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RESEARCH ARTICLE

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Development and effectiveness of digital story telling in teaching

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ABSTRACT

Digital storytelling is one of the upcomings and innovative technology in education. It is being used for teaching in foreign countries. This study was undertaken to know the effectiveness of digital stories in teaching the students of higher education in India. Six digital stories were prepared on successful women from different profession. Graduation students studying 'Gender and Development' as a subject, were sample of the study. Knowledge test was used for data collection. The digital stories on "Successful women from different profession" were found effective in terms of gain in knowledge. All the selected students liked this method of teaching and learning. They wanted to learn its process.

KEY WORDS : Story telling, Digital story telling, Development of digital stories

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INTRODUCTION

Storytelling has been used as an important part of healing, self-knowledge, personal and spiritual vehicle for connecting us to the world and to almighty. Stories are not only fictional accounts but also narratives describing "ideal" life events like biographies, autobiographies, histories, case studies, and reports of events or remembered day. It is one way to develop realistic thinking, as stories can show children how people realistically solve their problems. Not only the children but also the adults love to listen and share their stories. Storytelling is important to carry on previous generation's work, to offer something valuable to others, and to win people young.

The scriptures remind us that the child should be trained in the way he should walk, and when he is old, he will not depart from it. Since the youngsters are ready to accept things easily, and as their minds are available for training through stories, and since this is an impact that will last their whole lifetime, one must not leave this opportunity to win them young through this art of storytelling.

In today's world,technology is playing very important role in everybody's life. Now a days technology exists everywhere and everyone is taking advantage of it. We have everything in digitalize form. Like earlier, we used to have landline phones and now days it is out of fashion and everyone is using the cellular phones; like this we are using the emails, e-cards, e-billing, e-marketing,laptops and many more.

As storytelling is an ancient art of imparting the knowledge and technology it plays a very pivotal role in everybody's life; people have merged technology and storytelling together and invented a new form of storytelling *i.e.* Digital storytelling.

Digital storytelling association (USA) (1994) define digital storytelling as: *"Digital storytelling is the modern expression of the ancient art of storytelling. Digital stories derive their power by weaving images, music, narrative and voice together, thereby giving deep dimension and vivid colour to characters, situations, experiences and insights".*-(www.storycenter.org)

According to Wikipedia(2003), "Telling a story "digitally" means merging a short narrative, with corresponding audio, and various types of visual media, including photos, artwork, letters, and digital video. It also brings storytelling to the computer arena – so that it may be more easily distributed, communicated, and linked with

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other stories, in order to create a global storytelling experience". (www.en.wikibooks.org)

It is a practice of using computer-based tools to tell stories. Most of the digital stories focus on specific topic and contain a particular point of view.

Digital stories are "mini movies" created and narrated by the use of cameras, computers, scanners, and photographs. It usually contains some mixture of computer-based images, text, recorded audio narration, video clips, and music. They vary in length. The digital stories are being used for many purposes. People use these stories for expressing themselves as well as for imparting values in youngers. Now a days it has also been used for educational purposes. The usage of digital storytelling for educational purposes is discussed below:

Usage of digital stories in education:

It provides a platform for students to demonstrate their capabilities, skills, and aptitudes and prepare a better portfolio of achievement. It develops writing skills and sense of storytelling in students. Teacher can also use them to explain the process of certain things and to describe any topic.

Digital storytelling is a computerized method that comes up as a part of recent developments in computerized techniques and telecommunication. Through digital storytelling, teachers come closer to the technology in the way of teaching and students get closer to it in the way of learning through it. Digital stories can be used to motivate students. Most students would probably find it a refreshing departure from traditional educational assignments and thus more likely to stay engaged.

Digital storytelling allows students to work on authentic assignments, develop their personal and academic voice, represent knowledge to a community of learners, and receive situated feedback from their peers. Due to their effective involvement with this process and the novelty effect of the medium, students are more engaged than in traditional assignments.

It works at the intersection of the emotional and the epistemological aspects of learning, bridging story and theory, intellect and effect. For many students, an emotional engagement with the topic is the point of departure that allows them to connect their stories to the relevant theories. As emotions are reclaimed cognitively, they enable students to write themselves into existing discourse and to contribute personal perspectives to an academic community.

Digital stories are used for various purposes, including teaching, outreach activities, and communication purposes. The usage of it, is described by various academicians, researchers and outreach workers mostly from foreign land. This makes investigator curious about its usage and its effects on Indian students. The questions which came in the mind of researcher were:

– Will digital story be effective in teaching learning process in India?

– Will it be effective in imparting knowledge to higher education students?

