



DK1410

Bachelor thesis in Digital Culture and Communication

15 ECTS credit points

Spring 2015

# Leveling-Up With Cultural Heritage

Aspects from Gamification and Alternate Reality Games

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## **Abstract**

This thesis explores how heritage museums can engage more visitors to take part of cultural heritage in context to digital culture, and going deeper in on what implementation of gamification and alternate reality games can contribute with. Through the establishment of how the heritage museum space has changed since the implementation of technology, gives a response concerning new perspective in the experience economy. Connecting Mihaly Csikszentmihalyi's characteristics of flow together with Jane McGonigal's theory of alternate gaming can serve the visitor to invest in their own learning outcomes, thus invest more in cultural heritage. Nevertheless also how visitors can experience cultural heritage as one but at the same time as a community, participating through a common 'goal'.

**Keywords** / Museum / Culture Heritage / Alternate Reality Game / Gamification / Museum Space / Flow / Experience Economy /

*Dedicated to my grandfather, whom after many years of recalcitrant towards digital technology embraced the iPad like an awaited life partner.*

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## 1. Introduction

The impact of technology is one over all well-known phrase since the implementation of various digital tools. Within the heritage museum sphere it is the changing role of information, and collection management that has gotten grave attention, in context to technological methodologies. Whereas the visitors has aided the technology as a responsive character to use in order to connect and interpret their visit. Which has brought the heritage museum sphere to search for notion regarding; space; place; and community in context to technological methodologies that empathizes on visitors experience engagement within the heritage museum.

It is of common belief that virtual and digital installations can pose effectiveness for the heritage museum environment, because they possess high interactivity to support the exhibition with engagement from visitors (Hooper-Greenhill, 2004; Roussou, 2004; Wilson, 2010). Visiting a heritage museum induces engagement with (museum-) rituals and following (museum-) rules, but without any specific impact of adventuress excitement.

Which leads to the first question guiding this research, through changes provided by digital implementation can the visitors be engaged to take part of cultural heritage in context to digital culture?

An argument made by Jane McGonigal (2011) gives dynamics to what a digital implementation can serve with and she stated, “Fun from games arises out of mastery. It arises out of comprehension.... With games, learning is the drug” (McGonigal, 2011, p. 68).

Games over all entail the development of specific; communication culture: planning; decision-making; flexibility; and adaptability skills- through storytelling in order to be

able to master the goals within the game. Games within heritage museum space would then in fact create specific environments for the visitor to experience and thus construct their knowledge, a game in this context would also then let the visitor become a gamer in order for them to immerse the learning and create own hypothesis, testing it, revising and get a subject specific result (Beking, 2013).

Hence, heritage museums tell stories through collections of artifacts, which is shown in explanatory visual narratives, arguable similar to games contexture.

It can therefore be argued that the heritage museum is more than just an information and collection management system, in context to digital aspects it is a platform for cultural practices that can be used to engage more people in intangible- as well as tangible- heritage culture (Dena, 2008; Kindeberg, 2015). Therefore, will this text also raise the research question regarding what the implementations of games, with focus on the terminology of gamification and alternate reality games, can change in how visitors explore exhibitions.

### **1.1 Background**

The heritage museum likely gives denotation to an institution of traditional education and cultural preservation. It is defined as a sector 'for' the visitor but a place where the learning outcomes are mediation via the curators research- and communication plan (Bieldt, 2012; Sorensen, 2012).

Since the computer usage was introduced within the museum sector, during the 1960s, there has been an ongoing effort to find new relations between information systems, which have led the museum sector to continuously change and draw more attitudes from digital communication (Williams, 1987). The computerization has been an auratic

discussion surrounding from; power relation; information processing; to literacy. What is seen to be consistently is the focus on how to look at it from new paradigms, striving to obtain new relationships with visitors. Russo (2012) explains it as, the early museum discourse acknowledges that visitors own knowledge, experiences, and responses frames their own meaning of exhibitions. Therefore, the heritage museum (e.g. cultural sector) as provider of information regarding; cultural background; and heritage have seen the early computers to be status symbols, which could be used to present information from another point of view, and noticeable the computers could also immerse the visitor to consume the information on another level (Borgni, Avizzano, Evangelista, & Bergamasco, 1999).

Together with the digital evolution and the cross-over from Web 1.0, where the user-experience is seen as very passive and the user is also referred as a consumer, to Web 2.0, whereas the user has got a new place in the digital world, a participant and as content provider. The Web 2.0 is cited to be 'architecture of participation' to bring the user out of the shadows in which they actually becomes the curators (Simon, 2006). Nina Simon (2010) argues that:

Participation is just one design technique among many, one with a particular ability to enhance the social experience of the institution. Implementing participatory techniques requires some changes to institutional perspectives on authority and audience roles. (p. )

As a sector for the visitor the heritage museum needs to acknowledge their visitors as active agents to create dynamic platforms of information sharing.

## **2. From Traditional Museum to Media Museum**

### **2.1 Computerization as an auratic discussion**

Early on the technology had arguable potential in the museum sector but as the computers were integrated in the visitors surroundings the questions regarding new

relation paradigms drew the attention. These concerned the impact of technology within the museum sphere (e.g. Museum sector), and questioning if the relation establishment and interplay was stagnating when using new technology, and therefore not “following the ‘rules’ concerning social interaction, space and time, available for the visitor” (Bandelli, 1999, p.149). In focus is the assumption of ‘the real deal’, the auratic experience, with aspects from Benjamin’s theory (1936) about ‘the aura’ surrounding museum objects, where the auratic perception is presented in the connected feeling the visitor experience when interacting with exhibits. Visiting a museum is seen as a social event, not just looking at artefacts- rather talking about them and feeling the impact, where the visitor is not seeing their visit as a learning experience. It has thus been acknowledged and argued that the museum space is a unique environment for learning but without any actual evidence of learning impact. The traditional cultural mediation, and the museum space has a linear connotation to itself, in other words going from one room to another where the information meets the visitor but might not be subject-specific (Hooper-Greenhill, 2004; Kindeberg, 2015). Hooper-Greenhill (2004) describes that learning within museum should include a development of knowledge and understanding to become a personal world for the subject (visitor), changing and creating generic outcomes for the given information (Hooper-Greenhill, 2004).

Like visiting the Louvre in Paris to see Mona-Lisa, an exceptional example of traditional museum interplay. When visiting the visitor already have decided of why they are there, to see the well-known painting made by Da Vinci. With high expectations visitors walk around looking at other paintings but that specific experience is cluttered with the thoughts of- and search for- The Mona-Lisa, the mind is already set concerning expectations surrounding the experience economy. With expectations to feel the impact

caressing when gazing at the famous painting, and conclude with ourselves that it was a totally different experience when gazing at the original 'real-deal' painting, rather than other reproductions.

A slightly big crowd starts to emerge in front of the visitors, inside the Louvre, and they know what will meet them, that mystical smile. Once gazed upon the purpose of visiting The Louvre has been reached but the connection with the space or any information has not given any opportunity, rather left a numb effect from the communication, an anticlimax.

