

THE EFFECTIVENESS OF VIRTUAL FIELD TRIPS ON AUTHENTIC LEARNING OF STUDENTS FOR TEACHING FOREST RESOURCES AT HIGHER SECONDARY LEVEL OF WBCHSE

Sanjoy Dutta

Assistant Professor in Geography School Of Education, Adamas University, Barasat, Kolkata, West Bengal, India.

Received: May 28, 2018

Accepted: July 08, 2018

ABSTRACT

The aims of the study are to assess the effectiveness of Virtual Field Trips regarding Authentic Learning in respect to teaching forest resources and to analyze the Authentic Learning of students as a result of Virtual Field Trips. Quasi-Experimental Method and two groups Post-test Design were adopted for the study. A non-interactive one hour Virtual Field Trip module was prepared based on the topic, Equatorial Rain Forests. There is one dependent variable e.g. Authentic Learning and one categorical variable i.e. locality. The samples consisted of 100 Geography students of class XI. A Worksheet has been prepared as a tool for assessing the authentic learning of students. The result shows that VFT method of teaching is effective than conventional method. In both method of teaching rural students performed better than the urban students. No interaction is found. So both method of teaching are irrespective of locale. Since the students under experimental group performed better than the students under control group, the VFT method of teaching is preferable over conventional method for augmenting authentic learning among students irrespective of locale.

Keywords: Effectiveness, Virtual field trips, Forest Resources, Authentic Learning, WBCHSE.

INTRODUCTION:

A virtual field trip (VFT) is a guided exploration through the World Wide Web that organizes a collection of pre-screened, thematically based web pages into a structured online learning experience. (Foley,2003). It is an electronic exhibition of diverse natural and cultural phenomena that also provide digital simulations of the three-dimensional processes of surveying, observing, exploring and 'adventuring' in some actual field site. It is commonly used to describe any activities on computer, that a user browses, step-by-step, link-by-link, click-by-click through a set of linked web-pages to acquire information about a field site or location.

Authentic learning is learning designed to connect what students are taught in school to real-world issues, problems, and applications; learning experiences should mirror the complexities and ambiguities of real life.

Authentic learning, according to Shaffer and Resnick (1999) includes several characteristics:

- (a) learning that is personally meaningful for the learner,
- (b) Learning that relates to the real-world outside of school, and
- (c) Learning that provides an opportunity to think in the modes of a particular discipline.

THE OBJECTIVES OF THE STUDY:

1. To assess the effectiveness of Virtual Field Trips regarding Authentic Learning in respect to teaching forest resources.
2. To analyze the Authentic Learning acquired by the students as a result of Virtual Field Trips.

HYPOTHESES:

H₀₁: There are no significant differences in mean scores regarding authentic learning among students with respect of teaching through Traditional method and Virtual Field Trip method.

H₀₂: There are no significant differences in mean scores of authentic learning among rural and urban students with respect of teaching through Virtual Field Trip method.

H₀₃: There are no significant differences in mean scores of authentic learning among rural and urban students with respect of teaching through conventional method.

H₀₄: There is no interaction effect of method of teaching and locality towards authentic learning among students.

THE REVIEW OF RELATED LITERATURE:

Stainfield, John. Fisher, Peter. Ford, Bob. & Solem ,Michael (2000) concluded that Virtual Field Trips (VFTs) have a valuable role in supporting and enhancing real Field work and empowering students who are disadvantaged financially or physically. Qiu,Weili. and Hubble ,Tom.(2002) concluded that VFT has many advantages and can be useful in many aspects in teaching the geosciences. Lin, Hui., Chen,Min. and Lu ,Guonian. (2003) in their study prepared a case on the simulation of air pollution and its analysis at different geographic scales is used to demonstrate Virtual Geographical Environment's ability to facilitate computer-aided geographic experiments. The study made by Nix, Rebekah Kincaid (2003) shows that VFT can enable the principles of student-centered inquiry and constructivism for the benefit of all styles and ages of lifelong learners. One mobile learning application prototype created by Kravcik, M., Kaibel, A., Specht, M., and Terrenghi, L (2004) enables data gathering and annotation in the field, together with real time collaboration. Cantwell, Laurie Beth (2004) found that using the VFT as a pre-activity may diminish students' sense of discovery and wonder about the natural world. Sanchez, Alicia D., Cuevas, Haydee M., Fiore, Stephen M. and Cannon-Bowers ,Janis A (2005) sought to utilize advanced, interactive dynamic media approaches in classroom-based settings and this is more effective in teaching targeted material and also more motivating to students Robinson, Lilla. (2009) says that VFTs are a way to enable students to be connected, lifelong learners. The article of Stoddard, Jeremy (2009) describes hybrid distance learning models and VFT in the social studies and other areas, as well as a critical case study of one of the most prominent and long lasting Electronic Field Trip program.. Kingston, D. G., Eastwood, W. J., Jones, P. I., Johnson, R., Marshall, S. and Hannah, D. M (2012) indicate the mobile technology-based field exercises provide an important opportunity to investigate and evaluate the effectiveness of learning tools across the spectrum of undergraduate Physical Geography subjects. Young, Lee. & Kim (2013) investigated the effects of flash panorama based VFT as a supporting tool for geological field activity on middle school students' spatial visualization ability, conceptual understanding, and perceptions. Hehr , Karl Harven (2014) found out that the VFT did provide some level of increase in interest and motivation and it did allow the students to make deeper connections with the material. Findings from the study made by Oyler ,Mary (2014) show that the use of VFT does have a significant impact on student comprehension and vocabulary achievement. Selby, Katherine. & Davis, Simon (2014) found that the students were very positive about the VFT citing that greater information was obtained than a one day trip and the ability to access the VFT frequently at their own pace. The DVD based knowledge package treated by Jaikiran, K.P., Pradeepkumar, A.P. and Santosh, S (2015) shows that Virtual Field Geology by exposing learners to the Tertiary sedimentary section of the Kerala Coast of South West India. Bursztyn, Natalie., Pederson, Joel., Shelton, Brett., Walker, Andrew., Campbell, Todd (2015) shows that Student response to a game suggests a viable method for making geosciences instruction engaging and enjoyable, and hopefully will result in greater motivation to pursue the geosciences. Results of the investigation made by Bursztyn, Natalie., Shelton, Brett., Walker, Andy. and Pederson , Joel (2017) indicate the Augment Reality field trips increase student motivation to pursue geoscience learning.

RESEARCH METHODOLOGY

Research Method and Design: Quasi-Experimental Method was followed and Two group Post-test Design only was selected.

Variables: The method of teaching is considered here as independent variable. There are two types of method of teaching such as Conventional and Virtual Field Trip methods of Teaching. The treatment is VFT method. There is one dependent variable e.g. Authentic Learning and one categorical variable i.e. locality including urban and rural levels.

Study Area: For urban locality, Baranagar Rameshwar High School (H.S) at Baranagar and Tentulberia Anukulchandra High School (H.S) at Garia in Kolkata Metropolitan Region were selected whereas Gabberia High School (H.S) at Lakshmikantapur and Ramgarhut High School (H.S) at Diamond Herbour in South 24 Parganas were taken for rural locality under the state of West Bengal.

Sampling Techniques and Sample Size: The purposive-random sampling technique has been adopted for the selection of samples consisted of 100 Geography students of class XI. The students were divided into two groups. The treatment group was taught using the VFT module and the control group was taught by conventional method. The two groups consisted of 50 students each. There are 25 urban and 25 rural students among the 50 students of each group.

Tools: A Worksheet was prepared as a tool for assessing the authentic learning of students. The worksheet consists of 8 items characterized by real world issues related to the planning of the tour. A Rubric was prepared to quantify the responses given by the students for each item.

Standardization of Tools: The tool was verified by five experts. The recommendations made by the experts have been included wherever necessary. The content validity and the face validity were maintained here.

