

Proceedings of the **Regional Symposium** on Open Educational Resources: An Asian Perspective on Policy and Practices

19th - 21st September 2012

This Symposium is dedicated to the International Development and Research Centre [IDRC].

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COMPARATIVE STUDY OF SCREEN-CAST VIDEOS VS GUIDED EXPLORATION FOR LEARNING APPLICATION SOFTWARE

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Abstract

Open Education Resources (OER) vary in the types ranging from textual articles and podcasts to multimedia animations and simulations. The media used to access the OER also range from television and desktops to tablets and mobiles. The paper proposes a schematic representation of different formats of OER categorized on the basis of user-involvement each format offers.

The need was felt to research in effectiveness of two different formats, one with presentation mode and the other in the format of exploration tasks. Learning resources were designed to learn open-source design software 'MyPaint'. Guided exploration tasks were designed based on constructivist principles and Screen-cast videos were developed for presentation mode.

Two different sample groups, one consisting of 18 Applied Art learners and the other consisting of 18 Educational Technology learners were selected for this study. Two-group pre-post test experimental design was selected. The tests were based on the skills of MyPaint software.

Each sample group was divided into two equated groups. One was provided screen-cast videos and the other with Guided exploration tasks. Both the formats of educational resources were proved effective in training software skills. No significant difference was found between achievement scores of both the groups.

Introduction

Development and research in the area of computer assisted learning did not see major change in its nature till the intervention of internet in education. Web 2.0 tools have provided revolutionary dimension to the field of eLearning and now only sky is the limit for research and development in the field of ICTs in education and training. eContent in various forms such as articles, PDFs, videos, podcasts, e-books, games, animations, simulations, etc are accessed through various media tools such as desktops, tablets, mobiles, television and i-pod.

Globalization and need of sharing educational resources not only widened the scope of research, but also led to explorations of numerous formats of ICT-integrated education. The introduction of Open Education Resources (OER) in the field of education is making the phenomena of 'Education for All' true as no one is denied to the web-based resources. The way OER resources are increasing day-by-day, the experts contributing to the OER are gaining utmost satisfaction of spreading quality content and sharing knowledge with all those from every corner of the world who otherwise might have never gained this wealth of knowledge. OER is a quality response to the resources which are copyrighted.

OER nature of the content has increased responsibility of the experts since the content is being used widely by several users across the globe. As quality of the content is an important issue, providing different types of resources for different types of users also becomes a responsibility of the content providers. Today eContents are being generated with utmost freedom to select and design any eContent format. A few efforts seem to have made to classify educational resources, but those mainly talk about their own repositories.

This article describes some of the systems by which educational resources are generally classified or composed. It will also relate these systems to the way in which Wikiversity can structure itself and guide users in the creation of educational resources.

The Wikiversity (2011) article categorizes OER resources into 9 heads. (Please refer to Fig. 1 to 3 for categories provided by repositories recognized world-wide.)

Material Types

- [Animation \(1,213\)](#)
- [Assessment Tool \(135\)](#)
- [Assignment \(817\)](#)
- [Case Study \(664\)](#)
- [Collection \(3,495\)](#)
- [Development Tool \(205\)](#)
- [Drill and Practice \(1,376\)](#)
- [ePortfolio \(128\)](#)
- [Learning Object Repository \(689\)](#)
 - [Online Course \(3,117\)](#)
 - [Open Journal-Article \(1,007\)](#)
 - [Open Textbook \(2,202\)](#)
 - [Presentation \(4,261\)](#)
 - [Quiz/Test \(851\)](#)
 - [Reference Material \(8,219\)](#)
 - [Simulation \(3,011\)](#)
 - [Social Networking Tool \(106\)](#)
 - [Tutorial \(3,790\)](#)
 - [Workshop and Training Material \(435\)](#)

Fig. 1 Material Types in MERLOT repository

(Source: <http://www.merlot.org/merlot/materials.htm?sort.property=dateCreated>)

The screenshot shows the OER Commons website interface. At the top, there's a navigation bar with links for 'Register Now', 'Log In', and 'Help'. Below that is a search bar with a 'Search' button and an 'Advanced Search' link. The main content area has tabs for 'Home', 'Browse All', 'My OER', and 'Contribute'. Under 'Browse OER Materials', there's a sidebar for 'Browse Collection Providers' and a 'Featured Searches' section with links for 'Art & Social Justice', 'Open Textbooks', and 'K-12 Textbooks'. The main content area features a large table titled 'Materials Types'.

