

Digital storytelling in the museum: bringing cultural heritage to life

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Abstract

This paper explores the dynamics of digital technologies in the educational realm, based on a case study of the digital workshop ‘Make your Manga Comic’, a family event, which took place at the British Museum. The workshop’s objectives were to inform the visitors about the particular type of Japanese art, teach the basic rules of writing a story and allow them engage with the Sketchbook application on tablets, so as to create their own manga comic. The research explored how technology enables museum visitors to learn about cultural heritage via digital storytelling. The present paper discusses the parameters that affect a museum visit and focusing on the digital experience that empowers visitor to bring art and culture into life through advanced technology.

Introduction

In recent years, museums have welcomed new and innovative approaches to delivering learning outside the classroom and well beyond classroom-based curricula. The rapidly rising number of digital technologies for learning in museums and galleries and, more generally, in informal educational environments, corresponds to visitors’ demand for new ways of interacting with cultural heritage.

Since museums are considered as sites of learning (Hein, 1999) and storytellers in their own right (Bedford 2001; Johnsson 2006), digital technologies are becoming increasingly important and popular for the dissemination of culture. Digital storytelling is one such technology. Up till now several studies (Ohler, 2013; Robin, 2008; Bull & Kajder, 2005) have investigated the effects of digital storytelling, but mostly in the classroom environment. Its introduction to museums is quite new and the available bibliography is relatively limited (Pujol *et al.*, 2012).

Storytelling is an example of the impact digital technologies have on different learning environments, and has been one of the most prominent attempts to modernise the way in which museums host family and school events (e.g. British Museum). This pioneering effort aims to open up exhibitions and to attract visitors of various age groups (Pujol *et al.*, 2012) generating a calm environment which increases the visitor’s confidence (Johnsson, 2006). The central premise is to invite all participants to construct stories through their personal experiences. This has multiple effects; first of all, it broadens communication; secondly, the historical events or exhibits come alive and participants develop a closer understanding for the past (Pujol *et al.*, 2012). Thirdly, digital storytelling creates emotional links that are more profound compared to intellectual understanding (Springer *et al.*, 2004).

Below I provide an overview of my approach to the concept of learning in the museum through the use of digital technologies, followed by a short discussion of the concept of cultural heritage. Subsequently, digital storytelling is discussed as a new way of interaction that makes cultural heritage come alive. Digital storytelling, this paper argues, fosters creativity and makes learning enjoyable for adults but children, the ‘digital natives’ of our era.

Learning in Museums with Digital Technologies

Museums are mostly considered as places where people acquire new knowledge in an informal way through self- directed learning (Hein, 1998). This particular way of learning is generally recognised as autonomous, achieved under the premise of personal responsibility (Brockert and Hiemstra, 1991). In the same vein, free- choice learning (see Falk, 2005) happens when learners

choose their own what, how and when they wish to learn without any other influence. In the museum free-choice learning allows visitors to acquire any sort of knowledge "because they want to, rather than because they have to" (Falk & Dierking, 2000, p. 213).

Over the last two decades, the museum environment has been altered dramatically with the contribution of technology. Technology has managed to introduce advanced forms of interactions, expanding the visitor's experiences with new practices (Wyman *et al.*, 2011). It is worth mentioning that one element which differentiates these venues and makes them unique, is the fact that they enable the visitor to obtain information in an exclusive way, for example, via sensory experiences that impart new information effectively and capture attention more immediately (*ibid.*).

Museums are not confined to exhibiting collections. The advent of digital technologies has transformed them into places of excitement and wonder, that can inspire interest and creativity in all children and young people, and an awareness of the wider world and their place in it, in ways which neither parents nor teachers can provide and that might otherwise remain untapped (Bellamy & Oppenheim, 2009, p. 10).

For learning to occur within a museum, it has to produce a change to the visitor. This change can be minimal and may involve feelings of pleasure, astonishment or shock, or it may be major, resulting in altering future processes of thinking and decision making. Any change that can be placed within this spectrum involves a form of learning. However, according to Rennie and Johnston (2004), the above are not sufficient for a learning process to occur, as the latter is defined as a process that (a) takes time, (b) is personal, and (c) is contextualised.