Analyzing my personal visit gives a notion that I could have settled with gazing at it and retrieving that information from home or other remote location. Probably a notion I had before entering The Louvre, but it still did not stop me, or many other tourists.

The changing role of information and information infrastructures in this context shows that technology approaches have changed the auratic approach, yes, but nevertheless rather evolved itself together with society, creating higher expectation values, also argued by Marshall McLuhan (1964) (Roberts, 2001).

## **2.2 Cultural Turn in Context to Digitization**

The changing role of information within heritage museum connected to digital aspects noticed in Andrew Roberts study (2001), see Table 1, underlines a connection between the rising implementation of technology, and higher visitor expectations. As in other fields of digitization the technology drive out the search for new possible duties within the concerning field but as well mobility, in this context this phase has brought along a lot of change over a short period of time, in fact during only five decades.

When looking at it from the heritage museum sphere, mobility has over the years given the visitors a role of importance concerning perception of information and knowledge,

where it is not longer a question of a higher instance possessing the knowledge and paying it forward (i.e. teacher-student, museum-visitor). Rather interplay of instances, sharing- experiences, information, and knowledge. When acknowledged, the study shows that the digital implementation within the heritage museum sphere has almost all along been forced, not a natural response, rather a provision of ‘online’ media engagement (Wilson, 2011). Which have left traces of ‘forcing’ the technology to be a part of the experience without further evaluation of what it may bring to the table, to a point where the museum only see to their own existence ‘online’. Which was discovered during the digital implementation – the belief that it will provide greater access to exhibitions (Wilson, 2011; Roberts, 2001).

This brings out critical points of views regarding how to approach an interaction with these new digital resources, whereas the heritage museum sector has met challenges with seizing the understanding of how visitors consume digital objects (Parry, 2005). Hence, it was acknowledged that visitors was bringing their own knowledge to the museum with requests of respondents, which can be traced to the visitors usage of technology in the everyday life whereas the visitors brings expectations about how they will be able to use the technology advances within the museum sphere, therefore changing the traditional museum discourse of cultural- value and object (Wilson, 2011). Looking back to draw aspects from Benjamin’s theory (1936) about ‘the aura’ gives a demonstrative view of why the museum sector has been faced with challenges during this rapid digitization, accordingly to him, the aura of objects can be challenged with use of technologies. Thus, he argues that use of new media would separate the subject (visitor) from the object, and create a gap in context to experience. Whereas Ross Parry (2005), in context to digitization, calls it a cultural turn:

Movement within a subject towards the theories and approaches of cultural studies and sociology, a condition in which culture, and a number of related concepts, have become simultaneously both the dominant topic and most productive intellectual resources in ways that lead us to rewrite our understanding of life in the modern world. (p.341)

Applied in a/this 'free and open' society, digital technologies have led this generation to give (e.g. serve) the subject an opportunity to be the creator as well as the consumer, connected to what is called in context, cultural participation. Defined by UNESCO (2009) as, "Cultural practices that may involve consumption as well as activities that are undertaken within the community, reflecting quality of life, traditions and beliefs" (UNESCO, 2009). Then giving result of a new direction of culture, which once again draws attention to Benjamin's argument, rather establishing new relationships with the visitor through the experience in interacting with the narratives of the specific cultural heritage. Nevertheless bringing the visitors out of the shadows to become more visible, then the cultural turn also can be seen as the digital transformation within the heritage museum sector, which is creating new interrelations between heritage culture and technology, drawing upon Marshall McLuhan's theory (1964) concerning that one (new) medium can never replace another, rather enhance its predecessor.

**Table 1:**

	<b>Influences</b>	<b>Responses</b>
<b>1970s</b>	<ul style="list-style-type: none"><li>- Availability of large-scale IT systems, works towards organizational change and role specialization in the public sector.</li></ul>	<ul style="list-style-type: none"><li>- Priority on cataloguing; development and small-use of computer systems. Where staff is responsible for the documentations.</li></ul>
<b>1980s</b>	<ul style="list-style-type: none"><li>- Need for public bodies to demonstrate effectiveness, availability of in-house IT systems (microcomputers).</li><li>- Acceleration of role specialization.</li></ul>	<ul style="list-style-type: none"><li>- More active collections management, growing use of external computer service.</li><li>- Tentative use of in-house computers.</li></ul>
<b>1990s</b>	<ul style="list-style-type: none"><li>- Government and public perception of the importance of an information society, and changes in visitor expectations.</li></ul>	<ul style="list-style-type: none"><li>- Increase in use of computer systems, and effective collection management.</li><li>- Job mobility, and progression within the information profession.</li><li>- Changes in expectations.</li></ul>
<b>2000s</b>	<ul style="list-style-type: none"><li>- Pervasive use of computer and net works.</li><li>- Public expectation for access to information.</li><li>- Convergence of museum, library and archive interests.</li></ul>	<ul style="list-style-type: none"><li>- Move from inventory focus to information focus.</li><li>- Delivery of information access resources.</li><li>- Supporting the use of network and information by staff and users.</li><li>- Emphasis on in-house training.</li></ul>

### **2.3 Challenges with the Cultural Turn; Technology Trap**

With the focus on the technological change (shown in Table 1), still empathizing that the technology ‘revolutions’ are changing relatively fast may thus entail challenges or issues throughout the information transitions within the heritage museums.

Discussions concerning the paradigm shifts of -environment, -technologies, and -relations have been highlighted in context to the interrelation between technology and culture, with emerging questions, in this context, concerning if technological use is always seen as a positive act, regarding when and where to apply possible technology (e.g. digital media) in context, thereof positioning issues around the performance, or new directions for the heritage museum sphere when implementing technology (Besser, 1997; Pruulmann-Vengerfeldt, et al, 2013). Tomislav Sola (1997) presented a theory called, technology trap, when museums (can also be applied to the cultural sector over all) pursue the use of technology for its own sake. This theory gives a complex view of the cultural turn, where the technology is used as a way to promote the culture as a hands-on activity, hence the use as an information and knowledge transmitter is blurred when the museum sector forget the purpose of using digital media (Sola, 1997). Taking ViS's (world heritages in Sweden)[1] work together with ICOMOS (agency to UNESCOs culture and environmental matters for the world heritage convention) in Karlskrona, Sweden, during the world heritage day in 2013 as example in this context, where they under the #hashtag; #endagivarldsarvet created a photomontage event over Instagram to bring people closer to the world heritage. They were encouraging visitors to share their experience and be chosen as one out of many co-creators to have their image shown on monitors around Sweden's world heritage sites.

Without sounding condescending, out of approximately nine million inhabitants in Sweden there are only 1096 posts on Instagram with the #endagivarldsarvet.

Region Skåne's (Sweden) project concerning 'Developer in Residence & Experience Design Methods in Museums' (2015) – design methodology applied for digital solutions facing museum visitors, noted that there is a critical point when

museums overconfidence in what can be accomplished with digital solutions. Argued that digital solutions are only tools to create information environments, and with lack of purpose will have problems slowly occurring (Kindeberg, 2015). Just because there is a way to integrate and use digital media (like in previous example) does not say that it is the right medium for the purpose.

