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DIGITAL STORYTELLING AS AN EDUCATIONAL TOOL FOR CHILDREN LEARNING STEM SUBJECTS

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Digital Storytelling as an Educational Tool for Children Learning STEM Subjects

Synopsis:

This session will provide participants the platform to engage in an interaction on the use of digital storytelling as an educational tool for STEM learning at the Elementary level. We will engage in a conversation of the effect of digital storytelling on children STEM learning in school classroom and out-of-school settings. Results from using digital storytelling in both settings are discussed.

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ABSTRACT

The purpose of this paper is to describe a storytelling approach for enhancing children's expression of their STEM learning experiences via the use of digital devices such as: I-pads, laptops. Stories are vital in the lives of children as it helps them to understand their world and share it with others; this can also be applied to how they learn STEM subjects. Teaching and learning STEM subjects at the Elementary level should be an interesting and memorable experience, this would ingrain basic knowledge of related subjects in the minds of children beneficial to them in their later years especially for those who would choose a STEM career. The digital age we live in affords the possibility of integrating the use of such digital devices in educational settings. The presence of these digital devices therefore enables digital storytelling as a tool for learning and teaching. Also, there exists a plethora of digital storytelling apps that can be run on digital devices to aid children's STEM learning and expression of their learning experiences thereby improving their STEM vocabulary, sharing and presentation with others. Hence, this paper considers digital storytelling as an educational tool for children learning STEM subjects. This is largely because digital storytelling can accommodate the three major learning styles which are: visual, auditory and kinesthetic. The paper explores the use of digital storytelling for STEM Elementary learners

within the age bracket of 5-12 at the kindergarten-5th grade level, in ‘school classroom’ and ‘out-of-school classroom’ settings. Findings show the same effect Digital storytelling has on both learning settings; the children can relieve and express their memories of STEM learning through digital storytelling.

KEYWORDS: Digital storytelling, STEM Elementary learning

INTRODUCTION

The early years are the most important for children, because they are the formative years, so it is vital for current and relevant skill to be imparted at an early age in intellectual development. Childhood educators and neurologists express that the first ten years in a child’s life are a critical time for brain development (Sylvester, 2013). Early years are also viewed as a prime time for cognitive and emotional development. Elementary education has a decisive effect and importance on the evolution and the preparation for life of a person. STEM Literacy in the elementary learning years involves a basic awareness and understanding of concepts and terms in science, technology, engineering and math.

Our complex and changing world demands an adaptable workforce that is prepared to collaboratively reason through problems and come up with creative solutions. STEM education cultivates students’ curiosity and creativity while teaching them to work as a team, base their reasoning on evidence, and solve problems through experimentation. The use of interesting approaches to engage children in learning STEM subjects at an early age can act as a driver in sustaining their STEM interest in their adult years where career-decisions are made which can help build a stronger STEM workforce. Therefore, quality STEM education could sustain or increase the STEM pipeline of individuals preparing for STEM careers (Kennedy & Odell, 2014).

Storytelling is perhaps one of the oldest mediums that humans have used to convey information, transfer knowledge and help make sense of a complex and mysterious world. Storytelling can be a powerful tool for personal learning and self-discovery. Stories have been used to entertain, spark our imaginations, as well as challenge us to think, feel and see the world around us in new ways. The digital age we live in affords us to tell our learning stories via digital storytelling apps on mobile devices such as i-pads and laptops. Digital storytelling differs from conventional storytelling in the sense that it uses information and communication technology as a

means of telling stories (Dorner, Grimm, & Abawi, 2002). By integrating digital storytelling multimedia with written text, digital stories can be used to enhance and accelerate children's comprehension of STEM concepts. This paper therefore considers digital storytelling as an effective educational tool for children learning STEM subjects in 'school classroom' and 'out of classroom' settings.

LITERATURE REVIEW

A host of scholars have defined Digital Story-telling, these definitions focuses on combining the art of storytelling with several multimedia such as text, image, audio, music and video for certain purposes. Robin (2008) suggests that digital storytelling centers on the notion of combining the art of storytelling with various digital multimedia like, images, sound, and video. Robin goes on to list the three major elements of digital storytelling which are: purpose, content, quality multimedia resources and grammar usage. (Ivala, Gachago, & Condy, 2013), define digital storytelling as a group of photos integrated with voice recordings with an exportable factor that extends its reach worldwide.

Digital storytelling has gained even more popularity using web-based tools and blogs among almost every age group in numerous countries around the world (Yuksel-Arslan, Yildirim, & Robin, 2016). Research studies have indicated the benefits of digital storytelling when children compose their own stories about a given topic or subject matter. (Liu, 2011), particularly emphasized how preparing digital storytelling enhances students' creativity. (More, 2008) used digital stories to increase social skills for children with disabilities, and discovered that the children got better in communication skills. (Royer & Richards, 2007) increased students' reading comprehension with digital storytelling, this engaged the students to keep an interest in studying and learning.

