Integration of Multi-media Technologies to Facilitate Reflection and Learning, Particularly in the Area of Digital Storytelling

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ABSTRACT: *The development of computer skills by individuals of various ages and backgrounds in this age of mass digital technology has been phenomenal. By combining various digital technologies it is possible to provide the users with an enhanced interface that produces a more attractive, interactive and functional experience for them. Commercial programmes or authoring tools such as iMovie, PowerPoint and/or PhotoStory are not designed in accordance with pedagogical or andagogical purposes, for example not wizard based.*

The main hypothesis associated with this study is that, there are significant benefits to be accrued by the development or viewing of digital stories with regard to enhancing the learning and reflective processes of students within higher education. So the main aim of this study is to ascertain whether this hypothesis is true or not, and report upon the findings from utilising both qualitative and quantitative research methods.

The issue the hypothesis tackles is not easy. To this effect there is a need to develop a Wizard-based digital storytelling tool that helps students develop reflective stories.

The wizard, which is integrated with the story seven elements and encapsulate them, does not only provide technical guidance but more importantly it will direct and support the user in developing a digital story that meets the expectations and structure of what is considered to be appropriate.

There are many technical barriers present in developing a digital story by non-computer literate individuals. The development of a user-friendly tool that supports the creation of these stories is a key component of this study. Tutors /students develop digital stories in different learning subject areas using the same prototype depending upon the users' needs and requirements.

The initial work has concentrated upon the design of an appropriate 'Wizard-based' digital story tool that supports both tutors and students in the development of stories. This tool incorporates the fundamental guidelines for the development of digital stories mapped to various media templates. It is both flexible and powerful making use of an asset library of media objects that can be retrieved by a metadata search engine and are then included within the digital story scenes.

1. Introduction

This study investigates Digital Storytelling as a tool for encouraging reflective learning across various disciplines.

One of the most important aspects of this study is the evaluation of the use of Multimedia technology in developing the teaching of students groups, with particular reference to the area of digital storytelling supporting the pedagogical and andagogical processes for technology based students. All of the above needs will be covered by the development of an appropriate prototype with an easy to use user interface. The user group will be identified within this study and research undertaken to assess their needs with respect to the use of digital stories. The context of this study is higher education; therefore the primary intention here will be to develop ways in which storytelling can be used effectively as a learning and teaching tool within this sector, "*the use of digital storytelling in higher education allows students and staff to express their thoughts and ideas in a different, hopefully creative, way*" [1].

Storytelling has gradually changed throughout history; "*the first stories were told through pictures on walls*" [2], with stories being passed down orally from generation to generation until the present time via the various mediums associated with electronic technology. Denning [3] describes storytelling as being distributive in our lives, "*It has been at the heart of our communications since the beginning of the human race*".

Storytelling gradually became an important pedagogical tool in North America in the nineteenth century. The new German nursery schools brought storytelling as one of their educational tools, and then translated into public libraries [4]. Educators are currently using storytelling with students as a relatively new method of teaching.

2. Method

This study identifies and reports on the current research literature that reflects the impact that digital storytelling is having in the area of teaching and learning in higher education. The Wizard-based digital storytelling tool being developed will assist in creating an appropriate higher education environment and support the assessment of higher order skills.

Developing a media tool is similar to developing anything in this life, which needs planning, analyses and preparations before design. Ohler [5] describes this point as, "*developing a media list is analogous to making a list of everything you need to make a cake before you go shopping for ingredients*". Murray [6] reports that Bell et al [7] describe how a workgroup determines how they can develop an efficient (and repeatable) media production process, they suggest "*a standard instructional design process (ADDIE) as a foundation. ADDIE stands for Analyze (A), Design (D), Develop (D), Implement (I), Evaluate (E)*". (Figure 1) illustrates this process.

Figure 1. ADDIE Process [11]

For this prototype, developing an effective media production for higher education is one of the main project objectives. Ohler [5] concludes that, in order to design a tool that facilitates the production of a digital story, first it will be important to study the basic process of the digital story which will be integrated within this prototype's functionality wizard.

The background research has been accomplished and applied to the development of an appropriate design that meets the needs of developing the digital story tool. Consideration of the functionality of the wizard has also been analysed and the actual implementation of the tool has now commenced.