This can be one stagnating interplay result noted earlier, when searching frequently to find relation establishment and interplay with the 'help' from technology found in everyday-life. Which leaves arguable traces of an emerging counter-effect towards the digital media used in this context. It can therefore be argued that the interlace of digital-, and social- media with our daily tasks or life has affected how we react when applied outside of our natural comfort zone, hence the usage in context is being revised prior to use. Thus, also then seen as a new form of social stratification (Lauristin, 2013).

Which then entails that aid for fun; playful; educational platform discourse that draws the visitors attention, and creates another dimension within the physical space.

Parry (2005) acknowledges and argues for that technological use in context (e.g. documentation databases, and in-house computers) could in fact be called and used as 'knowledge environments' (p. 340) i.e. global access to culture that 'new' media in particular provide. This concept reinforces the technological convergence as a way to build new bridges between visitors and objects, and the paradigm of experience.

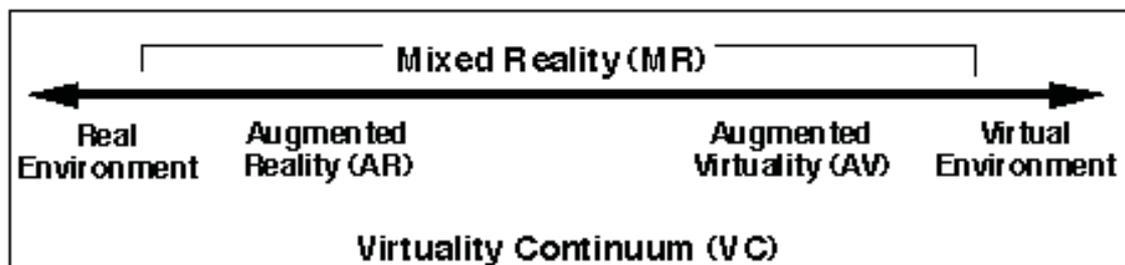
Where the thought of knowledge process within the heritage museum can help the visitors to use their (museums) recourses by creating 'forums' for dialogue, like a game-space. Where the information connected within the game can raise- and encourage- gamers (visitors) to construct their own knowledge as they experience, negotiate and reflect over given information (Beking, 2013).

### 3. Augmented Reality to Serious Gaming in the Real World

#### 3.1 AR- New Perspective on the Experience Economy

Virtual Reality (VR) is one field, in context, as a result of what the ‘new’ heritage museum sector has applied as a possible way to look for other paradigms to give experience and information to the visitors. This through the approach of mixed reality, stated by Paul Miligram (1994), where the Real Environment, world consisting of real objects that can be touched and felt, and the Virtual Environment, world consisting out of digital production and viewed from a digital system, are two ends of a continuum (Figure. 1), and together creates a synthetic world where real- and fiction- worlds are mixed to immerse the user within. Between these, Augmented Reality (AR) is on of the most recognized area, a term used for an approach in which the real environment is augmented with virtual objects (Miligram, 1994). Thus, layering and embedding the users view of the real world with visual information from coordinate- and visual-triggers, via use of an extern virtual platform, to reach the goals of interaction and total immersion. In other words ‘enhancing’ the reality to get maximum possible outreach when adopting this transmedia strategy within digital communication.

Figure. 1



Together with the introduction of smartphones the AR approach has opened up for new dimensions within learning, and paradigms of knowledge environments where the relationship between the subject and object, but also object and physical space has framed spatial solutions (Orhun, 2012). In contrast to traditional museum exhibitions, and its linear space, which calls to its experience process that takes place in a certain setting, the transmedia strategy entails new perspective on the experience economy. Thus, walls are not just walls, paintings are not just painting, and buildings are not just buildings – they actually carry stories, cultural value, and meaning. Hence, it is then acquired by the subject to interact, investigate, create, and play which is brought out by our digital communication today (Russo, 2013).

The experience itself is connected to the habitus, determined by the personal structures that are shaped by prior knowledge, and past events. Neither a result of free will, nor determined by structures, a kind of interplay between the two over time (Bourdieu 1984, p. 170), but digital media helps us understand new places (e.g. Google maps and other similar applications), which also helps us to construct new places (e.g. cameras) (Sandvik, 2012). It is therefore not strange that the implementation of AR has been greeted with open arms, it is in our ‘digital DNA’ of wanting to use digital media to guide us via the feeling of being in control by touching the screen and moving the device, to juxtapose the experience.

Because of the subject’s experience within a museum will occur in certain settings of interaction, and can therefore be rejected; The pursuit is therefore to have the subject enjoy the experience without knowing they are working for it, whereas the augmented space within the museums space can give opportunities for visitors to rethink the practice of understanding compelling information, thus interacting immediately with the physical

space by immersion from virtual aspects. Argued by Manovich (2006) as, "...Cellspace technologies (mobile media, wireless media, or location-based media) delivering data to the mobile physical space dwellers. Celspace is physical space..." (p. 221), creating a physical experience with enjoyment aspects in a new way to communicate (Manovich, 2006).

### **3.2 Characteristics of Flow in Museum Space**

Enjoyment and intrinsic motivation, presented by Mihaly Csikszentmihalyi (1975), applied in context to (the museums new perspective on) the experience economy would give its process to become linked to a rewarding stimuli also called, in Csikszentmihalyi (1975) study, flow – a state of 'happiness' in which the behavior patterns become built upon, following:

In the flow state, action follows upon action according to an internal logic that seems to need no conscious intervention by the actor. He experiences it as a unified flowing from one moment to the next, in which he is in control of his actions, and in which there is little distinction between self and environment. (p. 36)

Subjects in this state are aware of its actions but not itself, which would be optimal for the heritage museums linear space, but then the flow needs to be maintained to keep the subject in state and not paying attention to its awareness.

Csikszentmihalyi (1975) also mention self-forgetfulness as an important characteristic of flow as, "the loss of ego...does not mean, however, that in flow a person loses touch with his own physical reality... one becomes more intensely aware of internal process" (p. 42-43). Often when doing something that has been predetermined, like walking through an exhibition, does not require or accept any freely rules. This paradoxical feeling regarding,

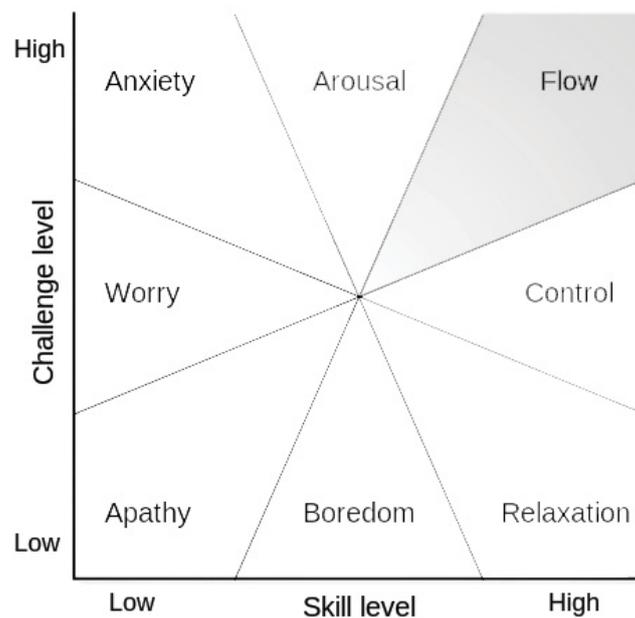
‘ongoing’, restriction without being in control over the environment (knowledge) is what awakening the subject from its state of flow in the museum space.