Let us examine these three premises separately:

Learning takes time - Learning is a continuous and lifelong process which involves connecting old with new knowledge and constructing a new cognitive schema. This operation takes time and an alteration may not happen at once. Hence, it is possible that the influence of a museum visit may manifest itself at some point in the future. It is anybody's guess how much influence a visit may have upon a visitor's life, or how much knowledge a visitor should expect to have acquired after going to a museum. Both depend on the visitor's identity (Falk, 2016), the context of the visit and what occurs each time (Rennie & Johnston, 2004).

Learning is personal - A learner should be engaged mentally, physically or socially in order to 'make meaning' and subsequently to acquire knowledge (Rennie & Johnston, 2004). Meaning making can occur through a process of linking and recalling (Silverman, 1995). Learning can also be assisted by previous experiences through a variety of aspects. It is detected by the person's declarations or by the actions that actually take place (Rennie & Johnston, 2004). In other words, it is generally easier to notice that knowledge has actually been gained by the way people act, behave or talk, for instance when a different opinion is made or once there is an attitude change.

Learning is contextualised – Falk and Dierking (1992) propose three contexts of learning: the personal, the physical and the social. These three interrelate in shaping the visitor's experience in the museum. The personal concerns the individual's prior knowledge and general grasp of the particular field on demonstration, in other words, how much the person already knew about the topic of a specific exhibition prior to the visit. The physical has to do with the museum surrounding, for example, how the exhibition has

been arranged around the halls or how the signs have been posted to facilitate navigating the experience. The social, concerns collaboration; more specifically, how visitors cooperate with each other in relation to a museum's displays. Learning occurs, for example, through having visitors working together on a common task. It is worth adding at this point that creating a friendly environment enhances the motivation for learning. If visitors do not feel relaxed, participation does not happen very easily and it is less likely for them to feel incentivised to acquire new knowledge. Creating an appropriate environment is vital for answering the questions we asked above – the where, with whom or what is happening through a visit at the museum.

Drawing on the above, Rennie and Johnston came to the conclusion that things don't just happen in a context; the context is part of what is happening. The circumstances of a visit, people's needs, interests, and expectations, all help to contextualize what is learned (2004, p. S7). Other studies have highlighted the advantages of digital technologies in making activities based on intellectual traditions and hands-on experimentation. In particular, the use of technologies enhances young participants' creative and critical engagement, improvisational problem-solving, agency, persistence and self-efficacy, and enrich young people's ideas (Blum-Ross *et al.*, 2020). These are exemplified in the work undertaken by Kafai and Burke (2014) where children making stories and animations and sharing them with each other, managed to learn computational thinking and gain a better understanding of the cultural and social nature of digital practices. Peer collaboration is also evident and has the ability to transform the traditional roles of educators and students, allowing participants to reflect and evolve from each other's expertise (Blum-Ross *et al.*, 2020).

Speaking specifically about collaboration, Wilson (1997) points out that the more advantageous and rewarding for visitors museum projects are those which are collaborative in nature. Collaborative learning occurs when two or more people endeavour to learn something together (Dillenbourg, 1999), motivated by seeking information from one another or exchange opinions on the same task. Collaborative learning is premised on the assumption that knowledge can be constructed within the framework of active participation of members who interact in either direct discussions or by sharing experiences. Within the museum environment collaboration can be evidenced when groups of students work together to create an artefact or other product that is linked to their knowledge acquisition (Harding-Smith, 1993).

Cultural Heritage and New Ways of Interacting

Cultural heritage is any "tangible or intangible forms of cultural property", including monuments, sites and artefacts (Teo, Khan & Rahim, 2014, p. 2). These elements often bring to mind sculptures, mosaics, group of buildings, archaeological sites or paintings and, in general, any work that is of exceptional value from a history, art or science point of view (Abdulqawi & Francioni, 2008). However, cultural heritage goes beyond the things that can be touched or seen. There are also immaterial factors such as oral history, traditional craftsmanship and practices or even knowledge that passes from one generation to another, – anything that is inherited (ibid). Culture, values and traditions are among the representative aspects of heritage that connect the past with the present and the future, shaping that way people's identity.

Museums are generally known as places where cultural heritage is preserved. At the dawn of the 21st century, these venues make remarkable attempts with the support of various stakeholders, to open up cultural patrimony to the wider public through the use of the latest technologies. The wide availability and considerable variety of modern technological tools has managed to make information accessible and attractive to the greater population. Some of the new types of

technologies used in the museum environments are the World Wide Web technologies, Augmented Reality (AR), Virtual Reality (VR), tracking devices or different types of interfaces which are combined with interactive techniques (Styliani *et al.*, 2009), such as setting photo spots, discussions or even scavenger hunts.

