
A Tutored Approach: Flashcard Based Digital Storytelling System

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ABSTRACT

This paper presents the development of a flashcard based digital storytelling system. It is an online interactive application which allows users to describe their experience and express creativity in the form of a digital story. The system was built based on two important concepts that is tutored approach and flashcards; basically, to draw upon the benefits of both. Contrary to other forms of guided learning, tutored approach was applied as it aims to ensure learning to occur by providing an optimal balance between giving and withholding assistance. Conversely, flashcard which has been widely used as a tool to build up student competence in terminology identification, improve students' visual memory, association, and comprehension, was incorporated as an important tool for the design of the application for the user to create their story

Keyword: *digital storytelling; guided learning; tutored approach; illustrated flashcards*

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INTRODUCTION

Storytelling has long been used as a means to educate and entertain children [1]. Traditionally, storytelling has been delivered through spoken words most often to share experience and to enthuse the audience with the desire to do noble deeds [2]. However, the past decades have seen it emerging in a variety of new forms of digital narrative such as web-based stories, interactive stories, hypertext, narrative computer game, QuickTime video, etc [3] [4] where it also emerges in the form of digital media such as digital image, music, video clips, and voice narrative. Some researchers define these as digital storytelling [5]. Basically, digital storytelling is an enhanced way of narrative through the creative use of digital tools

In the recent years, many researches on the model and software development have been carried out with the focus on storytelling creation. The evolution later progresses towards development of more interactive and interesting stories [2]. Currently, the focus is on the technology and platforms used to facilitate and ease the digital storytelling process especially those without programming skill. With respect to content production and the authoring process, many of existing tools are available in the market. For example Flash, Director, 3DS, Maya, Toonz, Virtools, Quest3D, Blender, or GameStudio, are commonly used to create interactive stories multimedia applications and digital games [S. Gobel, 2008]. As many of these are general multimedia tools, many researchers have proposed and developed several models of digital storytelling tools and authoring systems to facilitate the digital storytelling process especially for children [6][1][7][8].

The work proposed in the paper is an attempt to develop a digital storytelling authoring model based on flashcard, a well-known and widely used tool in the learning process especially among young children. So far none of the proposed tools in mentioned earlier or the literature has employed flashcards as a digital storytelling medium. Flashcards is a card containing information, such as words, numbers, and illustration or images, on either or both sides. It is often used in classroom as drills or in private study. It has been shown to be effective as a teaching and learning tool [9]. The involvement of the guide, instructor, parent, and or tutor in the learning process, is considered essential to give support, assistance, motivation, and feedback to the student especially if a learning goal is to be reached. Thus, to *gain the benefits of best worlds*, assistance giving or

tutoring component is also incorporated into the design framework together with the creative use of flashcards.

The paper is organized as follows: Section 2 presents the background literature by first introducing digital storytelling, followed by guided learning and flashcards concepts. Section 3 describes the system conceptual framework. The pilot prototype is presented in Section 4. Section 5 describes the discussion. We conclude the paper with highlights on system current limitation and future direction of work in Section 6.

BACKGROUND

This section provides an overview of the three main concepts that is guided learning, flashcards and storytelling, usually seen as separate entities, to expound on how the strengths of each of these elements can be combined into an idea creation and creative development called flashcard based digital storytelling system build upon on tutored approach.

A. Digital Storytelling

Digital storytelling is the art of combining several graphic elements in an interactive computer entertainment, whose goal is to creation of story-centered application that may become a new medium for expression [10]. Although storytelling is not new, but the idea of digital storytelling is new [11], its approach is simple but powerful to help the learners to make sense of the complex and unordered world of experience by crafting storylines [12][13]. Digital storytelling also has been defined by many researchers as an effective approach to teaching and learning activity [14]. For example, Gils (2005) suggested many advantages of using digital storytelling in education:

- to provide more variation than traditional methods in current practice.
- to personalize learning experience;
- to make explanation or the practicing of certain topics more compelling; to create real life situations in an easy and cheaper way; and
- to improve the involvement of students in the process of learning.

Typically, digital stories are produced in intensive workshops. The product is a 2-5 minute film that combines a narrated piece of personal writing, photographic images and a musical soundtrack. The philosophy behind this type of digital storytelling is one of using technology to enable those without a technical background to produce works that tell a story using moving images and background sound.