Csikszentmihalyi acknowledge activities such as chess, basketball, rock climbing, and dancing because of the fact that they are intertwined with performance where the attention is centered with the help from ‘rules’. Applying flow in the heritage museums physical space demands awareness directed to stimulus collected from structures of game work (like the activities mentioned above) that entails real enjoyment like self-chosen activities. Thus, he found that enjoyment of an actual task is irrelevant; it is the things that we must do that cannot become enjoyable. It is not until the task becomes meaningful to us or even rewarding that it becomes motivational and later enjoyable. This complexity is shared with how games are defined through four traits: Goal, Rules, Feedback System, and Voluntary Participation. According to Jane McGonigal (2011) in her book *Reality is Broken*; “Compared with games, reality is too easy. Games challenges us with voluntary obstacles and help us put our personal strengths to better use” (p. 22). Figure 2, below, illustrates how flow more likely will occur when the given activity is at a higher level of challenge, and also that the active person has an above average skill. The flow theory’s (see Figure. 2) techniques in the set of a heritage museums constrained space can show how it can derive the visit to become more of an social active event to stimulate the ability to perform the experience via commitment. An example of how it would work in praxis give Richard Bartle’s (1996) taxonomy on gamer personalities within Multi-User Dungeons (MUDs), a role-playing environment, and can according to Bartle be considerable applied in non-game situations. This taxonomy is built upon four typical ‘gamer’ personalities that can be found in this context; Achievers, Explorers, Socialisers, and Killers (Bartle, 1996, p. 2-5).

- Achievers: Players that are set out to find goals for themselves within the game.
- Explorers: Players that are experimenting within the game to find all secrets.
- Socialisers: Players that are using the game as a communication platform, for social interaction.
- Killers: Players that drives their number one enjoyment from defeating others.

Within the game-community players are identified with one personality and interact different accordingly to interactions with other gamer-personalities. When it comes to these personalities in non-game environment a person occupy small amounts of all gamer-personalities, and adapt their personality according to the occasion (Bartle, 1996). In context to the heritage museum experience, alternated as activity, can this taxonomy together with flow theory and AR create simulations to motivate the subject through social interactions within the museum space. Thus, source out the flow state within the visitors with the help from a game environment to challenge them to take on a meaningful role in their own learning, and identify their personality that will drive that absorbing of knowledge (Bartle, 1996; Csikszentmihalyi, 1975; McGonigal, 2011).

**Figure. 2**



### **3.3 21<sup>st</sup> Century Skills**

The dynamics of games (digital; computer; TV; online) are to serve the user with educational outcomes in which are argued to have long lasting results because games are during the (play-) time motivating the user to become active learners, B.J Fogg (2003) stated; “.. computers.. a host of persuasion dynamics that are collectively described as social influence- the type of influence that arises from social situations” (p. 90). Together with Jane McGonigal’s (2011) argument; that “Games motivate us to participate more fully in whatever we’re doing” (p. 124) gives a notion about how important it has become to give the subject an active choice to be a providing part of its own learning and knowledge process. But foremost to be self-motivated, also called by McGonigal a wholehearted participant (Fogg, 2003; McGonigal, 2011).

Similar to the metaphor; a carrot on a string in front of a horse will keep it going, ‘we’ the users needs to be motivated by external ‘rewards’ to participate and feel in control.

With Bartle's taxonomy in consideration we need other gamers in the surroundings to reassure our own gamer-personality, otherwise arguable only reached with interplay from digital media, whereas the affiliation study by B.J Fogg (2003) also shows that people are more willingly persuaded by computer technology that are somehow similar to themselves, like a companion or teammate. Bringing this into context of smartphones, today's center medium, which in other words are seen as a reflection of our personality with personalized; menus; apps; contacts of choice; saved messages; photos etc., shows through Fogg's (2003) arguments that digital media, "can motivate through conveying ostensible emotions" (p. 100). Also exposed in a 'new digital phenomenon' where if someone cannot reassure our personality or motivate it we turn to our smartphones, how many times in awkward-, embarrassing-, or to compelling-situation has the smartphone become an reflection of our personality- compatible to a real companion.

### **3.4 Gamification as Result of 21<sup>st</sup> Century Skills**

Nick Pelling (2002), a British computer programmer, coined Gamification after the search to use games user-interface on commercial electronic devices, and explains it; "applying game-like accelerated user interface design to make electronic transactions both enjoyable and fast...I wanted to build physical things and to make them fun and effective to use", in other words a concept of gaming applied in a non-game environment. Hence, applying game designer's technique to use the state of flow and guide the user through tasks with an active approach.

Looking closer at the gamification discourse gives a comprehensive approach to its assimilation over a broad spectrum; do to the fact of the digital surrounding.

Kickemeier-Rust and Dietrich (2012) explains it to be because of the changing 21<sup>st</sup> century skills that involves, “meta skills such as problem solving, non-linear thinking, creativity, or communication skills” (p. 680), users are more influenced by the technology and can transition their beneficial- experience, -rewards, and collateral learning faster. Thus, it is not a coincidence that the implementation of game-thinking in non-game environment has risen. According to Michael Zyda (2005) the experiences with digital-game natives, focused on those who have grown up with the (video, computer) game culture, can offer a lot of positive benefits within game-centered learning, and education (Kickemeier-Rust and Dietrich, 2012; Zyda, 2005).

Arguable by Zyda (2005) used as a knowledge/learning-environment it is referred as serious gaming, and defined as, “... mental contest, played with a computer in accordance with specific rules, that uses entertainment to further government or corporate training, education, health, public policy, and strategic communication objectives” (p. 26). Created as a regular game with a story, a software platform, and artistic features that involves pedagogy, together with low notion of education rather entertainment principles, noted from three distinguish areas; cognitive; emotional; social (Lee, & Hammer, 2011; Zyda, 2005). Where it is emphasized that used technology will provide and fulfill wider acceptance among the users.

Thus, the games provide system of rules to guide the player through exploration, experimentation, and mastery, which during the time evoke emotions (joy, frustration, optimism ect.) assembled with the adaptation of roles in order to make decisions valid for game results. Virtual Heroes [2], is a company dedicated to create video games for non-entertainment domains, where they explain their games to be representations of real life events that demonstrate physical or simulated phenomenon or process. The most

recognized one is America's Army (2002), created for the US Army and used as simulations training for military.

Relating the aspects of serious gaming to something that is closer to hand, and used over a wider gamer-spectrum, is the 2013 most downloaded application, with over 500 million active users worldwide, Candy Crush Saga.