The use of digital technologies in the museum sector aims to combine education with entertainment (edutainment), as the wider museum philosophy has moved from the passive walk around the exhibits to a more interactive experience. As part of this effort, the conventional way of presenting information has embraced a multimedia approach. For example, the long texts in museums' signs have been replaced, in many cases, with augmented reality environments. The visitor's experience is enhanced through visualization and navigation inside the galleries. Augmented Reality gives visitors the feeling that they can walk around the virtual cultural exhibits as if they stand in the actual environment. This "augmented" feeling of the real-world setting can create an instinctive admission to the cultural content which boosts the influence of the museum collection (Styliani *et al.*, 2009). In other cases the use of AR compliments the museum experience with attractions and real sites outside its confines. As a result it has been noted that there are tourists who wish to visit the actual destination that have experienced in augmented reality, promoting that way the exploration of some 'hidden' sites (Lee *et al.*, 2019).

In the same vein, Virtual Reality assists the recreation of reality for visitors. An interactive experience can provide various levels of immersion, depending on the type of technology. The VR headsets, for instance, or goggles with a special screen in front of the user's eyes, include programmes that can generate the emotion of control, apart from the sensory immersion in the museum surrounding (Styliani *et al.*, 2009). Another recent study by Lee *et al.* (2019) confirms the impact of VR in museums on escapism and aesthetic experiences (immersion) as it can offer a more personalised and tailored cultural heritage involvement. Museums such as the Vatican City and Museo del Prado use VR as a tool to provide the visitors with absorptive experiences (edutainment) and full immersions.

New technologies can provide fresh and novel interactive experiences to visitors in museums. Yet, they can be costly to acquire, develop or upgrade (Pujol *et al.*, 2012). The World Wide Web has been a relatively affordable option in many cases, because it allows museums and galleries to display their exhibitions online in a less expensive way. This widespread use of the World Wide Web as a strategy adopted by institutions benefits visitors, as everyone who has internet access is able to acquire knowledge almost for free and in a fair and accessible manner (Selwyn, 2011). Numerous works of art have now been digitised from museums around the globe, along with virtual collections and digital-born catalogues; all became available to awaken interest and curiosity for learning with a click of a button.

Another important contribution comes from mobile computer technologies, such as a personal digital assistant (PDA), or a cell phone or a tablet. The visitors are able to interact and explore the virtual exhibits from the special designed settings of selected applications (Styliani *et al.*, 2009).

There is a big variety of programmes for handheld devices, such as storytelling, which is the application we discuss below and shows how the portable tablet resource can become an efficient tool for learning. As George-Palilonis notes, 'the goal, at all times, is to make information active, not passive, and invite the user to participate in content and experience' (2013, p. 56). Effective guidance to user plays a significant role in storytelling, especially on the iPad surface, as it enables them to follow the layout of the exhibition to create a desirable outcome (*ibid.*). The applications that combine options for drawing and for personalised stories are mostly favoured by early years users (Hutchison *et al.*, 2012 in Kucirkova *et al.*, 2013). The

touch-screen iPad surface facilitates the interaction for young children, in comparison with a keyboard for example. It is easier for children to deal with this device, as it is portable and light. The easy use allows for unlimited options of communication and enables faculties such as creativity (Dezuanni *et al.*, 2015), which are analysed further in the section below.

Digital Storytelling

The Digital Storytelling Association defines digital storytelling as:

the modern expression of the ancient art of storytelling [...] Throughout history, storytelling has been used to share knowledge, wisdom, and values. Stories have taken many different forms. Stories have been adapted to each successive medium that has emerged, from the circle of the campfire to the silver screen, and now the computer screen (Sadik, 2008, p. 490).