Designing of the VFT Module: A non-interactive one hour Virtual Field Trip module was prepared by editing more than 80 Youtube videos, more than 25 photographs, 10 animated videos and Google Earth techniques based on the topic, Equatorial Rain Forests according to the content structure of the syllabus of class XI, WBCHSE.

Delimitation of the Study:

The study is limited to South 24 parganas and Kolkata Metropolitan Area based Govt. aided Bengali medium schools of higher secondary level under WBCHSE only. It is limited to teaching of the Equatorial Rain Forest resources belonged to class XI curriculum.

ANALYSIS OF DATA:

The study searched how far the students applied their learning to the real world issues.

- **The effectiveness of the Virtual Field Trip (VFT) Method of Teaching over Conventional method regarding Authentic learning:**

In both method of teaching Students were directed to give responses on worksheets. It is needed to compare the results of both method of teaching.

H₀1: There are no significant differences in mean scores regarding authentic learning among students with respect of teaching through Conventional method and Virtual Field Trip method.

Table -1 Mean and SD of authentic learning of students taught by conventional method and the VFT method

| Group | Number of students | Mean | Standard Deviation |
|--------------------|--------------------|-------|--------------------|
| Control Group | 50 | 17.58 | 5.3149385 |
| Experimental Group | 50 | 21.34 | 5.0086048 |

t-test: Two-Sample Assuming Equal Variances method was employed to compare the authentic learning results of 50 students each under the control and experimental groups. The details of the t -test has given below.

Table-2 Statistical details of t-test: Two-Sample Assuming Equal Variances

| Statistical details | Control Group | Experimental Group |
|------------------------------|---------------|--------------------|
| Variance | 28.24857143 | 25.08612245 |
| Pooled Variance | 26.66734694 | |
| Hypothesized Mean Difference | 0 | |
| df | 98 | |
| t Stat | -3.64055791 | |
| P(T<=t) two-tail | 0.000436696 | |
| t Critical two-tail | 1.984467404 | |

p value is 0.000436696 which is less than 0.05 level of significance

so that Null hypothesis is rejected and the result is significant. Hence, there are significant differences in mean scores of authentic learning among students with respect of teaching through VFT method and conventional method. The mean score of students of experimental group exceeds the mean score of students of control group. So VFT method is effective than conventional method.

- **Locale wise effectiveness of the Virtual Field Trip (VFT) Method of Teaching regarding Authentic learning:**

H₀2: There are no significant differences in mean scores of authentic learning among rural and urban students with respect of teaching through Virtual Field Trip method.

Table-3 Mean and SD of authentic learning of rural & urban students taught by the VFT method

| Group | Number of students | Mean | Standard Deviation |
|-------|--------------------|-------|--------------------|
| Urban | 25 | 18.4 | 3.4156502 |
| Rural | 25 | 24.28 | 4.6414796 |

t-test: Two-Sample Assuming Equal Variances method was employed to compare the authentic learning results of 25 students each under urban and rural categories regarding experimental group.

Table-4 Statistical details of t-test: Two-Sample Assuming Equal Variances

| Statistical details | Urban | Rural |
|------------------------------|-------------|-------------|
| Variance | 11.66666667 | 21.54333333 |
| Pooled Variance | 16.605 | |
| Hypothesized Mean Difference | 0 | |
| Df | 48 | |
| t Stat | -5.10167622 | |
| P(T<=t) two-tail | 5.69705E-06 | |
| t Critical two-tail | 2.010634722 | |

p value is 0.00000569705 which is less than 0.05 level of significance

so that Null hypothesis is rejected and the result is significant. Hence, there are significant differences in mean scores of authentic learning among urban and rural students. The mean score of rural students exceeds the mean score of urban students. So the rural students performed better than urban students.

- **Locale wise effectiveness of the conventional Method of Teaching regarding Authentic learning:**

H₀3: There are no significant differences in mean scores of authentic learning among rural and urban students with respect of teaching through conventional method.