Digital storytelling uses computers to create media- rich stories and the internet to share those stories creating communities of common concern on global scale. A digital story begins as a well-develop and closely scripted tale that is blended with images, digital audio and personal narrative and is usually saved in Quicktime format for convenience [15].

B. Guided Learning and Tutored Approach

Most previous works on digital storytelling design provided support for children to freely design their own stories based on the media given. For some learning processes where certain objectives need to be achieved, giving complete autonomy to young children to design their own stories may take them longer to reach the necessary objectives; some may not even achieve them. In such situations, some form of guidance is seen as necessary to help students stay focused on the intended goal of the lesson [16].

Guided learning is often referred to as assistance giving or directed-instruction [17]. According to [18], it is a type of learning where the subject matter has been reduced to the steps which the learner will find manageable and which most of the learning will be acquired by the learner himself by way of self instructional activities. Similarly, guided learning could be perceived as the instructional sequences for the small group student to provide bridge between teaching and independent work [19]. Basically, guided learning refers to the provision of some of form assistance to the student in order to achieve the learning goal.

Based on the amount of guidance given, Borek (2009) categorized guided learning into three approaches: inquiry-learning approach, tutored-approach and direct-instructional approach. The *inquiry-learning* approach provides minimal guidance whereby children doing activity with no hint

and work receiving minimal feedback. The *tutored-approach* is a mid level of assistance in which students receive intelligent tutoring hints and feedback while interacting with the system. The high level guidance of *direct-instructional* approach is when the students were coaxed to follow a specific set of steps. In his study comparing these three approaches, he found that students in the tutored condition performed significantly better on conceptual posttest question than student in the other two conditions, show in figure 1. Based on these results, Borek concluded that the tutored condition is a better guided learning approach compared to the other two approaches. He further assert that student in the tutored condition had just the right amount of assistance and utilized the available assistance only when their need to their best advantage [20]

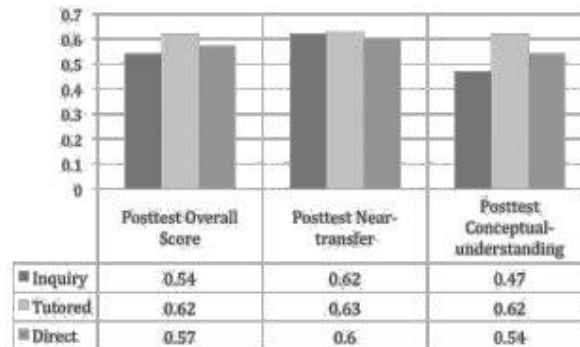


Figure 1 Borek study results were shows that student in the tutored condition did significantly better on conceptual posttest question than student in the other two conditions.

The study shows that tutored condition play an important role in how to develop an effective learning approach. Compared to the two approaches, the tutored condition offers the best balance of giving and withholding assistance. Thus, it works on the basis of initially telling a student what to do and providing feedback when necessary.

According to [21] written in [20], tutored is context sensitive, the tutor takes the pedagogical initiative and guides the student through the system with a structured agenda, uses some explicit instructions and makes sure the user is learning. Benefits of the tutored approach listed by Jaako Hakkulinen and colleagues' include:

- learning happens in a meaningful context.
- student can try things out right away and learn by doing. It is beneficial for constructivist learning. They can develop their thinking and understanding
- students can get supporting feedback on their performance.

Conversely, assistance withholding positively encourage students to think and learn for themselves, make their own decision, and construct their own knowledge. Thus, an optimal balance between tutoring or assistance giving and assistance withholding provided in tutored approach makes this approach a suitable choice to guide the proposed system design. Most importantly, this approach assures learning happens as intended.

C. Flashcard

A flashcard or flash card is any of a set of cards bearing information, as words, numbers, and illustration or images, on either or both sides, used in classroom drills or in private study. Flashcards are widely used as a learning drill to aid memorization by way of spaced repetition [22].

