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Science Learning Enriched With Mediated and Non-Mediated Distance Learning and the Relation to Fostering Scientific Creativity

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Abstract

A necessary condition for a revolution in education is posing the teacher as the leader of the educational change. In the past, the focus was on the teacher but it shifted towards the student and the learning became more accessible. Due to technology, the classroom is not limited to four walls and one "expert" but it allows many students and experts throughout the world to participate. The purpose of integrating technology and education is giving the students more responsibility for their own learning.

Distance learning first started as correspondence lessons through post in the 19th century. As a result of technology developments, today there are many options of a-synchronous or synchronous (the teacher and the students communicate via sound and/or video simultaneously) learning. There are even MOOCs (Massive Open Online Courses) available. Hence, the meaning of distance learning has changed.

Mediated learning involves an "Agent" who provides a suitable stimulus and then observes the learner's response to the stimulus. Based on the response, the agent interacts with the learner and the process is continued until either the teacher or the learner is satisfied with the learning experience. One can conclude that a well-trained teacher, like parent, literally practices mediated interactions in the teaching processes as often as possible.

An optimal assimilation of computers into learning environments depends on the teachers' ability to change their conventional role as "knowledge providers" to mediators, organizers, guiders, diagnosers, encouragers, learning partners and instillers of skills and values.

At the digital world "Content is a verb and not a noun" – i.e. the students create a great amount of content themselves therefore control the knowledge. They feel free to present their knowledge in creative ways to others. Learning tasks that require creativity demand self-learning and collaboration, and increase the students' motivation.

A creative process is defined as producing ideas fluently, flexibility and originally from previous information. Creative ability relies on knowledge and the skill to associate different ideas in a divergent way to create new knowledge. Very few have achieved an exceptional level of creativity in many fields. This claim supports the view of creativity as domain specific. Scientific creativity is defined from other fields by its products - technical product, science knowledge, science phenomena or science problem.

The purpose of this study was to research the relation between different enrichment programs (distance learning, "Mediated Distance Learning") and scientific creativity and scientific knowledge. "Mediated Distance Learning" is a form of learning that practices students in techniques of creative and critical thinking using "Cloud Based Tools".

The study was conducted in three phases. Students from three classes (8^{th} grade, 9^{th} grade and outstanding 9^{th} grade) answered a test to determine their level of scientific creativity.

After approximately two months of learning science enriched with a distance learning program, they answered the same test again.

At the second phase, the same students participated in a science enrichment program of "Mediated Distance Learning" for roughly two months and answered the test for the third time.

The last phase of the study was conducted with no enrichment program at all, and after it the students answered the test for the final time.

The scientific knowledge was measured by the tests that were administered throughout the school year.

There are three main findings that arise from this study. First, the scientific creativity level that was achieved after learning enriched with the "Mediated Distance Learning" program was significantly higher compared to the level achieved after studying with no enrichment at all. Second, the knowledge level of the 8^{th} grade class that was achieved after learning enriched with the "Mediated Distance Learning" program was significantly lower compared to the level achieved after studying with no enrichment at all or with distance learning enrichment.

Third, the fluency level of "excellence 9^{th} grade" students increased significantly after studying enriched with the "Mediated Distance Learning" program compared to the level achieved after studying with no enrichment at all or with distance learning enrichment.

This study demonstrates the importance of teacher mediation in distance learning environments to develop scientific creativity. Further research is recommended to explore the efficiency of "Mediated Distance Learning" in fostering scientific creativity compared to a control group that did not study with this program. Also, based on the findings in high achieving students, it is suggested to study the benefit of this program to self control and motivation processes.