### Candy Crush Saga [3]

Application- based (iOS & Android) game, built upon puzzle- and match-three logic. Each level are filled with colorful candies that are supposed to be moved around by swapping places of the candies vertical or horizontal within certain moves to reach a given goal (collect-; a certain amount; within time; serial matching) to be able to move on to the next level. Some levels may also contain some extra obstacles, like clearing chocolate or jelly, which will entail rewards in form of extra boosters to help finish levels faster.

Looking at Candy Crush Saga as a comparison to other games in the same category, like Bejeweled, does not give any indication of why this game has imprinted so on the mass. But analyzing from the gamification techniques presented by Lee & Hammer (2011) shows arguable intervention within this game. The strategic communication within this game moves over the areas included within serious game-thinking; cognitive; emotional; and social, which implies why a 'simple' game like this can appeal million of users.

### **Cognitive**

From the cognitive area there is a system of established rules (collecting candies-; a certain amount; within time; serial matching) but different ways to get there, which leaves the gamer with ways to explore how to get to the result through experimentation.

Argued by Lee & Hammer (2011) to be exceptional to get gamers to desire to beat each level, and will leave them to make small-scale experimental physicists, thus letting them figure out physical prosperities of the different draws to gain eventual boosters, and keeping them engaged (Lee & Hammer, 2011, p.3).

### **Emotional**

Throughout the engagement, the game will evoke powerful emotions; excitement when making an unforeseen draw; joy when finishing a level; frustration when not finishing a level; curiosity when starting a new level, the list may be long. The emotions are important in gamification, it is what keeps the gamer trying through failure, also argued as “gamification offers the promise of resilience in the face of failure, by reframing failure as a necessary part of learning” (Lee & Hammer, 2011, p.3). In other words, throughout the game the gamer is able to maintain the positive relationship with the game, because of the fact that there is a stake of pride when succeeded.

### **Social**

Within this area it is argued to be where the gamer tries new identities, in other words to this context, open up the mind to thinking outside the box. Such as going in the level with a new view set and trying to solve it from a fresh pair of eyes. Which lets them explore new sides of themselves (Lee & Hammer, 2011, p.4). But also gives social aspects in active choice to connect to other gamers to receive lives, ‘shortcuts’, and be able to share their journey over social media.

Yes it is a game, but a game that is presenting frameworks to promote desired behaviors, like following how a friend is doing and helping them to overcome obstacles. Thus, creating a play culture where players find meaningful roles (Lee & Hammer, 2011). As argued by McGonigal (2011), “Players begin each game by tackling the obstacle of *not knowing what to do* and *not knowing how to play*” (p.26). Applying the theories of augmented reality, gamification and serious gaming in real world as knowledge/learning environments gives the stand-alone concept of Alternate Reality Game (ARG).

### **3.5 Alternate Reality Games**

Wikipedia; (ARG) // “interactive networked narrative that uses the real world as a platform ... altered by players' ideas or actions. ...defined by intense player involvement with a story that takes place in real time and evolves according to players' responses. Players interact directly with characters in the game, solve plot-based challenges and puzzles, and collaborate as a community to analyze the story and coordinate real-life and online activities... generally use multimedia, such as telephones, email and mail but rely on the Internet as the central binding medium”. [4]

According to McGonigal (2011) the reality is unproductive, but with the help from games it can give a clear mission and create more satisfactory in doing. Think about it, doing the dishes how satisfying is it? I bet there can be found thousands of excuses not to do them, because of the fact that the task involves known outcomes, it will take time, you will get wet and wrinkled hands, yes the list is long. But what if a significant other steps in and challenges us about who can do the most dishes. An internally game is born, helping you to fully participate in that moment.

In that moment of stimulus we forget that it is something that we really have to do because we are triggering that primal emotional rush called ‘fiero’, unlike no other fiero

is the most powerful feeling, an emotional high of pride, the more challenging obstacle to tackle, the more intense fiero (McGonigal, 2011, p.33)

When using the approach of ARG in learning environments the subject can experience real meaning, which McGonigal defines as being part of something that is bigger than ourselves, by connecting with others who are driven by the same goal to reflect upon us to collectively matter. The interactive dimensions found in games break the traditional way to communicate (seen in Candy Crush Saga), ARGs provides with elements over a broad spectrum of media platforms that are easy mastered by the player (smartphones, e-mail, Google, services that stretch over many cultures; postal service), and are creation for one independent or as a crowd. Thus, in contrast to the heritage museum space whereas the communication is focused on the subject/object, surely an exhibition is also for masses but the entertainment and directly engagement is not reaching all visitors. In other words, the player of an ARG is targeted on different segmentations so that they can engage on a personal level or as sub-group (Dena, 2008, p. 43).

Within the design aesthetics of an ARG it differentiate from design aesthetics in AR, in AR, as established above, is the search and representation of the enhanced reality the goal, realism is in focus. Whereas in ARG the primary focus is upon the expressions created within and creative sphere, and removing any fiction –identifying frames, para-texts and gameplay heuristics (Dena, 2008; McGonigal, 2011). Which also compared to a regular video/computer game where the design aesthetics are important to appeal the gamer to play the game, as example Tomb Raider, which in mid 1990's became a huge success thanks to the sex appealing main character Lara Croft.

Whereas ARG's function is to leave the player with the need to establish what is actually in-game and out-of-game to be able to proceed in the game, which also keeps the player

in that state of flow and stimulating the fiero to over come and succeed. As argued by Hanaki, et al. (2009), this form will teach the player how to play the game but also about the game itself, there are 'hidden' components that have to be found and learned. Then when repeated the payoffs will change as the game proceed (Hanaki, et al., 2009, p. 1740).

### Why So Serious? [5]

During 2006/2007 Warner Brothers worked together with 42 Entertainment to create a promotion alternate reality game for the movie 'Batman: The Dark Night'. This transmedia experience got its name from the movies tag line "Why So Serious?", and was played over 15 months leading up to the premiere of the movie, over various media platforms such as; web based; mobile; smart phones; flash mobs; traditional gaming; real world events; video and unique collectables, with over 10 million participants in over 75 countries.

The immersive layout of this campaign called out to the audience to become real citizen of Gotham City and; campaign for Harvey Dent to get elected District Attorney, as during the same time prove the raise of the Joker's henchmen.

All over the world this ARG was activating the gamers to take the 'law' in to their own hands by calling phone numbers, hunting GPS coordinates, finding hidden clues in birthday cakes, paint their faces and upload images by cultural sites. Through this scavenger hunt the gamers came together even though with strangers to co-create the citizens of Gotham City.

This ARG ended where the new movie (The Dark Knight) took of, and the results of this marketing solution was astonished with the; most pre-sale of tickets in advance ever;

biggest opening day of all time; top grossing movie of the year (2008), with over US\$ 1 billion in box office collection (42 Entertainment, 2007).

‘Why So Serious’ is just one of many activating ARGs, but what makes it so remarkable is the way they created petitions for the gamers to actually convey living and acting out like real citizens of Gotham City, and campaign for made-up characters. Also how ARGs are able to give gamers a set of tools to experience real meaning, without contributing with something of real value (McGonigal, 2011, p. 97). What ARGs can provide us with in real life is the theory of leveling up, just as in Candy Crush Saga or another game (McGonigal, 2011).