Materials Types			
Activities & Labs	(9683)	Lesson Plans	(5182)
Assessments	(2129)	Readings	(9864)
Audio Lectures	(807)	Simulations	(4559)
Curriculum Standards	(4672)	Syllabi	(6297)
Discussion Forums	(98)	Teaching & Learning Strategies	(2573)
Full Course	(4076)	Textbooks	(843)
Games	(341)	Training Materials	(1132)
Homework & Assignments	(3217)	Video Lectures	(4096)
Lecture Notes	(2218)	Other	(2539)

Fig. 2 Material Types in OER Commons

(Source: <http://www.oercommons.org/oer>)

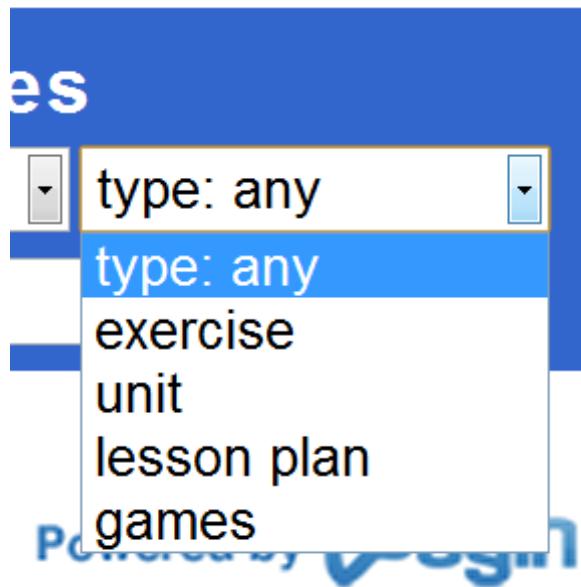


Fig. 3 Material Types in Curriki

(Source: <http://www.curriki.org/>)

These various categories provide an insight to generic nature of OER. The OER material provides a wide range of media involved, level of complexity of material development and also a wide range of interactivity the material ultimately provides to the user. The OER, at one hand, comprises of huge static content developed and published for the learners and teachers and at the other hand, an environment to enable users create a new live dynamic content on their own. OE content can be classified according to the level of interactivity it provides to the learner. The broad schema is presented in Fig. 4.