STEM learning, including educational instructions using critical-thinking and problem-solving skills can lead to content rich instructions and improvements in the overall achievement of elementary students, cultivating a passion for STEM. A growing body of research suggests that developing science, technology, engineering and math (STEM) proficiency starts early in childhood. The National Association for the Education of Young Children (NAEYC) perceive

early years as learning years stating that engaging children in STEM inquiry can provide helpful starting points for developing reasoning (NAEYC, 2013). Learner's awareness of their spatial skills, the ability to create and manipulate mental images, as well as their ability to apply these skills in problem-solving situations are easily developed at the early years (Weckbacher & Okamoto, 2015).

Children who are intellectually stimulated in their early years by STEM related subjects become easily immersed in scientific inquiry, they develop the desire to experiment and learn more. STEM education in children's early years' centers on science and mathematics and strongly supports learning in the content standards. The heart of STEM concepts involves creativity, curiosity, collaboration and critical thinking for children's intellectual development thereby creating a powerful and exciting link between STEM and childhood learners (Sanders, 2009).

Studies conducted at different grades from primary to higher education have shown that digital storytelling offers a meaningful context for the effective integration of digital technologies in the classroom (Sadik, 2008). Some research studies have also revealed the outcome of using digital storytelling to teach STEM subjects. Casey et al (2008) investigated the benefits of using storytelling to teach geometry to kindergarten students and indicated its usefulness for improving mathematics. A study by Alexander et al., (2015) showed how students used engineering design to develop and revise their final projects, which were digital stories; it allowed students to create a meaningful artifact over an extended period (Alexandria, Ashley, & Danielle, 2015).

Digital storytelling has been used in school classroom settings for various purposes, such as to teach content to the students, to teach writing and to empower students by making them active storytellers. The opportunities to create digital stories in the classroom for children enables them to learn and share their ideas and understanding of STEM concepts with others (Kervin & Mantei, 2015). Children also learn a lot about STEM in a wide variety of out-of-school classroom settings such as afterschool, summer camps, clubs, parks and field trips. These settings build children's learning experiences that reflect and respond to their interest in STEM. The use of digital storytelling can help children capture fun and memorable moments to tell a story about their STEM learning activities via audio, video, apps and other digital storytelling outlets (Kervin , 2016).

RESEARCH OBJECTIVE

The objectives of this research include the following:

- To explore digital storytelling as an educational tool for learning and remembering concepts in science, technology engineering and math at the Elementary level. This would be observed in school classroom and out-of-school settings
- To promote STEM literacy and boost children's interest in STEM subjects by using Digital storytelling as a platform for children to express their thoughts, ideas, creativity and memories of their STEM learning experiences.

RESEARCH METHOD

This research employed a qualitative research design streamlined into an instrumental case study of school classroom and out-of-school settings. The study leverages on collecting data from STEM-based Elementary school and STEM-based out-of-school settings to show how digital storytelling can be considered an effective educational tool to enhance children's STEM learning. The artifacts used for data collection in this study includes: observations, group study, field notes and interviews.

RESULTS

Results from this study shows that Digital storytelling can be viewed as an educational tool that can aid STEM learning concepts in children either school classroom and out-of-school settings. The children's engagement in STEM based activities in these settings led to them relieving their memories and learning experiences via Digital storytelling outlets like video, pictures, writing and music. The children in school classroom could use digital storytelling apps on their i-pads to express their STEM learning experiences after engaging in STEM activities. The children in out-of-school settings could also use digital storytelling apps to relieve their memories of STEM sights and activities on occasions such as field trips to STEM education centers, STEM summer camps and after-school programs. It was discovered that children who actively participate in the creation process of digital storytelling build their information and visual literacy in STEM. The interviewed teachers validated this discovery expressing that incorporating digital storytelling for STEM Elementary learning increased the level of children's interest and literacy in STEM in the following: STEM vocabulary, presentation skills and motivation to learn STEM subjects.

CONCLUSION

Elementary school systems are generally identified as a strong foundation for learning, this study applies this view to STEM learning. The paper considers supporting children to achieve STEM academic success through Digital storytelling. The paper concludes that the use of digital storytelling for STEM Elementary learning in school classroom and out-of-school classroom settings helps children to tell their learning stories in a variety of ways. Children can combine sounds, music, graphics, photograph, writing, artwork as they express their ideas and creativity in a way that engages their auditory, visual and kinesthetic learning skills.

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