This suggest that by making us ready to handle obstacle in our real-life and giving us feedback, and intrinsic reward programs would help us to make a better effort. Think about it from the flow theory where games provide; fantasy; emotional stimuli; challenges; and mastery, which can foster the state of flow and make us enjoy things we otherwise would not find appealing. Thus, reinventing our real-life experiences (Csikszentmihalyi, 1975; McGonigal, 2011; Romero, et al, 2014).

The popularity is not really that strange. We have established that the gaming culture is growing along with the digital media culture, context to use of different kinds of graphic elements that can provide cross-correlation of tangible and intangible aspects, thereof the extending implementation of gamification in non-game environment- learning by doing (Kindeberg, 2015; Mortara, et al, 2013).

## **4. ARG Approach in the Heritage Museum Space**

### **4.1 Gaming- Same Elements like Fine Art Articles**

Then how can the game theory within the heritage museum space become an innovative functioning communication channel. Applying a game approach in context to visiting an heritage exhibition where there are a lot of inexperienced area and new knowledge impressions, would then entail that there can be benefits derived from having limited understanding of what is being exhibit, meaning that visitors could still find it appealing to interact with an exhibition they where not there for at all, without any prior knowledge it is still fund appealing and interesting (McGonigal, 2011; Zyda, 2005). These kinds of solutions can give a holistic perspective, but the problems with them (the ones that is not thought through) are that they are missing purpose; a long with cluttered information, not seen as a communication strategy, and are therefor rejected or analyzed prior to use, thus missing the immersion to the sate of flow for the visitors. Arguable on the account of museums focus on user transactions, and the need of record keeping (collection management), hence the museums become bound to the historical methodologies (Besser, 1997; Kindeberg, 2015; Parry, 2005). Which is acknowledge by the culture economics framework that is concentrating on fine- arts; music; film; books; and heritage articles, though it would be argued that this economic can be more flexible towards other culture industries.

The argument concerning high- and low culture status is actually neglecting the ‘new digital approaches’, such in this case digital gaming (video-, computer-, smartphone-games), do to the fact of its elements of belonging in the low culture i.e. pop culture – not fine arts as the economics suggests. However the cultural economics equates the well being of people with their ability to maximize their satisfaction, argued by Hesmondhalgh (Dymek, 2010, p. 206-208). Empathizing on that the creation of a digital

game is made with the same elements like a fine art articles, also acknowledge by Zyda (2005) where he defines video games with elements of art, story and software. Which would then entail digital gaming to be a big part of culture economics as well, because of the fact that a technological artefact is an equally important actor as the human person using it, thus, giving it a certain level of agency (Dymek, 2010; Zyda 2005).

This is where we need to start this analyze, alternate the traditional notion of the heritage museum and its space to provide a ‘meta-world’ to coexist within the museum space, transforming the value of space and a medium in this context (Orhun, 2012; Valtysson, 2012).

#### **4.2 Tangible- and Intangible Cultural Heritage**

The physical (e.g. tangible) heritage within museum space is seen as a natural part of exhibits, something that is expected to find, hence not something that is ‘hard’ to preserve (i.g. buildings, art, sites, sculptures). But what about those things that cannot be touched, preserved and displayed the same ways, such as intangible heritage; social values; social cues; beliefs; attitudes; traditions; expressions; etc they are just as important heritage, and also the heritage that can serve with direct impact.

ARG in this context has earlier been established as attempt to educate the visitors, which can create new paradigms on the learning environments when integrating a constructivist perspective where Froschauer, et al (2010) stated, “knowledge is constructed, not transmitted” (p. 256) the gamer is given the active role of the learning process (Froschauer, et al, 2010; McGonigal, 2011). Within this matter, and focus on interlacing intangible heritage with tangible, ARG can provide with new cultural awareness, presenting an experience and bring-to-life of prehistoric events; descendant cultures that can be tried-, and understood- in first person. Whereas the historical awareness is also

being alternated, McGonigal (2011) argues that, “compared with games, reality is disconnected. Games build stronger social bonds and lead to more active social networks ... more likely we are to generate a subset of positive emotions known as ‘prosocial emotions’ “ (p. 82), transferring this idea into the museum sphere indicates then that the heritage museum is just a medium in a grey zone between the ‘exhibit-prehistoric-reality’ and the ‘real-world-reality’. Determined to show ‘what have been’ in to the opposite and bringing the heritage outside the walls of museums to meet the actual life of today, the actual outcome.

Kindeberg (2015) highlight the heritage museum to be a place that is waiting for the ‘other’ visitors to come, because the museums are only meeting the typical museum visitor’s habitus (the culture lover) requests (Kindeberg, 2015; McGonigal, 2011).

What makes the ARG in this context special is the active contact with others to break barriers; cross borders; and change the engagement economy, thus creating new cultural spaces.

The artistic group Blast Theory, led by Matt Adams, Ju Row Farr and Nich Tandavanitj, was early with the creation of serious gaming with mixed reality, and presented 2004 ‘I Like Frank’ that can be applied to a heritage museum exhibit as well, to reaffirm the convergence of tangible- and intangible heritage.

#### Blast Theory; I Like Frank [6]

This game invited players in the search for Frank throughout the streets of Adelaide using 3G phones. Sensors capture information about their current; location; context; too change the game experience according to where they are, and doing. It was a collaboration between online- and real life-players, where online players tour the streets

via a virtual model of the city to find and open location specific photos. The photos reveal the next hidden location, but the online players need to have a real-street player to retrieve photos at locations. The street players receives messages on their phones where Frank has spent his time and are thus asked to take part of Adelaide's culture by walking in Frank's footsteps.

It culminates with the interaction with a glimpsed figure, and via a video call on their phone they answer a specific question hidden within the location photos, and address it to an online player (Blast Theory, 2004).

This kind of game approach shows that it can raise new possible solutions of how to integrate the visitor in its own learning-, and experience-outcome by establishing social interactions between the gamers (i.e visitors), by letting the gamers choose an avatar it can invite them to actually embody an experience outcome they would not rather have chose, and nevertheless play together with others. Imaginable a game-setting like 'I like Frank' in context to heritage museums could help bring cultural awareness surrounding the intangible heritage connected to a physical space, thus highlighting how to show what-have-been but still in a sense of revitalizing it in a new touch. The creation of an ARG like previous example (Why So Serious) would provide with unique elements as a transmedia storytelling for direct engagement with the exhibits content (Dena, 2008). In other words, through the creation of new relationships between the gamer and the exhibition it will develop a user centered approach to the experience, an experience that can be altered various times depending where the visitor chooses to start the experience, like offline- or online-player. Thus, connecting; the technology; the visitors; and the heritage museums space, elements that transforms the communication within the heritage museums walls but connects with the 'real-world' outside (Dena, 2008; Wilson, 2010).

### **4.3 The Player Invest in Cultural Heritage**

A game according to McGonigal (2011) is intrinsically rewarding to play, in other words the players do not have to be paid (in any kind of currency; virtual; real) in order to play and participate. When the player is totally invested in its own progress and exploring the gaming world to its fullest is when the created community has reached its success. She draws out four important engagement principles for players when building a satisfying and inspiring community, an ARG (McGonigal, 2011, p. 244-245):

- Players need to feel invested in the world (game) and their own character.
- Players need to have long-term goal within the world (game) to keep them stimulated.
- Players cannot grief or exploit their goals.
- Content needs to be rewarding in and of themselves.