As a result of the research undertaken it has been identified that the use of multimedia technologies in the learning process have recently been included as a method of improving students' reflective skills, whilst digital storytelling is becoming an important strategy for educators.

From research it has been found that the Seven Elements associated with a digital story will need to be incorporated in the creation of a wizard based tool.

The Seven Elements of Digital Storytelling as taken from Lambert [8] are: 1) Point of View: The perspective of the author; 2) A Dramatic Question: a question that will be answered by the end of the story; 3) Emotional Content: Serious issues happen in a personal and powerful way; 4) The Gift of your Voice: a very personal way, to help the audience understand the context of the story; 5) The Power of the Soundtrack: Proper music or other sounds that can enhance and support the storyline; 6) Economy: using just enough content to tell the story without overloading the viewer with too much information; 7) Pacing: refers to economy and depending on how slowly or quickly is the progress of the story. The need for a Story Map is also an important prerequisite for the tool.

(Figure 2) shows a Story Map that describes the nature of the story elements [9], with transformation of Ohler [5].
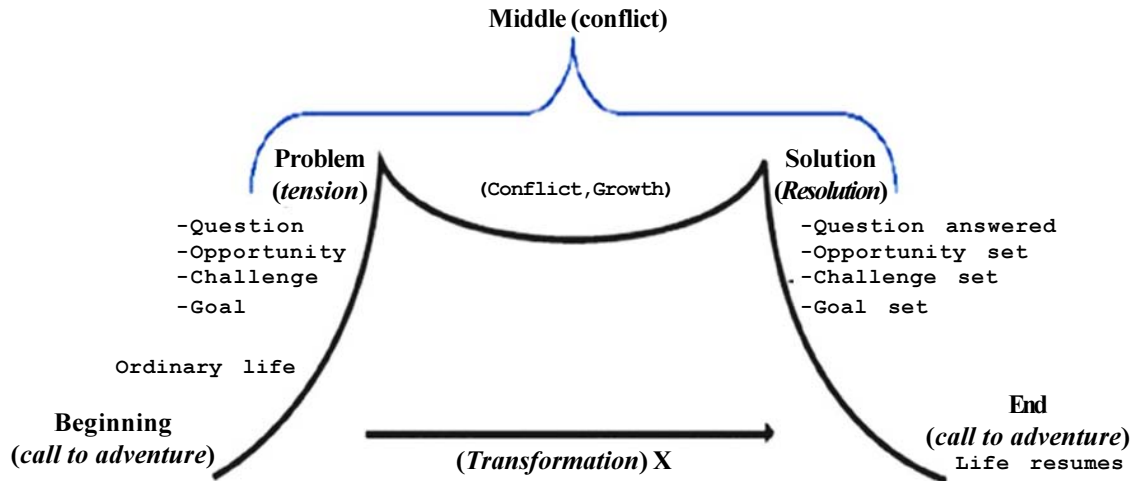

Figure 2. Story Map

The designed prototype is called **Wizard-based digital Storytelling prototype**. It contains a searchable list of items in the prototype library. This library contains a large collection of symbols, objects, images, audio, video, buttons and any other items that may be used for creating the digital stories.

