

Effectiveness of TERMS for developing scientific reasoning among secondary school students

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Abstract: *Education plays a very dynamic role in changing the society and its needs. In this world of technology the teachers should acquire and update the technological skill so that they can reach up to the needs of a student of present era and fulfil it. The learning realm of today's student is packed with computer and other gadgets. As this enhances their knowledge, the mastery over this becomes inevitable for the teacher trainers and the trained graduates. Then only the students of these teachers are benefitted out of it. It makes them more creative and scientific than the students of traditional class room. The total facet of society is being changed due to globalization and its demands are attained faster as the more techno-pedagogical skilled students work for it.*

This paper gives an overview of a new blog 'TERMS'(E-Resource Management System for Teachers) created by DIET, Kasargode District, Kerala with the help of IT@school, Kasargode and focuses on the influence of resources in TERMS for developing scientific reasoning among students. The blog TERMS is a new techno-pedagogy for developing students learning. The primary focus of the blog is to provide experiences for the students that will help them effectively infuse technology into their future classrooms. This objective is accomplished by providing students with the opportunity to use a variety of resources to accomplish tasks and by explicitly exposing them to the process of learning new technologies. This blog attempts to develop the critical and reflective thinking, scientific reasoning ability in students. Here in the present study the investigator attempts to study the effectiveness of TERMS for developing scientific reasoning among secondary school students.

Keywords: *Techno-pedagogy, TERMS, IT@school, ICT.*

I. INTRODUCTION

New approach to curriculum aims at enabling learners to construct knowledge. As we know it is not an easy task. We have to create a conducive physical and mental environment for that. In other words we have to create a disequilibrium in the existing schema of the child. As a result of this the child will engage in activities that eventually will lead to the construction of knowledge and there by the mental balance is retained.

In the learning process the child needs various inputs. Some of them in the form of teaching aids in which digital contents may occupy a decisive role. Digital contents in the form of videos, presentations, pictures, collage, worksheets, animations etc. will instill enthusiasm and involvement at a higher level. In some specific cases, where we cannot provide direct experiences, ICT materials are the best alternative.

But most of our teachers are not competent enough to collect, create and use them effectively. Due to the time constraints several of them are reluctant to explore the unexplored. But at the same time such teachers are ready to utilize ICT materials if they are provided suitably. This motive of the teachers met by DIET Kasargode. They tried to supply necessary ICT materials for class 10 and 7 namely "SMART@10" and "LASER" respectively in DVD format. Both materials are extensively being used by teacher community.

Through a joint venture of DIET Kasaragod and IT@School Kasaragod provisions are extended to realize the ICT support online and infinite possibilities of blog through "BLEND" with the help of committed and technically skilled teachers. This creative team formed under the banner of Kasaragod District Education Council to establish yet another landmark in the history of ICT enabled education in Kerala.

The project "TERMS" (E-Resource Management System for Teachers) aims at providing ICT contents for each subject classwise. The materials are either created by the members of Kasargode DIET or made available from

other sources. Through various additional links they can access digital evaluation tools, sample teaching manuals and other supporting materials. Links to useful websites and edublogs are also made available.

TERMS - e Resource Management System for Teachers is an initiative to strengthen the Govt. schools to improve the classes in the school and it has been told for a long time that IT's possibilities must be used to the maximum. Even the LP schools in Kerala have the necessary facilities for this. Teachers have received training, but the number of teachers using ICT in any school is very few. It is pointed out that the main cause of it is lack of time for constructing ICT materials and lack of experience. This is the main issue of schools in the past two years. As a solution for this the idea of a 'Resource blog' is put forward by DIET, Kasargode. It was approved by the district education committee and they assured technical assistance through Kasaragod IT@ school. Education officers in the district, with the support of the teacher's associations encouraged the teachers and Head Masters. TERMS was inaugurated by the Honorable education minister, Kerala on 04.01.2016.

Significance of the study

Blogs can create a learning environment that takes along the students beyond the class room. The teachers and the students have opportunities to express their opinions. The resources used in the blogs are highly motivational for the students. So that they find more interesting to visit such blogs and make use of it. Educational blogs, subject wise, introduce innovative methods in including lessons. The experiments in science are included in video format with description. Students know the answers for the questions. They are very good at presenting it also. The effort that they take to study these answers is appreciable. They know 'What' happens. But most of the students fail to answer 'why' or 'how' it happens. These blogs answers for these questions also. The ability to find reasons for the problems has become a hard nut for science student. This is resolved through these kinds of blogs.