Here McGonigal is referring to how the participants should be able to impact and explore a world with interaction opportunities to create a unique identity within the world to learn and grasp the bigger picture of what information and knowledge can be retrieved specific for the habitus.

When applied in the heritage museum context it would entail that the designed ARG can source out the visitor to experience parts of the exhibitions they where not there for at all. Thus, investing more in experience with the created community embedded with cultural heritage and investigate it thorough, than just walking a predetermined tour and looking at it as a locative institute where the notion of space has been institutionalized (Kindeberg, 2015; McGonigal, 2011; Roussou, 2004; Valtysson, 2012).

The combination of gaming and fun is therefor understood as a central model for immersed learning, where according to Csikszentmihalyi (1975), the distinction between leisure and work is blurred.

When investing in the cultural heritage through ARG the visitors are also investing in themselves, thus the experience will not only help to externalize the learning environment constructed by the designer, it is also personalized, unique to every gamer. Compared to the traditional exhibit, the use of ARG has a potential of multiple responses, for the same visitor (gamer), depending on the current mood when playing (Bartle, 1996; Roussou, 2004).

The Smithsonian American Art Museum (SAAM) created and hosted in fall of 2008, what is seen as, the first ARG of its kind within the museum space called; Ghosts of a Chance.

#### Ghosts of a Chance [7]

This game was designed to offer both new and existing audiences to engage with collections within the Luce Foundation Center for American Art. It invited gamers to co-create objects and later e-mail them to the museum for an 'exhibition' - hosted by two made-up avatar curators, but there was also a parallel game within the game that involved challenges to expose clues that would bind together a narrative for the objects to embody a wider histories. The game was active for four months and culminated with a six different scavenger-hunt quests. In total there were over 6000 participating players online, and around 244 came to the onsite events. This was a collaboration between SAAM, City Mystery, the Anti-Boredom Playtime Society (Bath, 2008).

The game was set out to be an experience that would give the gamers a way to explore the world of games the same way they would expect to explore the real world, thus it was created for gamers that where-, and where not- familiar with gaming. Though throughout the evaluation of the project and received feedback shows that most part of the active gamers where in fact those who where already familiar or had played ARG's before (Bath, 2008). Nevertheless looking at SAAM's goals and expectations shows how the museum generated a swarming online buzz surrounding the interest in using alternative technology approaches, but a lack in the goal to bring a new audience into the (physical) museum and therefor questioning the basis for the museum experience. Just as McGonigal (2011) points out, there needs to be gameness within an engagement activity like this, and points out that it needs an established good game community, which involves plenty of positive social interaction and a meaningful context for collective effort. To help the participation to grow the social infrastructure has to extract that the gamers have a large network of friends that they can connect to the game, or other (McGonigal, 2011).

Nina Simon, designer and researcher of participatory museum experiences, wrote September 28<sup>th</sup>, 2008 about the SAAM's ARG in her blog and stated, "ARG's require narrative consistency that museums may feel uncomfortable adhering to... are you ready to construct fictional, alternative narratives about our collection? Are you willing to give visitors intentional misdirection?" a harsh comment but a question concerning the purpose of use. McGonigal highlights it as sustainable engagement economy, motivating and rewarding through intrinsic rewards, where features concerning how to impact upon content becomes most valid.

The Greek Cultural Centre, Hellenic Cosmos [8], created games to this approach for children; Olympic Pottery Puzzles [9]; and EUREKA!!! [10], developed as experiences to complement exhibits on ancient Greece, where the visitors were asked to put together crossed ceramics with depicted Olympic games, and experiment along Archimedes to discover and understand his famous discoveries. Why children, in this matter, are investing in 'school'-activities, as mathematics, outside of school to create a knowledge environment for themselves is easily understood when contrasting it to McGonigal's (2011) engagement principles.

## **5. Conclusion**

The heritage museum has in order to engage more visitors, meet them, and create a subject-specific environment where the creation of a personal world for the visitor within the museum space is centered, and where the focus on the traditional 'social event' is transformed to a 'social active event' to give new perspective on the visit as a bring-to-life experience where it is sourced out from the visitor to perform cultural information. In order to appeal the visitor to become a gamer and invest in projected heritage, there is need for transition within heritage museums methodologies where the cultural economics need to capture the digital creations as an already included part to exhibitions. Thus, how visitors interact with digital media in the everyday-live should be projected in how they act within the museum space, not replacing previous methodologies but enhancing the predecessors, and as Parry (2005) acknowledges it to be a technological convergence to actually build bridges between the subject, and object through creations of forums for these kinds of communication. Which then draws out the physical experience and interaction with cultural heritage to now miss a connection with enjoyment that aids fun and playfulness, an alternation of the physical heritage museum

space which demands awareness directed to stimulus that is shared within games concerning; goals; rules; feedback system; and voluntary participation.

Nevertheless, using game-thinking in the heritage museum space can have the learning payoffs change as the game proceed through inviting the visitors to invest in themselves, through the basis of learning by doing with cultural heritage. Heritage exhibitions created as ARG's has the opportunity to connect and display both tangible- and intangible cultural heritage through the relation establishment of technology and culture. Encouraging visitors to level-up both inside and outside of the museum 'walls', by building stronger social bonds with cultural heritage as well as other visitors. Through the acknowledgement of gamer personalities and sustainable engagement economy can the visitors be identified as individuals to transition learning outcomes from impact and exploration. Games in this context can therefor in this matter be for; the one, or the mass, targeting different segments but still create a personal experience, and make the single player collectively matter with heritage culture.

## Notes

[1] <http://www.endagivarldsarvet.se/>

[2] <http://www.virtualheroes.com/>

[3] <http://www.candycrushsaga.com/>

[4] [http://en.wikipedia.org/wiki/Alternate\\_reality\\_game](http://en.wikipedia.org/wiki/Alternate_reality_game)

[5] <http://www.whysoserious.com/>

[6] <http://www.blasttheory.co.uk/projects/i-like-frank/>

[7] <http://ghostsofachance.com/>

[8] [http://www.fhw.gr/cosmos/index.php?id=75&m=75&lg=\\_en](http://www.fhw.gr/cosmos/index.php?id=75&m=75&lg=_en)

[9] [http://www.fhw.gr/cosmos/index.php?id=15&m=2&s=15&lk=120&lg=\\_en](http://www.fhw.gr/cosmos/index.php?id=15&m=2&s=15&lk=120&lg=_en)

[10] [http://www.fhw.gr/cosmos/index.php?id=15&m=2&s=15&lk=119&lg=\\_en](http://www.fhw.gr/cosmos/index.php?id=15&m=2&s=15&lk=119&lg=_en)