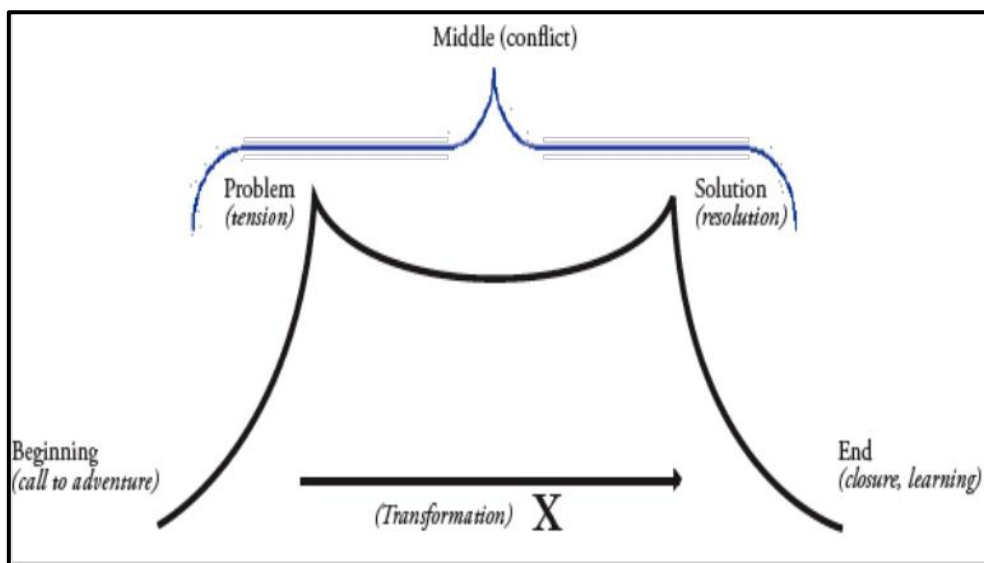


Figure 1. Graphic representation with the basic elements of a story. Source: Ohler, 2007, p.89.

Any story should consist of a beginning, a middle and an end. As can be seen in the figure above, the beginning is the initiation to adventure. The introduction of the main characters and their lives are revealed to the reader at this point. Life is usually interrupted by an unusual event, which leads to the second stage, the middle. The middle is where the problem, the conflict and the solution take place. The main character(s) manages to solve the problem through some sort of transformation. This can be either by learning, and a skill acquisition or a discovery. In the end, the result is closure and the learning that emerges from the whole story (Ohler, 2007).

The story map (Figure 1) leads the flow of the story in order to create a fruitful, captivating but also meaningful experience for the reader. Before moving into the demonstration of the technological tools and settings of such an application, it is crucial that the above elements be understood by the students, so as to create a well-structured and coherent outcome. The aim of the digital storytelling is to combine the framework of oral storytelling with the potential of the power of technology has to offer, yet without letting distraction to intervene in this procedure (Ohler, 2007).

Taking as example one Manga comic, created by a young learner during a workshop at the Samsung Digital Discovery Centre, "*Bob's adventure*" is a characteristic artefact of constructing a digital story.

On the first tile of the story, the young writer introduced the title and the main character, Bob, who has some strange features; no nose and odd feet. He set the scene nicely by explaining to the audience that Bob wondered where everyone was by adding a caption. While Bob was having a tour inside the halls of the British Museum, he quickly realized that the exhibits came alive and started talking. In the middle of the story, the problem that occurred was that, in his mind, “the Romans were chasing him” and made his way to the exit, as the caption implies. However, the Egyptian pharaoh Rameses blocked Bob’s way. The story reaches its peak when the bust of Rameses came to life and says “you will never leave this building Bob”. In the end, Bob managed to escape alive but because he was so tired and confused, he passed out in front of the main entrance of the British Museum.

Taken together, the entire product suggests that the young writer seemed accustomed to applying both the theory and the technology to his creation, as he was used all provided settings. Added to that, his story has a nice flow (a beginning, a middle and an end), a title, captions at the bottom of the pictures, different shapes of bubble speeches with different colours, and five different backgrounds in the six strips.



Several studies (Ohler, 2013; Robin, 2008; Bull & Kajder, 2005) have investigated the effects of the digital storytelling. One particular study (Robin and Pierson, 2005), based on a cultural context, showed that digital storytelling managed to release students’ imagination. In addition, the act of creating meaningful stories improved this experience not only for the learners, but also for the teachers and the educational institution in general.

Among the key objectives of their study was to learn how to use technology meaningfully on a historical topic, in order to simultaneously ‘enliven’ the rigid syllabus and enhance students’ skills. At first, students followed the guidelines given by trained teachers, and soon after the

demonstration of how to best use the technology provided, a collection of insightful digital stories revealed their profound knowledge of the topic. Digital storytelling is a powerful and supportive tool, able to transform the initial raw material of a story into a compelling outcome (Robin and Pierson, 2005). This is particularly relevant for young ‘digital natives’ (Pujol *et al.* 2012) , anyone born after 1980 who has grown up in the digital age, Prensky (2001) further claims that current students are totally different from previous generations and ‘demand’ completely different educational approaches from the existing ones.