Table-5 Mean and SD of authentic learning of rural & urban students taught by conventional method

| Group | Number of students | Mean | Standard Deviation |
|-------|--------------------|-------|--------------------|
| Urban | 25 | 14.76 | 4.30387422 |
| Rural | 25 | 20.4 | 4.75219247 |

t-test: Two-Sample Assuming Equal Variances method was employed to compare the authentic learning results of 25 students each under urban and rural categories regarding control group.

Table -6 Statistical details of t-test: Two-Sample Assuming Equal Variances

| Statistical details | Urban | Rural |
|------------------------------|-------------|----------|
| Variance | 18.52333333 | 22.58333 |
| Pooled Variance | 20.55333333 | |
| Hypothesized Mean Difference | 0 | |
| df | 48 | |
| t Stat | -4.39838232 | |
| P(T<=t) two-tail | 6.03697E-05 | |
| t Critical two-tail | 2.010634722 | |

p value is 0.0000603697 which is less than 0.05 level of significance

so that Null hypothesis is rejected and the result is significant. Hence, there are significant differences in mean scores of authentic learning worksheets among urban and rural students with respect of teaching through conventional method. The mean score of rural students exceeds the mean score of urban students. So the rural students performed better than urban students.

- **The interaction effect of methods of teaching and levels of locale regarding authentic learning:**

The study now requires an analysis of interaction effect between methods of teaching and the levels of locality.

H₀4: There is no interaction effect of method of teaching and locale towards authentic learning among students.

Table-7 Interaction table of the Methods of Teaching & the levels of Locale regarding Authentic Learning

ANOVA: Two-Factor with Replication technique was carried out to identify differences in mean total scores regarding authentic learning for urban and rural students who were taught using the VFT and by conventional method.

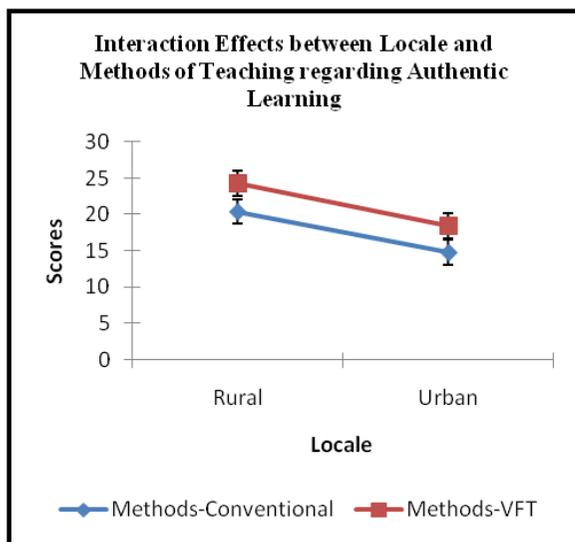


Fig. 1

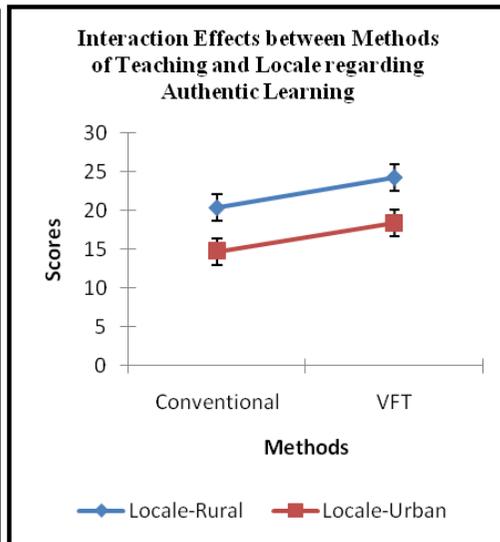


Fig. 2

Table-8 Statistical details of ANOVA: Two-Factor with Replication

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|---------|----|----------|----------|----------|----------|
| Sample | 829.44 | 1 | 829.44 | 44.64355 | 1.55E-09 | 3.940163 |
| Columns | 353.44 | 1 | 353.44 | 19.02346 | 3.25E-05 | 3.940163 |
| Interaction | 0.36 | 1 | 0.36 | 0.019377 | 0.889584 | 3.940163 |
| Within | 1783.6 | 96 | 18.57917 | | | |
| Total | 2966.84 | 99 | | | | |