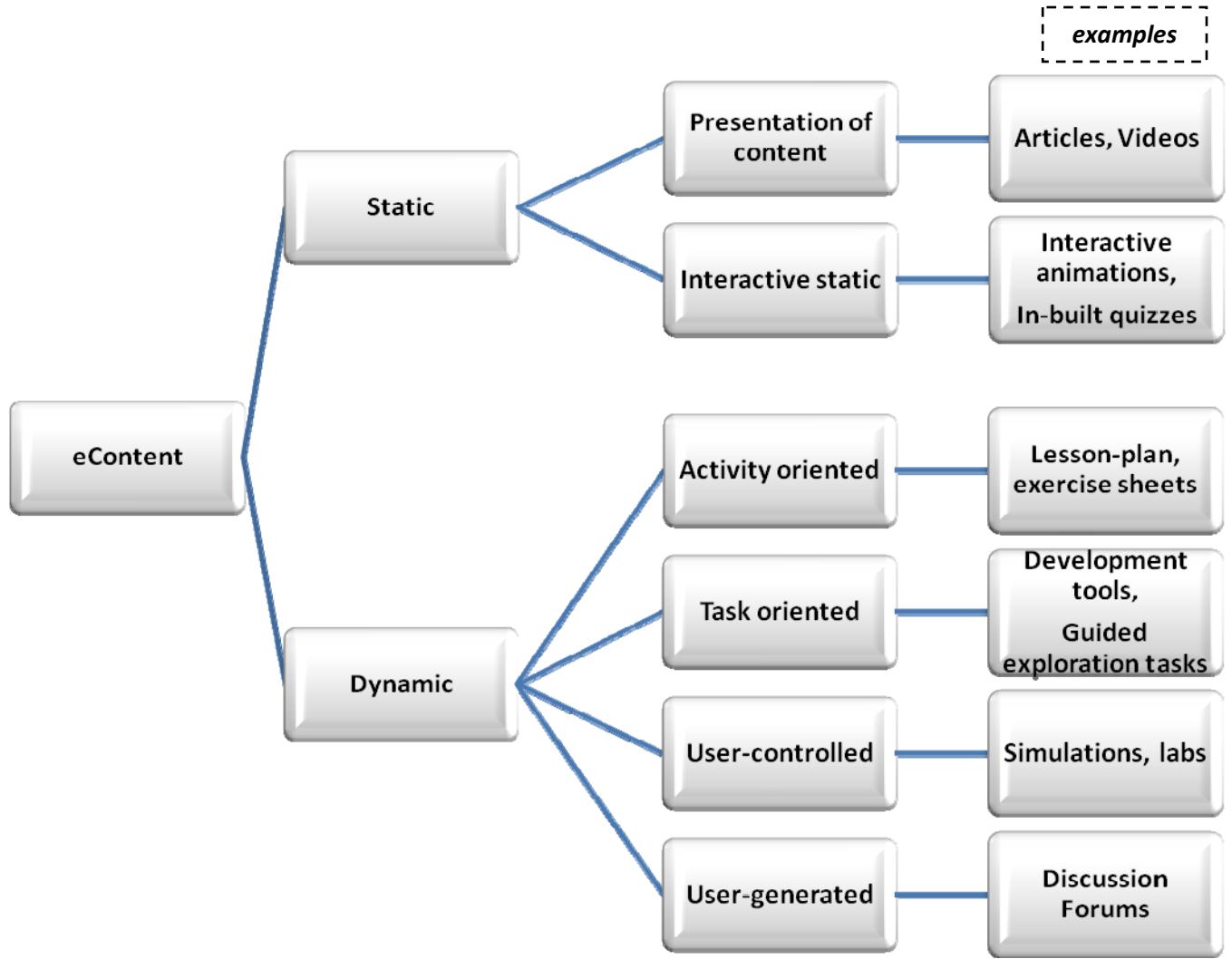


Fig. 4 Framework based on level of User-Interaction with the material

With the emerging formats of OER, the need is felt of experimenting with several available formats so as to find its usability and effectiveness in different settings.

Review of related studies:

Research in Guided Exploration was initiated way back in 2001, which continued considering various aspects such as situated cognition, Minimalism, androgogy and other cognitive strategies of learning. The studies have generally revealed that cognitivist and constructivist approaches prove effective in acquiring skills and higher cognitive skills. (Debowski S, Wood R., Bandura A., 2001; Hurt, A., 2007; Craig, J. M. B., 2012)

The medium of screen-cast videos is also being explored for its aspects ranging from multimedia design to its educational significance. Effectiveness of screen-cast videos has been tested for its effectiveness in face-to-face as well as web-based environments.

Usability, GUI, narration in digital videos have been a few significant variables which have attracted researchers in recent years. (Cripps, Michael J., 2009; Mohamad Ali, 2011; Ramsey, Musallam, 2010, Thompson, Riki, Lee, Meredith J., 2009).

Here is an attempt to experiment with two formats of eContent, one of which is a form of presentation and the other is exploratory in its nature.

The two selected formats of content for the study are Screen-cast videos and Guided exploration material. Screen-cast videos are widely being used in software-training, whereas Guided Exploration strategy is used in various other learning areas, though not so widely in the area of software training. An attempt was made to conduct a comparative study if any of the material types prove more effective.

Screen-cast Videos

Screen-cast video are achieved by recording procedures in the software run by capturing movements on the desktop. Basically all movements displayed on the display screen are captured as a video and hence software procedures can be performed and captured so as to produce demo for training purposes. Audio narration in any language can be recorded. There are several tools to facilitate record screen-movements and also embed audio in the same. (Aune S., 2008)

A project in India of creating huge resource of screen-cast videos with regional language narrations is named as 'Spoken Tutorial'. The project is initiated by IIT Bombay team and supported by several IITs and other technology institutes of India. It is like a normal tutorial that captures the changes in the screen in the form of a movie, followed by a running commentary of it by an expert at the same time. Spoken tutorial can be used to explain the steps involved in carrying out an activity, such as using some software. (Moudgalya K., 2009)

Guided Exploration

Guided Exploration is a problem-solving strategy, in which the sequencing of search activities and responses to problematic situations are predetermined.

Tasks that are to be accomplished are designed and arranged in a systematic order according to the level of increasing difficulty. The guided enactments of practice tasks ensure that the novice has a progressive sense of achievement, which strengthens perceived efficacy for the more demanding forms of the task and satisfaction with progress. (Debowski, et. Al., 2001)

MyPaint

The study reported in this paper is a comparative study of effectiveness of Screen-cast videos and Guided exploration material for learning software 'MyPaint'.

'MyPaint' is open source graphical software specially developed for Digital painter. Digital painters are those who make their artistic creations by using computer with different graphical software.