Flashcards also could be use as effective practice to build up student competence in terminology identification [23]. Flashcards have been used since time immemorial and many of flashcards based-projects has been on the rise in the web based environment [24][25] to help children in understanding the alphabets, illustration, foreign languages, vocabulary, and other subject and learning, game purposes. Figure 2 shows the example of current flashcards products that available in the nature for free.



Figure 2 Example of flashcards illustration of family showing grandmother and grandfather happy meeting, and a child playing football

In the real environment, illustrated flashcards are being used in many learning appliances. Some apply illustrated flashcards as a game tool, language learning, and or vocabulary learning. Famous companies like Disney, produce they own traditional paper-based flashcards as the learning and game appliance. One of their flashcard products is “pooh first word”; it is a learning game cards for learning simple English words.

Considering online applications, flashcards have been used as a model in several learning settings. Numerous ideas of flashcards have been developed as a learning appliance. For example the use of flashcards in language learning such kanji learning [24] and French learns [25]. Various ideas were available on the internet particularly by educationists on the use of flashcards in motivating and creating a fun learning environment [26]. Combined with repetition, flashcards help our minds learn facts quickly in the same manner a child learn his first language through exposure and saturation [22].

In her article, Linda Haver, a teacher with 35 years teaching experiences, asserts that flashcards can be a very useful tool to be used with younger children [26]. She further argues that using flashcards can help improve visual memory, association, and comprehension.

Considering the benefits and its wide applicability in the learning environment, flashcards as the digital media or content material in the digital storytelling system appears to be inherently plausible. Through comprehension approach on what topic that they want to elaborate in their story, the media-enriched digital flashcards could play the roles as a tool to motivate young children to generate idea of creating understandable topic of the story. Furthermore, the topic that was developed can be used as the theme idea of creating related story. Thus, the project describes in this paper aim to explore the use of digital flashcards as a medium in digital storytelling. Tutored approach is incorporated in the system design to further guide student through the storytelling process. The developed prototype based on this idea is presented in the next section.

THE SYSTEM CONCEPTUAL FRAMEWORK

The propose framework incorporate the three key element within the digital storytelling design tool, that is assistance giving, flashcards, and assistance withholding. The learner is being the center of the design, it to allow them easier to interact with the information that provided. Figure 3 show the conceptual framework of the system. Whole process of the framework is attaching the tutored condition, which is the student can request for help when they felt need it.

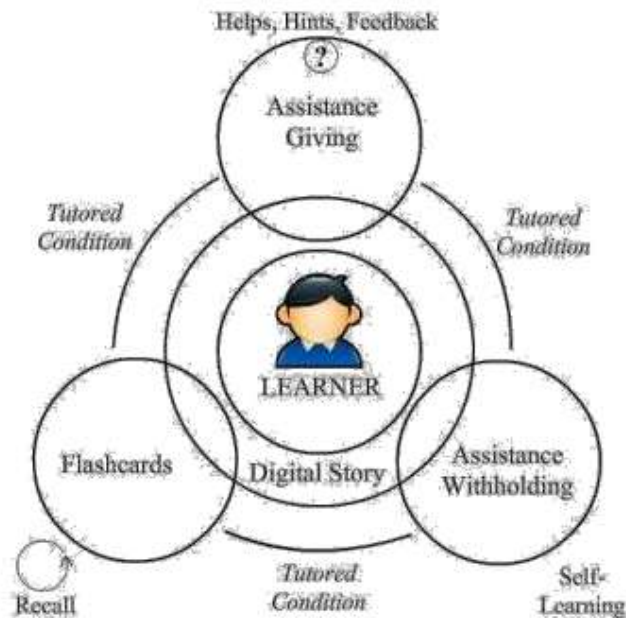


Figure 3 show the conceptual framework of the system

In this system conceptual framework, the tutored condition allows the learner to getting information from all section of elements. Assistance giving is allowing learner to request for helps, hints, and receive feedback on their performance or action. Flashcards is the visual representation that purposed to give the theme of idea, motivation of think through terminology identification, then recall the past experiences, or new idea that learner have to develop it become a digital story. Assistance withholding encourage learner to develop self-learning. In this concept of self-learning mean the learner is encouraged to develop their own idea and creativity through creating story based on illustrated flashcards media.