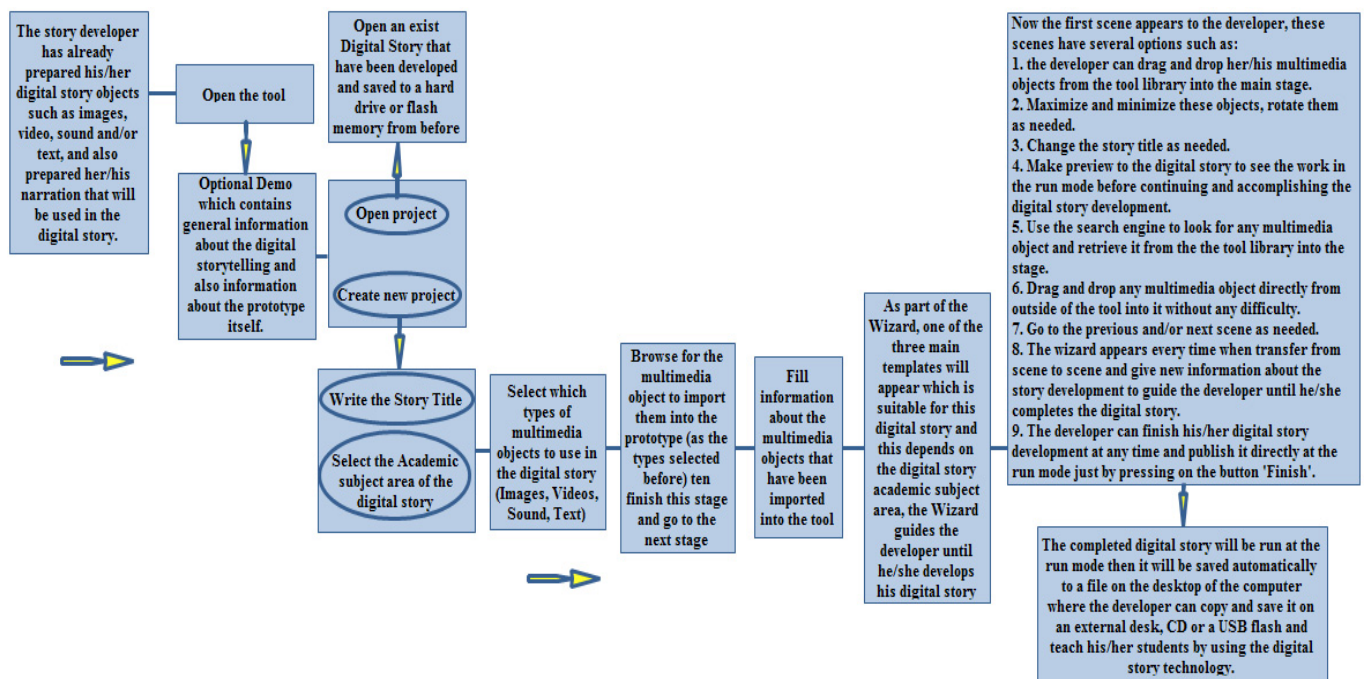(Figure 3) shows the main functionality of the proposed prototype.

Figure 3. The prototype main functionality

One of the main requirements in this prototype is the creation of appropriate templates to support the digital story development. Nanard et al [10] describe templates as "*a bridge for reuse from design to implementation*", while Celentano et al [11] describe them as; "*they are in which the multimedia items can be placed in a coordinated way according to the desired dynamics*". Template design will give a coherent structure which is easy to modify and at the same time "*should not appear repetitive or boring to the user*" [12]. Templates enable the user to interact with the contents and develop interactivity which is one of this prototype's key requirements.

The media items such as video, audio, images and text files can be uploaded from outside of the prototype and also digital story developers can select all or some of their multimedia objects from the prototype library itself according to the user selections, then a template will be created from the retrieved data in spatial and dynamic relationships [11].

An important aspect will be taken into account in this project which is how to retrieve items from the prototype library. In order to be able to easily get these items, it will need to make use of metadata for tagging purpose. Metadata describes the structure and nature of the library content and the relationships between the various parts of the prototype. In this prototype, there will not be a particular LOM standard used; a collection of elements will be used as needed. The multimedia objects are described by means of metadata such as keywords, captions or descriptions, and the retrieval will be performed using annotation-based information retrieval techniques [13]. Keywords such as name, type, date and size, subject area and description can be added in this prototype. (Figure 4) shows a sample of proposed keywords.
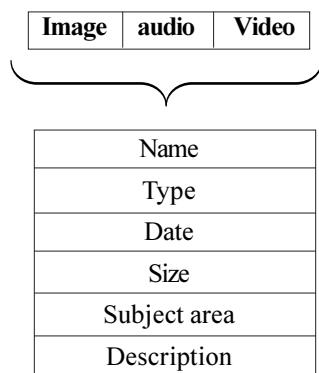
Image	audio	Video

Name
Type
Date
Size
Subject area
Description

Figure 4. The proposed metadata

The wizard included in the tool will follow the steps illustrated below:

1) Select a topic of the story; 2) think of the purpose of your story. Are you trying to inform, convince, provoke, question? Remember why and what do you want the audience to get out of your story; 3) decide on the purpose and **point of view** of your story. Make sure it is personal and to tell your own story or think of how to pretend it's your own story; 4) think about what will make the story a story; write a script which will be used as a narration where you provide a purpose and the point of view you have chosen. Most stories follow the pattern of describing a desire, a need, a problem, a challenge and a goal that must be addressed by you. Try to communicate with every part of your story. You may sometimes forget the story, but always remember the point; 5) in the beginning of your story, the key elements are: information to be demonstrated concerning you as the main character; and a quest is described or begun. The listener should understand who the main character is, sometimes with help from others. Then you should transfer to the middle of the story by defining the character's quest and here also the conflict or problem should be determined, where also exists the character progresses from the problem to the solution; the character learns, grows, and changes. Tension also is increased through the use of conditions that ask for solution. But at the same time in this stage there should be **emotional contents** which should come from the heart and will be a personal decision. At the time you are changing in your story to a certain degree, the listener should feel that the story is ready for closing. You should show here you have completed a full circle; the listener needs to feel that a goal has been reached and the story events have been performed; 6) when the script of the story is ready to be recorded as a narration, if you have decided to add narration over your story, remember that the person making the story should record the '*voiceover*', your **voice is a great gift**. Remember also that the person making the story is the one who should also find his own connection to the material; 7) you have an option here to make storyboarding. You can make your storyboard right on this prototype before beginning your story. A storyboard will speed your work in many ways. It can show you where your voiceover should be cut before you record, and it may help you to determine

if you have too many or too few images chosen before you begin scanning. You can get others, if you wish, to join you in your storyboarding process and make it a collaborative project; 8) the story material is supposed to be incorporated into the appropriate template. Now do you think it will be preferable to add an introduction text to your digital story? This will give an opportunity to show the **dramatic question** especially if you don't have a narration to cover your story, this question will help to set up the attention of audience from the beginning to the end of the story; 9) in this stage you can add the first image, animation, video with a special sound (as needed) on another track to your digital story; the one which you see should be in this position and will be coordinated with the narration. Remember that **economy** is the biggest problem with telling a story. Please realize that the story you would like to tell can be effectively illustrated with a small number of images, video clips and short text. Take into account that your story should not be more than 5 minutes in length. While a '*typical*' digital story which is created by a single person lasts for 2-3 minutes [14] ; 10) you can now add the next images, videos or animation or sounds as needed but take into considerations the regular steps and speed of your digital story. **Pacing** may be the true secret of successful storytelling. The rhythm of a story determines much of what sustains an audience's interest; 11) after finish adding your images, video or text on every scene you can add **background music** which can, by its power, build the mood you want.

This prototype will be developed by using combination of multimedia tools, frameworks and programming languages such as Adobe Flash and ActionScript, XML (Extensible Markup Language), PHP and MySQL.

The end deliverable format: The completed prototype can be delivered using one of the following methods:

1) Application based system: a client machine hosting the application with a library repository holding the various media objects accessible over a network.

2) Web based system with the client being auctioned within a browser and the media object repository residing on the web server. The benefits of incorporating Flash into websites or any platform development can be seen clearly.

3. Conclusion

In order to develop a flexible and usable tool there will be a need to develop appropriate templates and metadata so that the imported learning objects may be incorporated into the system. For the future work once the prototype has been developed it will be evaluated with a particular user group. Appropriate measurement will be undertaken in order to provide both quantitative and qualitative data. A comparative analysis will be undertaken to evaluate the impact that this tool has had upon the learners, both as viewers and developers of the digital stories.

The uniqueness of this study and this system is going to be better than existing systems by the following aspects: 1) The wizard will not only provide technical guidance but will more importantly direct and support the user in developing a Digital Story that meet the expectations and structure of what is considered to be appropriate; 2) The '*I*' part of the created digital story. The users tell their own stories which are from their own past personal experiences or they consider the stories that they are going to tell as if it is from a personal point of view; they pretend these stories belong to them (considered as '*technological role-play*'); 3) Commercial programmes or authoring tools such as iMovie and PowerPoint are not designed in accordance with pedagogical or andagogical purposes, for example not wizard based; 4) Tutors /students develop digital stories in different learning subject areas using the same prototype depending upon the users' needs and requirements.

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