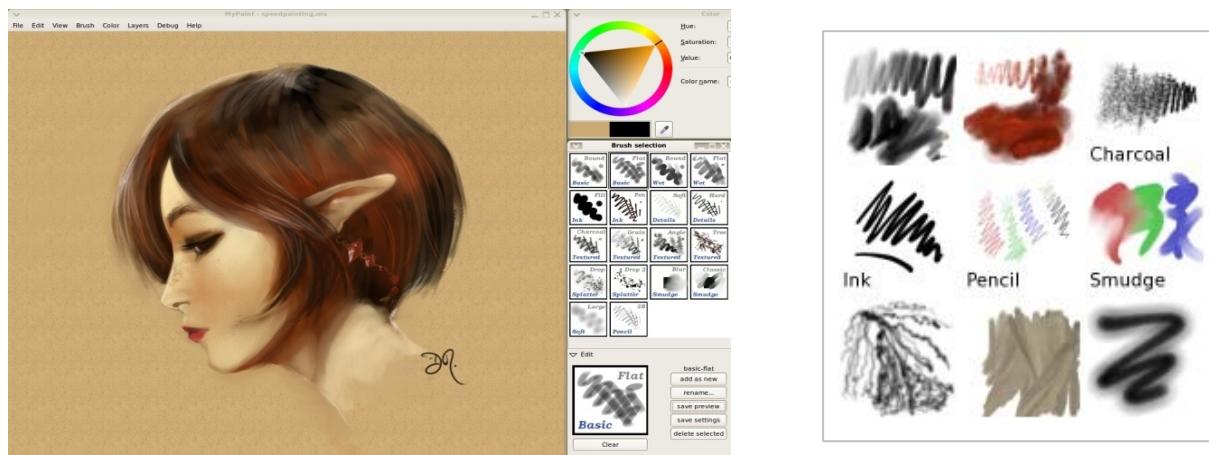


Fig 5 Working screen of MyPaint software and Brush effects available in MyPaint

Objectives of the study:

- To test the effectiveness of Guided Exploration material.
- To test the effectiveness of Screen-cast videos.
- To compare effectiveness of Screen-cast videos and Guided Exploration material.

Hypotheses

H0.1 - There will be no significant difference between the achievement of the group using Screen-cast videos and the group using Guided Exploration material

H0.2 - There will be no significant difference between the scores of pre-test and post-test of the group using Screen-cast videos.

H0.3 - There will be no significant difference between the scores of pre-test and post-test of group using Guided Exploration material

The scope of this study was restricted to two student centered approaches mentioned above.

Research Design

Experimental method with two-group pre-post test experimental design was used for the study.

Two different sample-groups were decided. The sample consisted of 18 undergraduate learners of Rachana Sansad Institute of Applied Art, Mumbai. The group was from Drawing and Painting background and conversant with computer, but not familiar with ICT-based training strategies. The other group consisted of 18 participants from Graduate degree programme offered at the Department of Educational Technology, SNDT Women's University, Mumbai. They did not have any background in the field of Applied Art, but all were used to ICT-based teaching-learning strategies. The initial sample was 23 Educational Technology learners. Since this group was exposed to several other applications in education and training, 5 of them could use the software upto the mastery level at the pre-test and hence were omitted from the study.

Since both the sample groups were from different backgrounds, two separate studies were conducted with no intention of clubbing or comparing them.

Achievement tests were prepared to test the effectiveness of both the strategies in learning the software skills of MyPaint. Pre and post-tests were designed with the help of a common blue-print. The tests consisted of two major tasks, one of which was divided into 3 sub-tasks. The tests were of 20 marks each. The tests were validated by the experts in the field of Education and Applied Art.

Quantitative data analysis was done using t-ratio.

Development of material:

Screen-cast videos were produced using Cam Studio, the Opensource screen-casting software. The script of the tutorials was prepared before actual recording so as to bring accuracy. There were 10 videos of 3 to 4 minutes each.

Tasks for Guided exploration designed in such a way that the learner will acquire important skills of using MyPaint by trying out the tasks. The tasks were designed in light of the same skills addressed in the screen-cast videos. The complexity and sequence of skills to be achieved was also maintained in both the formats. A few guidelines regarding use of options in the software were also provided alongwith the tasks as it was Guided exploration material.

Both the groups were administered pre-test in which they were provided with some tasks with the use of MyPaint, without any guidelines. They were expected to perform the tasks within 2 hours. Two parallel groups of each sample group were formed. One of the parallel groups was provided with the screen-cast videos to view and learn the software, whereas the other group was provided with the Guided exploration material. Thus, two groups used screen-cast videos and two groups used Guided exploration tasks.

The learning experiences were planned for about 5-6 hours. Individual learner took different time for learning. Post-test, parallel to the pre-test was administered on all the groups.

