How learning techniques initiate simulation of human mind

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The simulation of human mind often helps in the understanding of abstract concept by representing it in a realistic model and simplistic way so that a learner develops an understanding of the key concepts. Bian (1873) and James (1890) in their work suggested that thoughts and body activity result from interactions among neurons within the brain. This paper explains how the usage of synectic technique helps in experiencing and exploring a broad range of environments, objects and phenomena within the walls of the classroom through simulation which makes learning more straightforward and intuitive for many students; and supports a constructivist approach to learning. Human mind analogues to modern day computer could enable virtual reality for the students to encounter abstract concepts as well as to control their learning. A study was conducted on student teachers using the survey method on the effectiveness of synectics linked to the simulation of human mind. The result of survey revealed that synectic technique is an effective approach for improving students' learning in concept formation, skill development and content area knowledge.

Key words: Simulation, learning, virtual reality.

INTRODUCTION

The word synectics was derived from the Greek word synectikos which means "bringing forth together" or "bringing different things into unified connection." By definition synectics thinking is the process of discovering the links that unite seemingly disconnected elements. It is a way of mentally taking things apart and putting them together to furnish new insight for all types of problems. Recent research has proved synectic thinking technique stimulates creative thinking, mobilizes both the sides of the brain the right brain (the dreamer) and the left brain (the reasoner) which provides a free thinking state of consciousness. It is based on analogic thinking, fusion of opposites, synergetic, converts ordinary perceptions to extraordinary ones by generating new ideas. Gordon (1961) explained synectics as an approach to creative thinking that is often used by students to develop creative responses to problem solving, to retain new information, to assist in generating writing, and to explore social and disciplinary problems. Its main tool is analogy or metaphor. Couch (1993) suggested that the teacher facilitators should extract ideas from the students to establish similarities and dissimilarities between the two words namely atomic structure and solar system in teaching chemistry or physics. The usage of synectic lesson plan
of a particular topic in a specific curriculum should be
based on the following phases:

1. Phase I: Substantive Input (The teacher presents the
   new topic)
2. Phase II: Direct Analogy (The teacher suggests an
   analogy and asks students to explain it)
3. Phase III: Personal Analogy
4. Phase IV: Comparing Analogies (Students point out
   the similarities between the new material and the direct analogy)
5. Phase V: Explaining Differences (Students recognize
   where the analogy breaks down)
6. Phase VI: Exploration (Students re-explore the original
   material)
7. Phase VII: Generating Analogy (Students repeat the
   analogy process in small groups; this time creating their
   own analogies).

The usage of synectics is based on constructivist
philosophy suggested by Jean Piaget (1971). According
to him children in the preoperational state of cognitive
development understand in a better manner through their
personal analogies which is a component of synectics as
it engages otherwise uninterested students in classroom
activities. “Students are stimulated when they are excited
and encouraged when they produce original ideas related
to significant subject matter. Ormrod (2006) suggested
that Peer interaction also enables students to benefit
from distributed cognition as they co construct knowledge
by working together. The research work done by
cognitive psychologists has shown learning tendencies
by classifying left right brain hemisphere dominance,
mind-styles, and multiple intelligences. Synectics is
especially valuable in classrooms of diverse thinkers
because it accommodates the vast array of learning
styles in each system. Brain imaging techniques like EEG
(Electroencephalogram) revealed that the brain’s left
hemisphere is logical, analytical, verbal and sequential,
while its right hemisphere is intuitive, conceptual,
nonverbal and pattern-seeking. A band of neural fibers
called the corpus callosum connects the two otherwise
independent hemi-spheres and transmits information
between them and it was also found that individuals
exhibit tasks which favor either left - or right brain
dominance whereas the usage of synectics is logical to
infer that an individual’s learning is most complete and
integrated when it involves both halves of the brain.

**Relationship between synectics and simulations**

The practice of synectics techniques generates thoughts
considered as software and brain as the computer
capable of creating simulations to enable students
understand abstract concepts by providing a fertile
learning environment. For example, to explain the struc-
ture of atom, if a teacher uses synectic technique
comparing the atomic structure to that of solar system
produces simulation in the mind of the learner through
experiencing the particular event, observing and reflecting
on that, formulating abstract concepts and generalizations
around that, and then testing their implications of their
concepts in new situations as suggested by Koble (1994).
According to Galanneau (2004), simulations generated by
a computer, human made machine built for goal-based
learning, internalizing processes, understanding systems,
decision-making, perspective-shifting, team-building co-
operation” etc mind simulations generated by one’s own
thought process make it appear as real situation to
mind’s eye. The following similarities could be drawn
based on computer simulations and human mind
simulations.

The model in Figure 1 explains that synectic technique
when practiced in the teaching learning process could
generate mind simulations similar to computer simulation.

**Objectives of the study**

1. To find the effectiveness of synectic technique in
teaching –learning process.
2. To find the performance of students with respect to
their academic achievement as the result of mind simulations

**Research questions**

1. Is there significant improvement in the academic
achievement of students as a result of mind simulations?
2. How could synectic technique bring mind simulations?

**Sample**

The sample consists of 100 students (Boys and Girls in
the age group); 15 to 17 years were selected for the
study. 30 Boys and 25 girls were randomly selected as
experimental group given training to use analogies in
order to understand the concepts. The remaining was
treated as control group.

**METHODOLOGY**

The teacher trainees were asked to use the teaching learning
model involving five inter related steps (Figure 2). To begin with
teacher trainee introduces the concept to students using suitable
analogies. The students are encouraged to use their own analogies
and to compare the analogies as mentioned by the teacher explore
the analogies in order to understand the concepts. This
methodology is followed for six weeks. At the end of six weeks,
the students were tested in their academic achievement. The result of
the experiment is given in Table 1; it shows the significant
differences between pre and post academic achievement test
between boys and girls of the experimental group.
Table 1. The result of the experiment.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Gender</th>
<th>Type of test</th>
<th>Mean</th>
<th>S.D</th>
<th>'t'</th>
<th>L.S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic achievement</td>
<td>30</td>
<td>Boys</td>
<td>Pre</td>
<td>80.82</td>
<td>15.47</td>
<td>3.43**</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post</td>
<td>86.97</td>
<td>8.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Girls</td>
<td>Pre</td>
<td>72.99</td>
<td>9.45</td>
<td>8.17***</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post</td>
<td>84.54</td>
<td>6.12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001, N.S=not significant. 't' value was found to be significant for the experimental group showing that using analogies in teaching learning process helps students to understand the concepts in a better way.
Conclusion

The practice of Synectics provides mind training encouraging and enriching creative self-expression and creative thinking through simulations of human mind. Synectic technique promotes logic reasoning as a result of generating new ideas. This makes the students attain the following learning experiences:

1. Concrete experience by focusing on the solution of real-life problems.
2. Active experimentation by solving problems in a participative way with the users.
3. Abstract conceptualization by designing and facilitating problem solving processes.
4. Reflective observation by evaluating the results of a creative process.

REFERENCES

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