Fostering Creativity for Learning

According to Bruner (1990), storytelling is thought to be the most crucial method of human learning. In addition to that it sits at the junction of four learning methods; engagement, project-based learning, reflection for profound learning and the effective incorporation of technology into instruction (Barrett, 2006).

The method of storytelling can be also used for boosting literacy and collaborative skills, critical thinking, communication and construction of knowledge. The production of personalised stories improves a child’s writing skills for example, by introducing new vocabulary which can be identified and retrieved more easily in the future (Mello 2001). Moreover, sharing personalised stories with peers or family members, generates an exceptional approach of communication (*ibid.*). When it comes to family in particular, members choose to spend ‘quality time’ by being involved in creative challenges like this one, as it aims to improve and reconnect their interpersonal relationships (Chitakunye & Takhar, 2014). It is often proved to be a sort of family escape from the daily routine, since nowadays it is quite limited the substantial time of the family as a unit, as everyone is busy either with daily activities or with heavy work schedules.

Creativity can be defined in various ways, due to its multifaceted nature (Runco & Charles, 1993). One definition provided by Lowenfeld & Brittain (1975, p. 61) describes it as “flexibility of thinking, the ability to come up with new ideas, or see things in a new way”. Innovative ideas can be, for instance, artistic products, which are recognised from the experts as having aesthetic, social or scientific value (Vernon, 1989). Creativity is also present in problem-solving and communication (Csikszentmihalyi, 1996). What is also interesting is that it is considered as ‘social glue’ when individuals are exposed to the construction of creative projects that are personally and/or collectively meaningful (Blum-Ross *et al.*, 2020).

When young learners attempt to create their own digital story, they start to research using libraries and/or internet, in order to synthesize a wide range of information. This process trains them on how to handle deep content and consequently learn how to organise their ideas, analyse complex meanings, express various views and construct narratives. The benefits of storytelling as an educational tool are numerous. Storytelling can be used to promote student reflection and emotional intelligence. This can be achieved when students share their work with peers and exchange views, providing constructive feedback by using their critical thinking. At this point, they go from being passive observers to active participants, taking that way control of their learning: ‘Digital storytelling can encourage creativity as well as give students a voice as they use their stories to share their ideas and feelings with others’ (Robin, 2016, p. 19).

Framing creativity in the museum and especially within the area of art, the personnel of Denver Art Museum provides an answer to why creativity matters. The cultivation of art in a creative manner drives the visitors to take what they learned from artists and their creativity and apply it to their own lives. This action has resulted in a translation of the things that experienced and seen at the museum into their own terms (*Research & Reports, Denver Art Museum, 2014*).

Many museums, like Denver and the British Museum, have exclusive rooms and maker spaces, as the Samsung Digital Discovery Centre, which are designed to promote creativity. The website of the Newark Museum of Art (*MakerSPACE | Newark Museum, 2020*) describes the word maker space as:

an interactive area where visitors of all ages play, tinker and create as they make connections between the materials, processes and concepts of artwork and natural science objects in the Museum's collections and their own creativity.

Sometimes though people misconceptualise creativity as a skill. They confuse the drawing ability, as they may not be so good at it, with the actual nature of creativity, and this is what knocks their confidence down (Kelley & Kelley, 2013). Creativity is an independent skill which has no connection with drawing. Among the aims of the digital workshop is to rebuilt the 'affected' creativity confidence of the participants and make them think outside of the box, in order to boost this aspect.

The maker spaces, apart from the creativity aspect, are related with the aspect of "making" things. The process of making, meaning constructing things, is connected with the learning theory of constructivism. It is worth mentioning at this point that much research for the use of technology in the pedagogical realm promotes the method of constructivism. Specifically, Singer & Revenson (1996, p.13) stated that "the child learns by doing". Thus, the personalised construction of visitors' own productions has multiple effects both on learning and on skills. The constructivist pedagogy emphasizes on the concept that learners actively construct their own knowledge and meaning making from their personal experiences. Vygotsky, like Piaget, believe that that individuals who actively construct their own knowledge develop deeper understanding, their knowledge is more generalizable and they are more motivated to learn. The Vygotskian view of learning has, unsurprisingly, implications of how the pedagogical approaches should be designed, including designing with new technologies, through which they aim to facilitate learning. The facilitation of learning can be achieved through the method of scaffolding. The idea behind scaffolding (and hence the name) is that the support, which may be substantial initially, is adjusted depending on the specific needs of the learner at any given point in time and in relation to the specific learning task. Such scaffolding can be gradually added, modified and removed to eventually fade away completely. To be effective, scaffolding needs to involve a range of different strategies which are designed to tease out different ways of thinking on the part of the learner and different forms of knowing in order to figure out a solution independently. A strategy could be the provision of some hints or prompts which will assist the learner to find out the answer on his/ her own (Ackermann, 2001).