– Can we develop digital stories based on prescribed curriculum?

These were some of the questions which need to be addressed in Indian context. Hence, it was thought to undertake a study of developing digital stories and checking its effectiveness in imparting knowledge to higher stories and checking its effectiveness in imparting knowledge to higher education students.

From the above discussed points, the investigator came to know that digital story telling are being used in education in other countries. Thus, to find out its relevance in Indian education system a research study was undertaken on "Development and effectiveness of digital stories in teaching".

Objectives:

– To develop digital stories on selected successful women from different profession.

– To study the effectiveness of developed digital stories in terms of gain in knowledge amongst the undergraduate students of faculty of family and community sciences.

– To find out significant difference in the effectiveness of digital stories in terms of gain in knowledge with in the students, in relation with following variable:

- Area of study
- Academic achievement
- Medium of instruction

– To study the reaction of selected students towards the developed digital stories.

Assumptions of the study:

Digital storytelling emerged as a teaching medium in formal education.

Null hypotheses:

– There will be no significant gain in knowledge from the developed 'Digital stories', amongst the undergraduate students of Faculty of Family and Community Sciences.

– There will be no significant difference in gain in knowledge among the students in relation to their;

- Academic achievement of previous year.
- Area of study of graduation.

- Medium of instruction at school.

Delimitation of the study:

The study will be limited to undergraduate students who are studying 'Gender and Development' course at Faculty of Family and Community Sciences, The M.S. University of Baroda.

METHODOLOGY

The study was conducted in the academic year 2009-10 using "Pre-post experimental design". The methodology used for the study is described as follows:

Development of digital stories:

Decision on the subject:

The investigator had decided to develop the digital stories for undergraduate students of the faculty of family and community sciences. To decide the topic for developing digital stories, investigator first referred the courses offered to the undergraduate students. After referring the courses, it was found that gender and development course has certain topics on which digital stories could be developed. After listing down the possible topics, investigators selected a topic on which interesting, useful and informative digital stories can be developed. The course outline of gender and development has various sub units like; importance of studying women, status of women (political, health, legal), women, and mass media and national efforts for women. For teaching these topics teacher refers to women achievers who have already made their names in their profession. So, after consulting the teachers, teaching this course, it was decided to develop digital stories on 'successful women of India'.

Following three criteria were kept in mind while finalizing the list of selected women, on whom digital stories can be developed:

– Women should be from different professions.
– Have contributed to the society through her career.
– On student's suggestion.

Finally, following women were selected on whom digital stories were prepared:

- SmtHansa Mehta
- Dr. Kiran Bedi
- Ms. Nandita Das
- Dr. Rameshwari Pandya
- Ms. Sushmita Sen
- Mrs. Vasundhara Raje

Gathering material:

For preparing digital stories three types of material were collected:

- Written matter
- Pictures
- Sound

Creation of storyboard:

Around 30-40 pictures were selected for each story. After this, story was cut down into division and pictures were divided according to that. For each sentence, 2-3 pictures were selected. The storyboard was prepared by the use of power point presentation. It made the process of making digital stories easier and simpler.

Recording voice over and adding music:

Voice over were recorded and edited in sound forge software and background music was added after the recording. Recording was done in parts so that story can be framed easily.

Editing of the stories:

For editing, multimedia software was selected according to the need. Swish was used to edit the stories as it is easy to execute and flexible enough for changes. All the images were brought into the timeline matching the layout of storyboard in Swish software. Voice over was added and according to this, transitions were given to each picture so that the pacing can be done properly. Along with pictures, subtitles were added to the story.

Finally, stories were completed after going through all above steps and ready to give for the validation. They were given to the experts from various field for validation.

Validation and pre-testing of digital stories:

The developed digital stories were given to five experts for the purpose of validation. The experts were professors, lecturers, multimedia experts from the following departments:

– Department of Education; Faculty of Education and Psychology, The Maharaja Sayajirao University of Baroda.

– Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda.

– Department of Human Development and Family Studies, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda.

– Computer Centre of Maharaja Sayajirao University of Baroda.

Experts were requested to check the organization of the content, designing aspects, colours of the font, suitability of subtitles, coordination of pictures, narration

and subtitles and presentation. The pretesting of digital stories was conducted to check its effectiveness and to confirm its appropriateness for level of understanding of the students. The suggested changes were incorporated into final drafts. The modified version was converted into video format. In this way, six digital stories were prepared and were made ready for presentation.