p value of interaction is 0.889584 which exceeds 0.05 level of significance

so that Null hypothesis is not rejected and the result is not significant. Hence, there is no significant interaction effect of teaching methods and locale upon authentic learning. It means that changes in the authentic learning can be explained by the two methods of teaching. The total average scores of authentic learning regarding the conventional method and VFT are 17.58 and 21.34 respectively. The mean score of authentic learning of VFT exceeds the mean score of conventional method. So the VFT method of teaching is effective than conventional method of teaching upon authentic learning of students irrespective of levels of locality.

Item analysis of Authentic Learning:

A situation of planning of family tour to the equatorial rain forests was left to the students and they were instructed to be an integral part of the planning of the tour. They entered their responses in the specified cells in the worksheet. Their responses were evaluated with the help of a Rubric.

i. Item- 1 (selection of location with explanation) :

The students were asked to select a location by citing proper reasons to make a tour towards equatorial rainforest. The mean of this item regarding the experimental group is highest than the mean scores of other items. Again, the mean of this item exceeds the mean score of the item of control group.

ii. Item-2 and Item-3 (Reflection on climatic characteristics) :

Students act as good advisors to suggest their family members about clothes and other belongings to pack in luggage. Item 2 was associated with packing of things in luggage and item 3 was related to carrying of things at the time of visiting through the forest. In VFT the mean scores of the item 2 and

item 3 are 2.44 and 2.30 respectively whereas conventional method indicates the mean scores are 2.08 and 2.18 respectively.

iii. **Item-4 (Characteristics of the forest) :**

The students were instructed to arouse interest among their family members by informing them about the special characteristics of the forest. In VFT method the mean of this item is lowest. But the mean of the item regarding the conventional method is lower than the VFT.

iv. **Item-5 (Type of Trees) :**

The students were instructed to prepare a list of different types of trees of the forest. In conventional method the mean score of this item is highest but lower than the mean score of the item regarding the VFT.

v. **Item-6 (food items) :**

The students were told to prepare a list of different food items available in the forest to inform their mothers. The conventional method performed very poor than the VFT. The mean of the item regarding the conventional method scored lowest among all items. The mean score of the item regarding the VFT is very high.

vi. **Item-7 (faunal items) :**

The students were required to enlist the name of different animals found in the forest to inform their siblings. The mean score of the item regarding the VFT is very high than the conventional method.

vii. **Item-8 (causes of backwardness of timber industry) :**

In the case of conventional method the mean score is very low than the mean score of the item of VFT method. But the mean score of the item of VFT method is second lower among other items.

From the above discussion, it can be said that VFT method of teaching performed better than the conventional method. In both method of teaching rural component performed better.