Conclusion

The present paper contributes to the growing body of knowledge that drives the continuous improvement of educational practice in museums (O'Leary, 2014). The "digital native" visitors of today's era have been calling for fresh and innovative approaches in the museum realm, moving from two (2D) to three-dimensional (3D) experience, from passive to (inter)active participation. The paper explored the concept of learning within the context of museums through the use of digital technologies. The main argument is that technology can make cultural heritage more accessible and attractive to museum visitors via digital storytelling. The democratisation of knowledge and heritage is now happening, keeping the cost factors relatively low.

The various dynamics of digital technologies during museum workshops can enhance the visitors' sense of control upon the creation of an artefact as well as their active engagement in

the learning process. The innovative techniques, along with the transformative power of technology, make history come alive and further develop soft skills such as creativity and divergent thinking that might otherwise remain untapped.

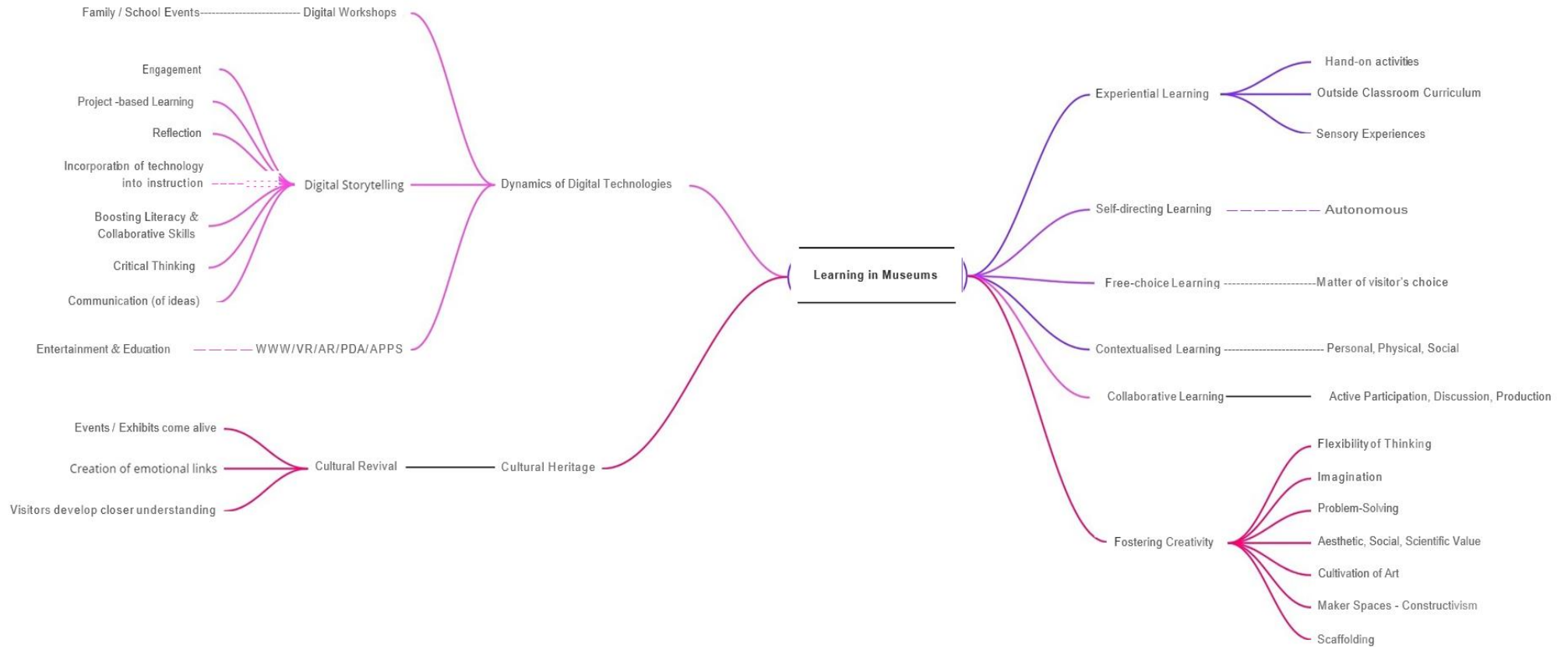
Last but not least, the findings reveal that technology can allow learning and entertainment (learn- tainment) to take place at the same time. Other aspects such as sensory immersion, motivation and imagination manage to trigger visitor's interest to think about the cultural heritage and capture participants' attention during digital workshops, even if they are not initially so interested in art.