Population and sample of the study:

The population of the study comprised of undergraduate students studying the 'Gender and Development' of Faculty of Family and Community Sciences, Maharja Sayajirao University of Baroda, of the academic year of 2009-10. Since the population was small therefore, all the students were taken as the sample. The sample of the study were students studying "Gender and Development" course. They were second year students of the Department of Extension Communication and third year students of Composite Group. There were twenty-five students in each group but at the time of final experiment, three students of Extension and Communication were absent; so the sample size reduced to forty seven from fifty.

Tools for the data collection:

Different tools were used for collection of data in the present study :

Table 1 : Tools used for data collection for different purposes

Sr. No.	Tool	Purpose
1.	Check list	For collecting students background information
2.	Knowledge test	To obtain pre and post knowledge level of the students about selected successful women from different professions
3.	Reaction scale	To collect reaction of the students about learning through digital stories

Conducting the experiment:

For conducting an experiment, announcement was made through course teacher and researchers to both the groups to watch the digital stories in their class of 'Gender and Development'. Researchers informed the students that, they were selected as the sample of this study. It was shown separately to both the groups. The actual experiment consisted of four steps. Firstly, investigator gave power point presentation on introduction to Digital stories. She explained the meaning, definition, elements, and usage of digital stories. The main purpose of this was to bring familiarity among the students regarding the term 'digital storytelling'. The second step was to administer pre test. It was administered to know the knowledge level of the sample. It included the administration of first part of tool.

After pre-testing, the next step was presentation of digital stories. All prepared digital stories were presented to the students with the use of LCD. Prepared digital stories were shown separately to both the groups. The last step was to administering the post test. Along with this, reaction scales were administered to the students. Post test conducted to obtain the data on knowledge gained by the students whereas reaction scale was used to know the feed back of the students regarding learning through digital stories.

Scoring and categorization:

Categorization of the variables:

Scoring and categorization of variables was done as follows:

Table 2 : Categorization of the variable

Variable	Basis	Categories
Academic achievement	O-B	High academic achievers
(in previous year)	C-E	Low academic achievers
Area of study	-	Extension and
(in graduation)		communication
	-	Composite
Medium of instruction (at	-	Gujarati medium
school)	-	English medium

Maximum and minimum score in knowledge test:

The knowledge test had six sections. Each section consisted of three questions, for which one can get maximum of ten marks and minimum zero mark. Hence, for six sections, the maximum marks one can get is sixty and minimum zero.

Table 3 : Maximum and minimum score in knowledge test

Sr. No.	Basis	Minimum score	Maximum scores
1.	One story	0	10
2.	Grand total/ all stories	0	60

Categorization of gain in knowledge :

The gain in knowledge was categorized as follows :

Item wise intensity indices:

It was calculated for the reactions of the students

Table 4 : Categorization of gain in knowledge

Dependent variable	Basis	Categories
Over all gain in knowledge	Mean and above mean	High scorers
	Below mean	Low scorers

related to different aspects of developed digital stories and for the opinion regarding learning through digital stories.

The range for the item wise intensity indices for all items, having 3 point scale were as follows:

Table 5 : Intensity indices

Range of scores	Categories
2.60-3.00	Great extent
1.60-2.59	Some extent
1.00-1.59	Less extent

Formula used for calculating item wise intensity indices:

$$\text{Itemwise intensity indices} = \frac{\text{Total scores for an item}}{\text{Total number of the students}}$$

Formula used for 't' test:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_{x1} - x2}$$

$$Sx_1 - x_2 = \sqrt{\left[\frac{SS_1 + SS_2}{n_1 + n_2 - 2}\right]\left[\frac{1}{n_1} + \frac{1}{n_2}\right]}$$

where –

SS_1 =Sum of squares for Group 1

SS_2 = Sum of squares for Group 2

n_1= Size of group 1

n_2 = Size of group 2

(Wimmer and Dominick, 2003)

Plan of analysis:

Table 6 : Different statistical measures used for analysis of data

Sr. No.	Purpose	Statistical measures
1.	Background information of the students	Percentage
2.	Effectiveness of digital stories in terms of gain in knowledge amongst the students	t-test, Mean scores, Percentage
3.	Significant difference in effectiveness of digital stories in terms of gain in knowledge amongst the students in relation to following variables: - Academic achievement - Area of study - Medium of instruction	t-test, Mean scores, Percentage

Contd Table 6……..