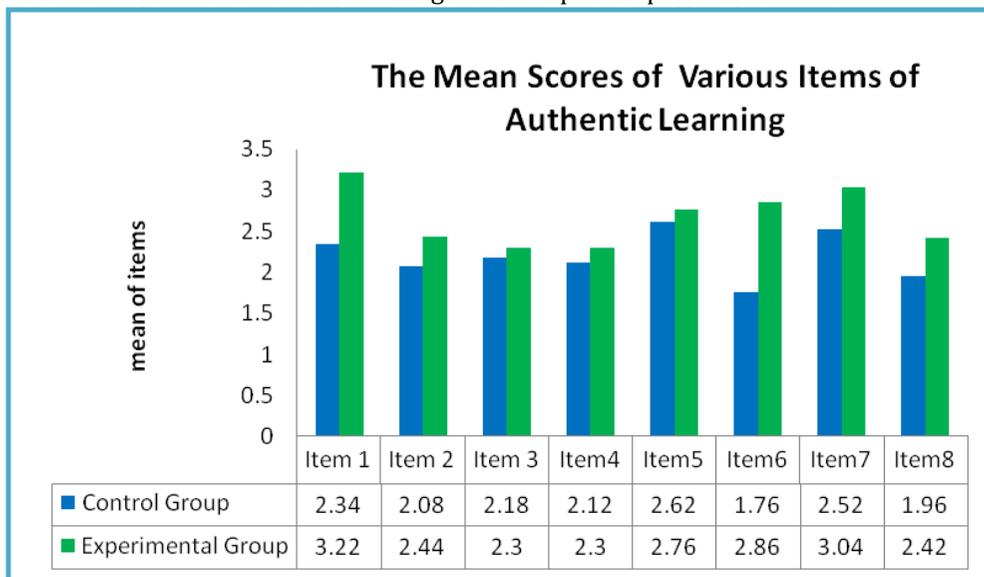


Fig. 3

CONCLUSION:

The mean score of authentic learning of students under experimental group exceeds the mean score of students belonging to control group. So the VFT method of teaching is effective than conventional method to enhance authentic learning among students. In both method of teaching rural students performed better than the urban students. But rural students under the experimental group performed better than the rural students of the control group. Same scenario has been revealed out in the case of urban students. Hence, the VFT method of teaching is all over effective method of teaching for enhancing authentic learning. No interaction is found in between methods of teaching and the levels of locale. So both method of teaching are irrespective of locale. Since the students under experimental group taught by VFT performed better than the students under control group, the VFT method of teaching is preferable over conventional method of teaching for augmenting authentic learning among students irrespective of locale.

ACKNOWLEDGEMENTS: I would like to thank Professor (Dr.) Mita Banerjee, former Vice Chancellor, The West Bengal University of Teachers Training, Education Planning and Administration and Dr. Sujit Pal, OSD,

The West Bengal University of Teachers Training, Education Planning and Administration. I am also grateful to the Headmasters of the schools selected for the study. I would also like to thank my students Kaushik Majumdar, Baisakhi Halder, Wahida Shaikh and Santu Manna.

REFERENCES:

1. Caliskan, Onur. (2011). Virtual field trips in education of earth and environmental sciences. *Procedia Social and Behavioral Sciences* 15 (2011) 3239–3243.
2. Degen, Ronald Jean. (2012). Effective Student Assessment in Virtual Learning Courses Based on the Guided-Experience Approach.
3. Dr. A. J. Obadiora. (2016). Comparative Effectiveness of Virtual Field Trip and Real Field Trip on Students' Academic Performance in Social Studies in Osun State Secondary Schools: *Mediterranean Journal of Social Sciences*, MCSER Publishing, Rome-Italy, ISSN 2039-2117 (online) ISSN 2039-9340 (print), Vol 7 No 1 January 2016.
4. Dutta, Sanjoy (2018). The Effectiveness Of Virtual Field Trips On Academic Achievement And Motivation Of Students For Teaching Forest Resources At Higher Secondary Level Of WBCHSE, *Journal of Emerging Technologies and Innovative Research*, Volume 5, Issue 7, ISSN-2349-5162, pp 658–675.
5. Hehr, Karl Harven. (2014). Virtual field trips as an educational and motivational strategy to teach Iowa history. Iowa State University.
6. Michael, J., Malley, O. and Pierce, Lorraine Valdez. (2005). Authentic Assessment for English Language Learners: Practical Approaches for Teachers.
7. Obadiora, A. J. (2016). Comparative Effectiveness of Virtual Field Trip and Real Field Trip on Students' Academic Performance in Social Studies in Osun State Secondary Schools.
8. Stoddard, Jeremy. (2009). Toward a Virtual Field Trip Model for the Social Studies. Stoddard, J. (2009). Toward a virtual field trip model for the social studies. *Contemporary Issues in Technology and Teacher Education*, 9(4), 412-438.