Using digital and interactive ways inside museums allow visitors to explore areas that would not normally encounter, gaining a deeper understanding of the various aspects of cultural heritage and, in general, of art and culture.



Figure 2. Infographic representing the key components of the study.

Figure 3. Breakdown structure of the emerged aspects in mind map presentation.



References

- Abdulqawi Y., & Francioni, F., 2008. Part II Commentary, Art.1 Definition of Cultural Heritage. In *The 1972 World Heritage Convention*. Oxford Commentaries on International Law. Oxford University Press.
- Ackermann, E., 2001. Piaget's constructivism, Papert's constructionism: What's the difference. *Future of learning group publication*, 5(3), 438.
- Barrett, H., 2006. Researching and evaluating digital storytelling as a deep learning tool. In C. Crawford, et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2006*, 647–654.
- Bedford, L., 2001. Storytelling: The real work of museums. *Curator: the museum journal*, 44(1), 27-34.
- Bellamy, K. & Oppenheim, C., 2009. *Learning to live: museums, young people and education*, London: Institute for Public Policy Research: National Museum Directors' Conference.
- Blum-Ross et al., 2020. *Enhancing digital literacy and creativity : makerspaces in the early years* / edited by Alicia Blum-Ross, Kristiina Kumpulainen and Jackie Marsh.
- Brockett, R. G. & Hiemstra, R., 1991. *Self-Direction in adult learning: Perspectives on theory, research, and practice*. New York: Routledge.
- Bruner, J., 1990. *Acts of meaning*, Cambridge, Mass: Harvard University Press.
- Bull, G., & Kajder, S., 2005. Digital storytelling in the language arts classroom. *Learning & Leading with Technology*, 32(4), 46-49.
- Chitakunye, P. & Takhar, A., 2014. Consuming family quality time: The role of technological devices at mealtimes. *British Food Journal*, 116(7), 1162–1179.
- Dezuanni, M., Dooley, K., Gattenhof, S., & Knight, L., 2015. *iPads in the early years: Developing literacy and creativity*. Routledge.
- Dillenbourg, P.M.N., 1999. *Collaborative learning: cognitive and computational approaches*, Amsterdam; Oxford: Pergamon.
- Falk, J. H., 2005. Free-choice environmental learning: Framing the discussion. *Environmental Education Research*, 11(3), 265-280.
- Falk, J. H., 2016. *Identity and the museum visitor experience*. Routledge.
- Falk, J. H. & Dierking, L. D., 2000. *Learning from museums: Visitor experiences and the making of meaning*. Walnut Creek, CA: Alta Mira Press.
- Falk, J.H. & Dierking, L. D., 2002. *Lessons without limit : how free-choice learning is transforming education / John H. Falk and Lynn D. Dierking*, Walnut Creek, Calif.: AltaMira Press.
- Falk, J. H., & Dierking, L. D., 1992. *The museum experience*. Washington, DC: Whalesback Books.
- Forbes, N. 2020. 'This Think Paper is one of a collection of Think Papers issued by RICHES in order to stimulate further debate on the issues arising from the research. Research undertaken by the RICHES project covers a range of subject areas including digital libraries, virtual performance, crafts, fashion, technologies and spaces.' Available at: https://ec.europa.eu/futurium/en/system/files/ged/rch_thinkpapers_06.pdf [Accessed 31 August 2020].
- George-Palilonis, J., 2013. Book Review: iPad Design Lab: Storytelling in the Age of the Tablet. *Visual Communication Quarterly*, 20(1), 55–57.
- Harding-Smith, T., 1993. *Learning together: An introduction to collaborative learning*. New York, NY: HarperCollins College Publishers.
- Hein, G.E., 1998. *Learning in the Museum*, London: Taylor and Francis.
- Hein, G. E. ,1999. The constructivist museum. *The educational role of the museum*, 2, 73-79.

