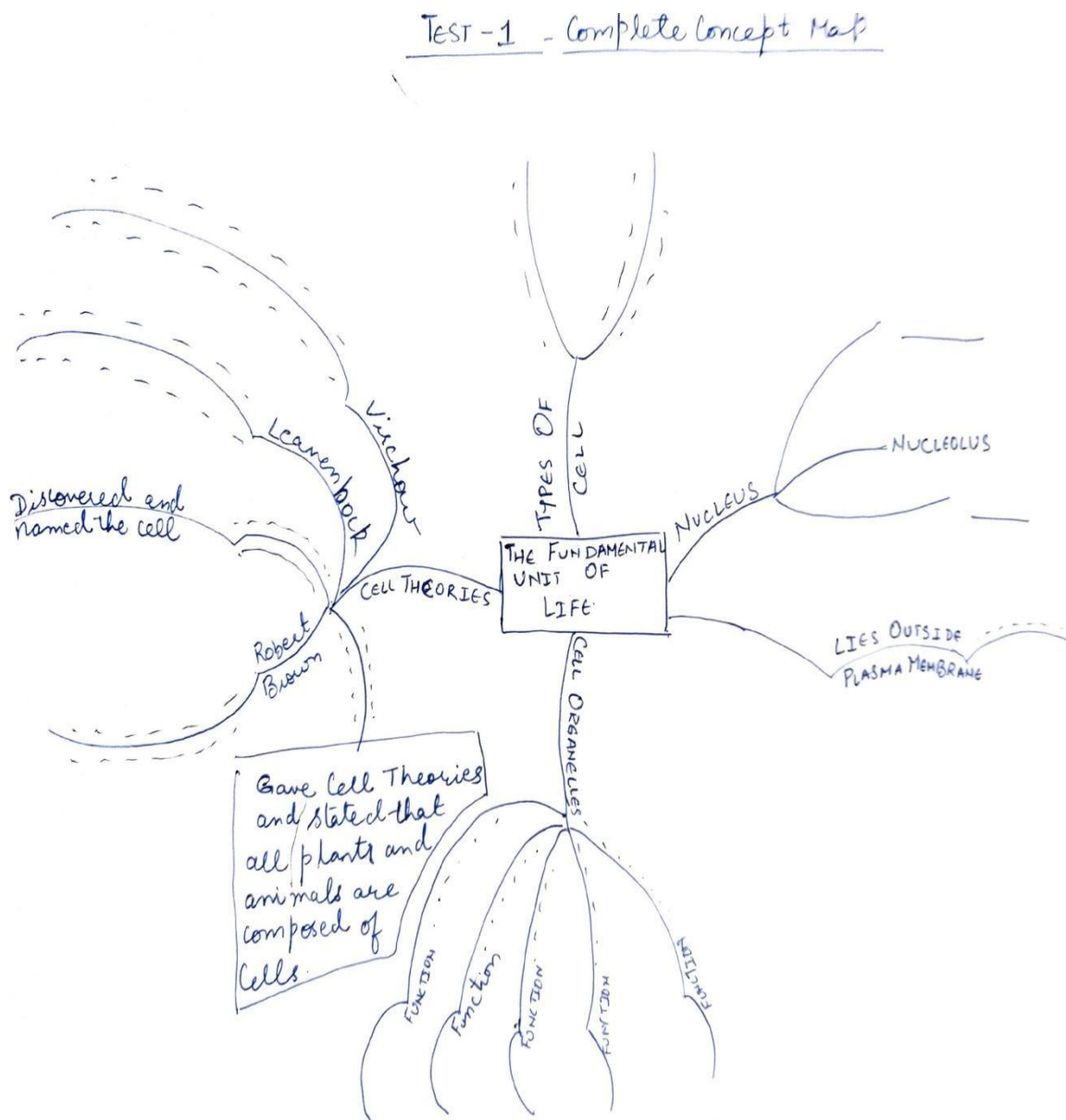


Image: Cognitive mapping-based test (Hand Made)