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4.	Reaction of the students towards digital stories:	
	- Aspects	- Intensity indices
	- Opinion regarding learning through digital stories	- Intensity indices
	- Suggestions of the students for the next digital stories.	- Percentage

OBSERVATIONS AND DISCUSSION

The results obtained were observed in terms of different variables like age, academic achievement and medium of instruction at school. The major finding of the study is that there was significant overall gain in knowledge among the students. It was observed through pre-knowledge test and post knowledge test. The findings are divided into two parts:

Overall gain in knowledge:

Variable wise gain in knowledge:

The purpose was to obtain complete picture about gain in knowledge in view of all the possible variables. The reason is the present result does not look to unitary gain to a specific group of students. But it certainly looks forward to applying the method to all variety of students with diverse socio-cultural background, difference in age group and education. The study has to have a wide base for further application. Hence, the discussion has been presented in two parts.

Overall gain in knowledge:

First, in terms of overall gain in knowledge, students gained higher marks in the post knowledge test. At post test level there the number of high scorers increased from 21 to 25 and number of low scorers marked decreased from 26 to 22. In terms of the percentage at the pre-test, the high scorers were less than fifty per cent whereas the low scorers were remained beyond the fifty per cent of the students. Interestingly, at the post test level, the percentage of high scores increased beyond fifty per cent and low scorers declined below fifty per cent. It means that the students had higher gain in knowledge with increased number.

It means that the digital storytelling method was effective for teaching and learning. The possible reasons for the above findings could be many. The developed digital stories was a unique technology for teaching and learning in formal education system. Watching their role models, live must have entertained the students and caused deep impact on them. The stories might have attracted them

and created curiosity and interest in them to knowing more about the theme digital stories conveyed.

The multimedia technology with its positive impact on learners' minds can lead to better understanding and learning that may stay longer with the learners. Digital stories contain narration, pictures, subtitles and background music. They allow students to listen and see. They provide a better understanding with delight. That was the result that secured higher score in the post knowledge test.

Significant difference in effectiveness of digital stories in terms of gain in knowledge of the students:

Table 7 reveals that at the pre-test level, the mean score of the students remained low with 10 and that at the post-test level, it was 27 which was higher. The t value calculated was 3.45 that indicated higher trend. The t value calculated was significant at 0.01 level. Thus, the difference in the mean scores of the pre-test and post-test level was significant to show that there was considerable gain in knowledge. So, the Null hypothesis that showed that there will be no significant gain in knowledge from the developed 'Digital Stories', amongst the students was not accepted.

Table 7 : t-value showing difference (in mean scores of the students) in measure of pretest and posttest of total students (n=47)

No. of students	Pretest	Posttest	S_{x1-x2}	Df	T value
47	10	27	2.00	45	*3.452

* indicates significant of value at P= 0.01, df=45

Variable wise gain in knowledge:

Once overall gain in knowledge is considered, it becomes necessary to look at the variable wise gain in knowledge. This will provide a better understanding of gain in knowledge through developed digital stories in a wider perspective encompassing all variables noticed about learners.

Academic achievement in previous academic year:

The findings reveals that higher percentage of the high scores was marked with the high achievers at both pre and post test levels. If we compare both results at the pre test and post test levels, we may notice an increase in the number of high scorers in both categories (for the high achievers 8 to 10 and for the low achievers 12 to 15). There was a decrease in number of the low scorers at the post test level from 23 to 20. This means that the gain in knowledge remains higher at post test level in both the categories *i.e.* high achievers and low achievers say from 67 per cent to 83 per cent and 34 per cent to 42 per cent, respectively.

Significant difference in effectiveness of digital stories in terms of gain in knowledge of the students in relation totheir academic achievement :

Table 8 reveals that there was a significant difference in gain in knowledge of the students in relation to their academic achievement. The students who were high academic achievers showed higher gain in knowledge than that by the low academic achievers.

Table 8 : t-Value showing difference in mean scores of the students in relation to their academic achievement (n=47)

Academic achievement	N	Mean score	S_{x1-x2}	df	t value
High academic achievers	12	35	3.61	45	*3.047
Low academic achievers	35	24			

* indicates significance of value at P=t 0.01, DF=45

Thus, the Null hypothesis stating that, there will be no significant difference in the gain in knowledge through digital stories in relation to their academic achievement was not accepted. High achievers show higher gain in knowledge. It was due to high sincerity that they paid to their studies, their self-efficiency to learn, and good retention power. They would achieve higher score even with inadequate teaching learning materials. However, the students reported that the developed digital stories were easy to understand. So, it naturally became easier for the high academic achievers to understand it well and secure higher score in the knowledge test. The entry score of low academic achievers was very low. However, after watching the stories, their scores increased and showed higher gain in knowledge. This indicates the effectiveness of digital stories.