- Johnsson, E., 2006. *Telling Tales: A guide to developing effective storytelling programmes for museums*. Museums Hub.
- Kelley, D., & Kelley, T., 2013. *Creative confidence: Unleashing the creative potential within us all*. New York: Crown Business.
- Kucirkova, N., Messer, D., Sheehy, K., & Flewitt, R. (2013). Sharing personalised stories on iPads: A close look at one parent–child interaction. *Literacy*, 47(3), 115-122.
- Lee, H. et al., 2019. Experiencing immersive virtual reality in museums. *Information & management*, 57(5), p.103229.
- Lowenfeld, V., & Brittain, W.L. (1975). *Creative and mental growth* (6th ed.). New York: Macmillan
- MakerSPACE | Newark Museum (2020). Available at: <https://www.newarkmuseum.org/makerspace> (Accessed: 30 August 2020).
- Margaryan, A., Littlejohn, A., & Vojt, G., 2011. Are Digital Natives a Myth or Reality? University Students' Use of Digital Technologies. *Computers & Education*, 56(2), 429–440.
- Mello, R., 2001. The power of storytelling: How oral narrative influences children’s relationships in classrooms. *International Journal of Education and the Arts*, 2(1).
- Ohler, J. B., 2013. *Digital storytelling in the classroom: New media pathways to literacy, learning, and creativity*. Corwin Press.
- Ohler, J., 2007. *Telling your story: A handbook for putting the story into digital (and traditional) storytelling*. Juneau, AK: Brinton Books.
- O’Leary, Z., 2014. *The essential guide to doing your research project* 2nd ed., Los Angeles; London: SAGE.
- Prensky, M., 2001. Digital Natives, Digital Immigrants Part 1. *On the Horizon*, 9(5), 1–6.
- Pujol, L., Roussou, M., Poulou, S., Balet, O., Vayanou, M., & Ioannidis, Y., 2012. Personalizing interactive digital storytelling in archaeological museums: the CHESS project. In *40th annual conference of computer applications and quantitative methods in archaeology*. Amsterdam University Press.
- Rennie, L., & Johnston, D., 2004. The nature of learning and its implications for research on learning from museums. *Science Education*, 88 (Suppl.1), S4-S16.
- Research & Reports | Denver Art Museum (2020). Available at: <https://denverartmuseum.org/about/research-reports> (Accessed: 7 July 2020).
- Robin, B. R., 2008. Digital storytelling: A powerful technology tool for the 21st century classroom. *Theory into practice*, 47(3), 220-228.
- Robin, B. R., 2016. ‘The Power of Digital Storytelling to Support Teaching and Learning’.
- Robin, B., & Pierson, M., 2005. A multilevel approach to using digital storytelling in the classroom. In *Society for Information Technology & Teacher Education International Conference* (pp. 708-716). Association for the Advancement of Computing in Education (AACE).
- Robinson, K., 2011. *Out of our minds: Learning to be creative*. Oxford: Capstone.
- Runco, M.A. & Charles, R.E., 1993. Judgments of originality and appropriateness as predictors of creativity. *Personality and Individual Differences*, 15(5), pp.537–546.
- Sadik, A., 2008. Digital storytelling: A meaningful technology-integrated approach for engaged student learning. *Educational technology research and development*, 56(4), 487-506.
- Selwyn, N., 2016. *Education and technology: Key issues and debates*. Bloomsbury Publishing.
- Singer, D. G., & Revenson, T. A., 1996. *A Piaget primer: How a child thinks*. Madison, CT: International Universities Press.
- Springer, J., Kajder, S., & Brazas, J. B., 2004. Digital storytelling at the National Gallery of Art. In *Proceedings of Museums and the Web*.

- Styliani, S., Liakokapis, F., Kotsakis, K., Patias, P., 2009. Virtual museums, a survey and some issues for consideration. *Journal of cultural Heritage*, 10(4), 520-528.
- Silverman, L. H., 1995. Visitor meaning-making in museums for a new age. *Curator*, 38, 161–170.
- Vernon, P. E., 1989. The nature-nurture problem in creativity. In *Handbook of creativity*, 93-110. Springer US.
- Wilson, B., 1997. *The quiet evolution: Changing the face of arts education*. Los Angeles: Getty Institute for Education in the Arts.
- Wyman, B., Smith, S., Meyers, D., & Godfrey, M., 2011. Digital Storytelling in museums: observations and best practices. *Curator: The Museum Journal*, 54(4), 461-468