Review

July , et al (1996) described a teaching activity that improves student's scientific reasoning by focusing attention on the causal, explanatory nature of psychological theories. Piraksa , et al (2014) conducted a study on effect of gender on student's reasoning ability: A case study in Thailand. They used and Lawson classroom test of scientific reasoning (LCTSR) Lawson (2000) was administered to investigate student's scientific reasoning ability in six constructs namely Conservation of mass and volume, Proportional thinking, Control of variable, Probabilistic thinking, Correlational thinking and Hypothetical deductive reasoning. The results indicated that the gender does not significantly impact on student's scientific reasoning ability of each construct.

Morris, et al (2012) has written a book on emergence of scientific reasoning.it covers the cognitive, metacognitive processes that involved in scientific reasoning. It also includes strategies for developing scientific reasoning in students.

Objectives

- To introduce TERMS, a new blog for teachers and students
- To test the effectiveness of TERMS for developing scientific reasoning among secondary school students

Hypothesis

- There will be a significant effect of TERMS on developing scientific reasoning among secondary school students

II. METHODOLOGY

Method

Experimental method was used for collecting data. Quasi-experimental design was selected for the study

Sample

60 secondary school students were selected for sample. 30 students were in the control group and 30 for the experimental group.

Tools

1. LCTSR(Lawson Classroom Test of Scientific Reasoning)
2. ICT resources in the new blog,TERMS(e Resource Management System for Teachers)

Statistical techniques used

t test was used for testing the significance of effectiveness

III ANALYSIS OF RESULTS

When ‘t test’ was conducted for the Pre-test scores of control and experimental to identify the normality of scientific reasoning of students in control and experimental group, it was found that there is no significant difference in the scientific reasoning of students in the control and experimental group. The results are shown in Table I.

Table I

Level of difference between Pre-test of Control and Experimental group

Sl no	Variables	N	Mean	SD	t
1	Pre-test (Control)	30	3.20	0.96	
2	Pre-test (Experimental)	30	3.33	0.84	0.51

When ‘t test’ was conducted for the Post-test scores of control and experimental to identify the effect of two methods in these groups, it was found that there is a significant difference in the scientific reasoning of students in the control and experimental group after the two methods. The results are shown in Table II.

Table II

Level of difference between Post-test of Control and Experimental group

Sl no	Variables	N	Mean	SD	t
1	Post-test (Control)	30	3.46	0.93	
2	Post-test (Experimental)	30	5.16	1.31	6.06**

**Significance at 0.01 level

When ‘t test’ was conducted for the total sample in experimental group to compare scientific reasoning of students it was found that there is a significant difference in the scientific reasoning of students in the pre-test and post-test scores of experimental group. The results highlight the effect of TERMS in student learning and scientific reasoning processes.

The comparative analysis of scientific reasoning of students before and after the method that is before after applying TERMS in classroom are given in Table III .

Table III

Level of difference between Pre-test and Post-test of Experimental group

Sl no	Variables	N	Mean	SD	t
1	Pre-test (Experimental)	30	3.33	0.84	
2	Post-test (Experimental)	30	5.16	1.31	6.45**

**Significance at 0.01 level

When the ‘t’ test was conducted in total sample of control group it was seen that there is no significant difference between pre-test and post-test scores of scientific reasoning of students before and after the class. The results shows that there is no significant influence of traditional method in developing scientific reasoning in students. The results are following in Table IV.

Table IV

Level of difference between pre-test and post-test scores of Control group

Sl no	Variables	N	Mean	SD	t
1	Pre-test(control)	30	3.3	0.96	
2	Post-test(control)	30	3.4	0.93	1.16

IV. CONCLUSION

Digital technologies are embedded in our society and it is widely used in teaching and learning. The impact of digital technology on academic achievement of students is varied according to the technological skill of the students. Present curriculum of Kerala aims at enabling learners to construct knowledge. In the learning process the child needs various inputs. TERMS (e-Resource Management System for Teachers) gives a variety of learning experiences for the children from first to tenth standard. It will be useful for students to improve their academic achievement along with reasoning ability. From the study we found that there is a significant difference in the pre-test and post-test scores of scientific reasoning in experimental group and there is no significant difference seen in control group. So the investigator concludes that the high score in the post-test in experimental group is due to the effect of TERMS.

Educational Implications

From the study it is clear that TERMS effect in developing scientific reasoning. ICT materials are not much available for the LP school students in the present system of Kerala. Here, TERMS provides a variety modes of materials which help this section. TERMS answers for the questions ‘Why’ and ‘How’ also. By the time they complete their secondary schooling, they will have acquired scientific reasoning ability. So teachers should take initiative to provide this material to all the school at least from 1-10 standard.

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