Medium of instruction at school:

The results showed that the majority of the high scorers belonged to the English medium background with 72.7 per cent (eight out of eleven) whereas, students from Gujarati medium background showed more of low scorers with 66.6 per cent (twenty four out of thirty six). However, an increase was noticed in number of high scorers in both the categories from 8 to 11 and 12 to 14, respectively at the post test level, where as the ratio of low scorers has gone down from 3 to 0 and 24 to 22, respectively. This trend indicates that students with English medium background registered higher gain in knowledge as compared to students from Gujarati medium background.

Significant difference in effectiveness of digital stories in terms of gain in knowledge of the students in relation totheir medium of instruction at school:

Table 9 looks at the T value in terms of language through which they had learning at school. Table reveals that there was significant gain in knowledge of the students in learning through digital stories in relation to their medium of instruction in school. The students from English medium had higher gain in knowledge with the mean score of 42 than the students from Gujarati medium could gain. They registered lower score with the mean score of just 25. In the light of above status, the Null hypothesis stating there will be no significant difference in gain in knowledge of the students in learning through digital stories in relation to their medium of instruction in school was not accepted.The specific reason of this observation was that the stories were developed in English language. The students from Gujarati medium school did not possess enough training and skills to understand things in English. At school, they were provided limited exposure to study the English language. So, they might have faced difficulties in understanding the digital stories that were told in English.

Table 9 : t-Value showing difference in mean scores of the students in relation to their medium of instruction (n=47)

Medium of instruction	N	Mean score	S_{x1-x2}	df	t value
English medium	11	42	3.29	45	*5.167
Gujarati medium	36	25			

* indicates significance of value at P= 0.01, df =45

Area of study:

The results also reveal that at pre-test level, higher percentage of high scorers (45.5 per cent) was found with the students of Extension and Communication, whereas in sixteen students of composite group was higher as low scorers with 64 per cent. At post test level, both the groups marked an increase in number of high scorers with twelve and fifteen in number (5.5 per cent and 60 per cent, respectively). In number of low scorers both the groups marked a decrease from 12 to 10 and 16 to 10, respectively fall in percentage. This indicates that, higher gain in knowledge was registered with both the groups at post test level.

Significant difference in effectiveness of digital stories in terms of gain in knowledge of the students in relation totheir area of study at graduation :

Table 10 focuses on variable 'area of study'. It reveals that the closer scores like 28 and 26 in case of both the groups showed no significant difference in gain in knowledge of the students in learning through digital stories in relation to their area of study. It means that they showed equal gain in knowledge irrespective of their area of study. In this sense, the Null hypothesis stating that there will be no significant difference in gain in knowledge of the students in learning through digital stories in relation to their area of study was accepted.

Table 10 : t-Value showing difference in mean scores of the students in relation to their area of study (n=47)

Area of study	N	Mean score	S_{x1-x2}	DF	T value
Extension and communication	22	28	3.35	45	*0.5970 N.S.
Composite	25	26			

*NS=Non-significant

The probable reason for such result would be that, a digital story is a novel medium and it would attract both the groups equally. Hence the students of Extension and Communication Department and composite group showed similar results to indicate that they gained equally from the learning experiences. This indicates the effectiveness of developed digital stories. The video factor with all itscolour and dimension and the audio and the musical parts supplement receiving and understanding on the part of learner with an addition of 'delight' to it. 'Learn with delight' proves effective method even in convention methods of teaching.

Conclusion:

Digital storytelling is found to be effective learning method. It may inspire further research to affect improvements in learning process at schools and colleges. More studies of such kind of educational media development should be taken up to strengthen the educational technology. Digital stories can be developed on different subjects for different target groups. It can be used in formal education system. It should be tested for imparting informal education also. Digital stories can also be produced to impart non-formal education to children in pre-school stage and old age people and women at homes. These stories may be viewed as windows to provide a view of the world at large. They may bring their minds and hearts out of self-assumed confinement.

Production of digital stories on variety of topics related to the curriculum may be tried out. So that learning material becomes more interesting with a huge variety of subjects. Such a material can provide better exposure to students about world of nature, science, and technology, culture

and heritage and routine things about human life.

It may be well considered that the coming days will be the time of computer technology and telecommunications. Children of the future will receive sense of using technology right from their cradles and day care units. As they grow up, they expect harder application of digital technology in shaping their study material and teaching methods at schools and colleges. They are likely to hold a sense that such application would give a modern touch to course curriculum providing the modern requirements. Digital stories and the methods developed thereby may prove an effective initiative in this direction. More research and improvements will render study material and learning experience thereby a more meaningful exercise practicing aptly the 'learning with delight'.

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