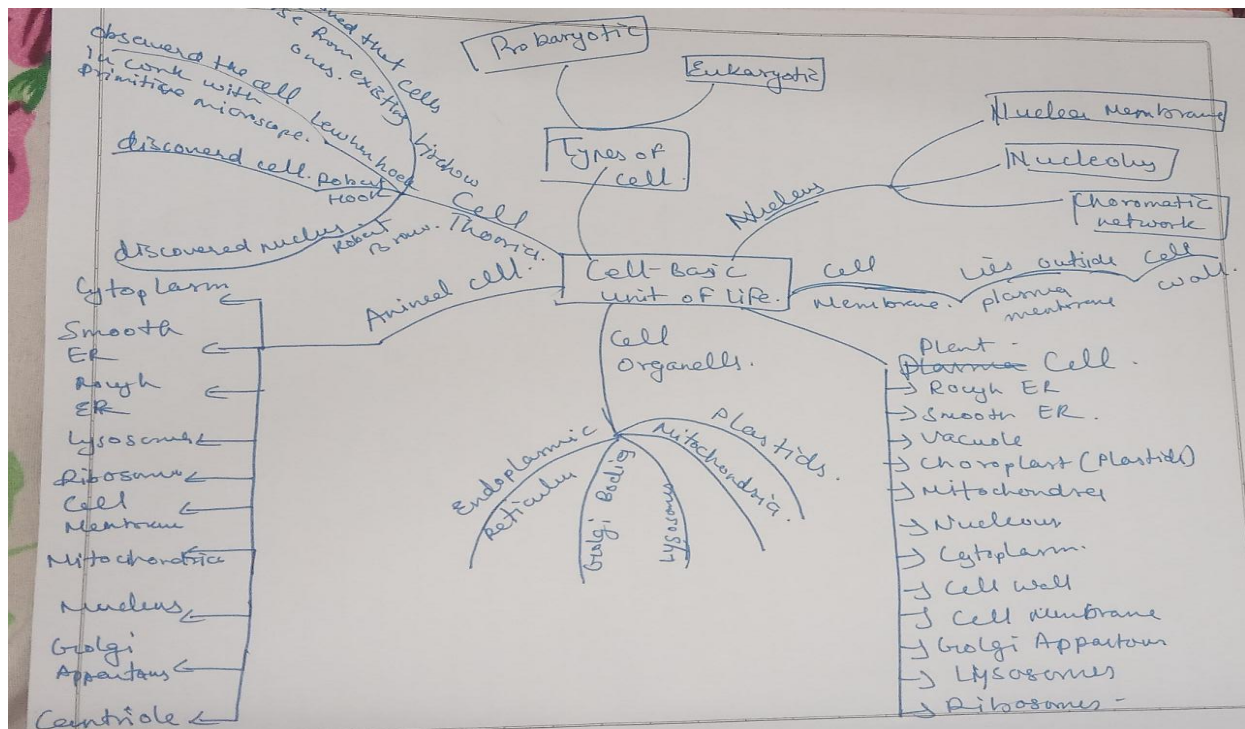


Image: Cognitive mapping-based Test done by student

Data Analysis

Following the Research questions, the researcher computed a link between achievement test scores and cognitive mapping test scores for students-based achievement test scores. The value of the correlation coefficient that was obtained is shown in Table

Group	N	correlation coefficient	Level Of correlation
Achievement test score	33	0.69	Average Correlation
Cognitive Mapping Test score	33		

According to table correlation coefficient between achievement test score and cognitive mapping test score found 0.69. Value of correlation coefficient 0.69 indicates average correlation.



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Conclusion

A average correlation was found in the post-achievement test score and cognitive mapping scores of experimental group students. This result leads to finding a solid base for assessing students with an optional testing way during learning of science. Cognitive mapping test can be used as alternative way of evaluating students and also for ensuring the results of achievement test at school level examination in learning science.

One may argue that evaluating students with achievement tests and cognitive mapping tests will reveal little to no variance in results, and that cognitive mapping tests can be utilized as an alternate method of validating the findings of achievement tests.



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