THE PROTOTYPE APPLICATION

A pilot prototype has been developed to illustrate the idea of the system. The system was implemented using adobe flash software as the main tool to design the interface, terminology, character animation, and interactivity. Beside that the action script 2.0 is really help in developing the functions of drag and drop, sketching, form and menu. In the system side php has used as the platform to build the connection between the graphical user interface and the server side. Php programming code will read the defined variable in action script 2.0 and save it in mysql database for documentation. Such variable below is useful for the php to get the information are posted by the action script 2.0.

```
var frmTopicID;  
var frmSoundID;  
var frmGender;  
var frmInsNameID;
```

The storytelling process provided by the tool is based on a three phases: Registration, Story creation, and Story publication. These phases are further explained next.

Registration phase This phase comprises two main parts: Student registration and story registration. Basically, the first part offers user student registration page to gather user's background information for new user and display login page for existing user. The story registration is further divided into three parts: topic selection, instructor selection and background sound selection. In topic selection, first, the user needs to select the topic of the story from list given. Each topic will be

presented with an associated flashcard to illustrate the topic. The topic of the story will represent the theme idea of the story creation. The audio selection page offers a variety of background music to influence the mood of the story. However, user can opt not to have a background sound. Instructor selection is whereby user can choose their personal tutor from a given selection of images. The selected tutor will be present throughout the whole process to guide story creation.

Story creation This is the main component of the system in which the story is created. In this phase, users are ready to create their story. Users will be presented with a story creation page such as shown in Figure 3. This page comprises of two main areas: card arrangements and card creations. In the card arrangement area, an array of flashcards based on the topic selected by the user will be displayed. Users can select and arrange the cards to create the story. The selection and arrangement of cards would result in different story for different users. When necessary, a click on the tutor image or help menu will provide the users with the guide and feedback needed. The sketchpad is used for the students to create and personalize their own flashcards to be added to their current list. Once the arrangement is complete, the user may proceed to next phase.

Story publication This is the final step of storytelling process in which story will be published into the digital output. The swf file format will be generated as the output, it consists of flashcards slide show, story text, and background sound. The student can run the output file to preview the result or save it in the root of the computer directory.

The prototype interaction is by drag and drop method, sketching and writing or typing within the graphical user interface. List of menu designed to provide the information required and it will be displayed together with the instructor character to build the assistance mode. The selected instructor will define what character to be used as the assistance during the process. Figure 4 shows the current interface of the flashcards based digital storytelling prototype application.



Figure 4 shows the current interface of the flashcards based digital storytelling prototype application.

DISCUSSION

Two sources of guidance are provided by our tool: passive assistance provided by the flashcards and active assistance provided by the instructor within the help menu. The illustrated flashcards naturally provide guide on the creation of an interesting story. It is expected the images or illustrations will assist the user to create the user quickly compared to creating a story from a blank storyboard. This is because the images related to the theme are already provided, what the user needs to do is just arrange the cards. The story could be further enhanced through description and sketches on the story. The illustrations on the cards themselves could also function as an idea generation tool to invoke creative ideas from the users. Future work would include providing user opportunities to compose their own flashcards to add to their story.

The active assistance in this context is equated to a tutored approach highlighted in the preceding section in which guidance is only provided when needed. Thus, when necessary users can actively seek guide and assistance from the help menu function during the storytelling process and the instructor will appear together with the information needed.

The three-phase framework design of the tool allows the users a structured approach to storytelling development. An important benefit of the framework users' creativity is not compromised due to the optimal balance of guide provision and withholding given by tutored

approach. The tool could be useful in the learning process where specific objectives need to be met. The tool's tutored approach concept assists users and ensures the learning objectives. Example, some benefit includes learning happen in meaningful context, student can try things out right away and learn by doing, and then students can get supporting hints and feedback on their performance.

CONCLUSION

The prototype of flashcards based digital storytelling system show how the three elements includes digital storytelling, flashcards, and tutored approach merge together within a system. This approach provides the balancing between the need of guide or assistance and self-learning. The prototype consist of three design concepts of framework includes assistance giving, flashcards, and assistance withholding. That three design concept generate the idea that system will provide the assistance through the assistance giving, recall the idea through illustration on the flashcards, and self-learning allowed by the assistance withholding concept.

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