## References

- 42 Entertainment.** (2007) Why So Serious? The Dark Knight, Warner Brothers  
Retrieved from <http://www.42entertainment.com/work/whysoserious>
- Bandelli, A.** (1999). Virtual Space and Museums, *Museums in a Digital Age*. New York, NY: Routledge (2010), 149-152.
- Bartle, R.** (1996). Hearts, Clubs, Diamonds, Spades: Players Who Suit MUDs. *The Journal of Virtual Environments*, 1(1). Online:  
<http://www.brandeis.edu/pubs/jove/HTML/v1/bartle.html>  
<http://www.mud.co.uk/richard/hcde.htm>
- Bath, G.** (2008). Ghosts of a Chance Alternate Reality Game (ARG), Smithsonian American Art Museum.
- Beking, A.** (2013). Murdoch v. Murdoch: The Possibilities and Challenges of Gaming in the Museum. *Peace And Conflict: Journal Of Peace Psychology*, 19(4), 353-357
- Benjamin, W.** (1936). *The Work of Art in the Age of Mechanical Reproduction*. England, London: Penguin Group (2008).
- Besser, H.** (1997). The Transformation of the Museum and the Way it's Perceived, *The Wired Museum*. Washington: American Assosiation.
- Bieldt, N.** (2012). Building a Transformative Museum? Getting to 'Our Place' Trough the Creative Industries Lens: A Case Study from New Zealand, *Proceedings of the DREAM conference The Transformative Museum, 1-14*.
- Borgni, A., Avizzano, C.A., Evangelista, C., & Bergamasco, M.** (1999). Technological Approach for Cultural Heritage: Augmented Reality, International Workshop on Robot and Human Interaction, 206-212.
- Bourdieu, P.** (1984). *Distinction: A Social Critique of the Judgement of Taste*. USA, Harvard College: Routledge & Kegan Paul Ltd.
- Csikszentmihalyi, M.** (1975). *Beyond Boredom and Anxiety: Experiencing Flow in Work and Play*. San Francisco, CA: Jossey-Bass INC.

- Dena, C.** (2008). Emerging Participatory Culture Practices: Player-Created Tires in Alternate Reality Games, *Convergence: The International Journal of Research into New Media Technologies*. Sage Publications, 14(1): 41-57.
- Dymek, N.** (2010) Industrial Phantasmagoria: Subcultural Interactive Cinema Meets Mass-Cultural Media of Simulations. Stockholm, Sweden: KTH Industrial Engineering and Management.
- Fogg, B. J.** (2003). Computers as Persuasive Social Actors, *Persuasive Technology Using Computers to Change What We Say and Do*. San Francisco, CA: , 89-120.
- Froschauer, J., Seidel, I., Gärtner, M., Berger, H., & Merkl, D.** (2010). Design and Evaluation of a Serious Game for Immersive Cultural Training, 253-260.
- Hanaki, N., Ishikawa, R., & Akiyama, E.** (2009). Learning Games. *Journal of Economics Dynamics & Control*. Elsevier B.V, 33: 1739-1756.
- Hooper-Greenhill, E.** (2004) Measuring the Outcomes and Impact of Learning in Museums, Archives and Libraries: The Learning Impact Research Project, *International Journal of Heritage Studies*, 10:2, 151-174.
- Kickmeier-Rust, M. D., & Dietrich, A.** (2012). A Domain Model for Smart 21<sup>st</sup> Century Skills Training in Game-Based Virtual Worlds. ICALT 2012 Proceedings. Italy, Rome, 680-681.
- Kindeberg, S.** (2015). Developer in Residence: Kulturhistoriska föreningen I Lund, Malmö museer & Regionmuseet Kristianstad, Rapport & Projektsammanfattning: Region Skåne.
- Laurustin, M.** (2013). New Media and Changes in the Forms of Cultural Transmission: The Estonian Experience, *Digital Turn: Users Practices and Cultural Transformation*, 27-43. Frankfurt: Peter Lang AG.
- Lee, J.J., & Hammer, J.** (2011). Gamification in Education: What, How, Why Bother?, *Academic Exchange Quarterly*, 15(2).
- Manovich, L.** (2006). The Poetics of Augmented Space, *Visual Communication*, 5, 219-240.
- McGonigal, J.** (2011). Reality is Broken: Why Games Make Us Better and How They Can Change the World. England, London: Penguin Group.
- McLuhan, M.** (1964). Understanding Media: The Extensions of Man. New York, NY: Routledge (2001)
- Miligram, P.** (1994). A Taxonomy of Mixed Reality Visual Displays. Canada, University of Toronto: The Department of Industrial Engineering.

- Mortara, M., Catalano, C.E., Bellotti, F., Fiucci, G., Houry-Panchetti, M., & Panagiotis, P.** (2013). Learning Cultural Heritage by Serious Games. *Journal of Cultural Heritage*. Elsevier B. V, 15: 318-325.
- Orhun, S.** (2012). A Study on transforming the museums through interactive exhibiting, *Proceedings of the DREAM conference The Transformative Museum*. Danmark, 279-288.
- Parry, R.** (2005). Digital Heritage and The Rise of Theory in Museum Computing. *Museum Management and Curatorship*, 20, 333-348.
- Roberts, A.** (2001). The Changing Role of Information Professionals in Museums, *Museums in a Digital Age*. New York, NY: Routledge (2010), 22-27.
- Runnel, P., Pruulmann-Vengerfeldt, P., Laak, M., & Viires, P.** (2013). The Challenge of the Digital Turn, *Digital Turn: Users Practices and Cultural Transformations*, 7-12. Frankfurt: Peter Lang AG.
- Roussou, M.** (2004) Learning by Doing and Learning Through Play: An Exploration of Interactivity in Virtual Environments for Children, *Museums in a Digital Age*. New York, NY: Routledge (2010), 247- 265.
- Russo, A.** (2013). The Rise of the Media Museum: Creating Interactive Cultural Experiences Through Social Media, *Heritage and Social Media: Understanding Heritage in a Participatory Culture*, Chp, 8. New York, NY: Routledge.
- Sandvik, K.** (2012). Mixed Reality, Ubiquitous Computing and Augmented Spaces as Format for Communicating Culture, *Proceedings of the DREAM conference The Transformative Museum*. Danmark, 335-346.
- Simon, N.** (2006). What is Museum 2.0?. Retrieved from <http://museumtwo.blogspot.se/2006/12/what-is-museum-20.html>
- Simon, N.** (2008). The Participatory Museum. California, Santa Cruz: Museum.
- Sola, T.** (1997). Essays on Museums and Their Theory: Towards the Cybernetic Museum. Helsinki: Finnish Museums Association.
- Sorensen, C. G.** (2012). Interface of Immersion- Exploring Culture Through Immersive Media Strategy and Multimodal Interface, *Proceedings of the DREAM conference The Transformative Museum*. Danmark, 409-421.
- Valtysson, B.** (2012). Reaffirming Museum Power: Locative Media and the Institutionalisation of Space, *Proceedings of the DREAM conference The Transformative Museum*. Danmark, 468-481.

**Williams, D.** (1987). A Brief History of Museum Computerization, *Museums in a Digital Age*. New York, NY: Routledge. (2010), 15-21.

**Zyda, M.** (2005). From Visual Simulation to Virtual Reality to Games, 25-31.