Data-analysis:

Since the hypotheses set for the study needed to be tested by using t-ratio, the following three differences in terms of t-ratios were computed:

1. Pre-test and post-test of Sample 1 (Applied Arts learners) using Screen-cast videos
2. Pre-test and post-test of Sample 2 (Educational Technology learners) using Screen-cast videos
3. Pre-test and post-test of Sample 1 using Guided exploration material
4. Pre-test and post-test of Sample 2 using Guided exploration material
5. Post-test scores of Sample 1 (Applied Arts learners) using Screen-cast videos and using Guided exploration material
6. Post-test scores of Sample 2 (Educational Technology learners) using Screen-cast videos and using Guided exploration material

Table 1 and 2 present t-ratio of Pre-test and Post-test scores of sample using Screen-cast videos.

Table 1

t-ratio of Pre-test and Post-test of sample I (9) using Screen-cast videos

Name of the Test	Mean	Standard Deviation	t-ratio	Critical value
Pre-test	4.778	1.541	18.818	2.898
Post-test	14.444			

The obtained value of the t-ratio as shown in the table is higher than the critical value at 0.01 level of significance. Therefore, the null hypothesis was rejected at 0.01 level of significance.

Mean of Sample I (Applied Art learners) was 4.78 which increased to 14.44. Two of the participants achieved mastery and the lowest achieved score was 60%.

Table 2

t-ratio of Pre-test and Post-test of sample II (9) using screen-cast videos

Name of the Test	Mean	Standard Deviation	t-ratio	Critical value
Pre-test	13.056	1.976	6.662	3.36
Post-test	17.444			

The obtained value of the t-ratio as shown in the table is higher than the critical value at 0.01 level of significance. Therefore, the null hypothesis was rejected at 0.01 level of significance. Except two, all others achieved mastery level of skills (80% or more) in this group. The overall performance was better than Sample I as Educational Technology learners are exposed to several application software.

Table 3

t-ratio of Pre-test and Post-test of sample I (9) using Guided exploration material

Name of the Test	Mean	Standard Deviation	t-ratio	Critical value
Pre-test	4.889	1.620	16.459	3.36
Post-test	13.778			

The obtained value of the t-ratio as shown in the table is higher than the critical value at 0.01 level of significance. Therefore, the null hypothesis was rejected at 0.01 level of significance.

Two of the participants achieved mastery and the lowest achieved score was 60% in this group. Though the group was from Applied Art background, they were not familiar with learning by exploration.

Table 4

t-ratio of Pre-test and Post-test of sample II (9) using Guided exploration material

Name of the Test	Mean	Standard Deviation	t-ratio	Critical value
Pre-test	12.833	2.878	5.849	3.250
Post-test	18.444			

The obtained value of the t-ratio as shown in the table is higher than the critical value at 0.01 level of significance. Therefore, the null hypothesis was rejected at 0.01 level of significance.

Except one, all achieved mastery in this group.

The Educational Technology learners of this group shared that they acquired the skills of using MyPaint mainly because they were allowed to explore the package by themselves. None of them complained that they were deprived of videos. On the contrary, they shared about their rich learning experience with the group viewing videos.

Table 5

Post-test scores of Sample I (Applied Arts learners) using screen-cast videos and using Guided exploration material

Name of the Test	Mean	Standard Deviation	t-ratio	Critical value
Post-test of sample using Guided exploration material	13.778	1.904	0.966	3.250
Post-test of sample using Screen-case videos	14.444	1.871		

The obtained value of the t-ratio as shown in the table 5 is higher than the critical value at 0.01 level of significance. Therefore, the null hypothesis was retained. No significant difference was found between effectiveness of both the strategies.

Table 6

Post-test scores of Sample II (Educational Technology learners) using Screen-cast videos and using Guided exploration material

Name of the Test	Mean	Standard Deviation	t-ratio	Critical value
Post-test of sample using Guided exploration material	18.444	1.750	1.650	3.250
Post-test of sample using Screen-case videos	17.444	2.883		

The obtained value of the t-ratio as shown in the table 6 is higher than the critical value at 0.01 level of significance. Therefore, the null hypothesis was retained. No significant difference was found between effectiveness of both the strategies.

Conclusion:

The present study was a small effort of researching with the formats of OER and instructional approaches woven in the design OER. The study proved that both the formats prove effective in learning and acquiring skills on your own. Many more studies in this area will certainly enrich repositories of the quality resources. Similar studies can be conducted on larger samples to test and compare different formats. The generalized results will help instructors to choose from the existing resources as well as add to the resources.

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