Entertaining Knowledge

The video game medium in archaeological public outreach

Lenneke de Lange

Cover image: screenshot made by the author in *Assassin's Creed: Origins* (Ubisoft)

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1.

Introduction

Archaeological research yields the most stunning and important results about the human past but the general public hears only about the greatest finds; the most aesthetically pleasing or awe-inspiring, or those with a sensational story to accompany them. Gearing towards this, museums may give a researcher a small piece of ostensibly ordinary brown fabric with the objective to make it interesting to their public, no matter its importance to the archaeological community. This is what happened to Dr. G. Vogelsang-Eastwood, who analysed exactly such a piece of fabric from the British Museum. She did so like she did with all archaeological samples, in search not of something unique, but in search of information about the past. However, she did consider herself lucky when she discovered gold thread in the piece of cloth, for this meant the museum would deem the artefact worthy of being displayed. If the piece had not had such a special story behind it, it would have been of no interest to the public and they would never have gotten to see it (Appendix 1; the piece of fabric can be found in Welsby and Daniels 1991, 306).

Whether it is fabric containing gold thread, mummies buried amidst their treasures, colourful pottery or intricate glass and metal work from even the most remote regions, it is only these more sensational artefacts that are known, even though they are not reflective of the artefacts archaeologists usually find. The finds the public gets to see are exceptional and often not what is important for the archaeologist's task: to unravel how past humans lived. With that task in mind, a bulk of greyish pottery sherds can be far more interesting than the unique objects found on display all over the world. Unfortunately, the public presumably will not come to museums to see large quantities of homogenous sherds. They will not read about it in magazines as long as the title of the article is not mysterious or spectacular. They will not seek out this type of archaeological information as long as it is not presented to them in a dramatised context, as is seen in many documentaries.

How then will important archaeological knowledge, the archaeology that completes our perception and image of the past, ever reach the general public?

This thesis proposes the use of video games to teach the general public about the past as seen in the archaeological record. Not by creating educational games that feature archaeological research and results, but by implementing the archaeological record and

information derived from it in video games that, in principal, are still entertainment-based. This way, the archaeological community becomes part of a channel that runs straight to the public, a public that continues to grow. The popularity of games can be seen in sales figures, but also in its growing presence in the academic sphere; game studies has been growing towards the same levels as literature and film studies. Almost two decades ago, some people already recognised games as a cultural phenomenon that was more important than movies and even sports (Aarseth 2001). An illustration of this lies in the gaming branch of esports, which has been noticed by traditional, professional sports leagues and is considered to appear on the 2024 Olympics (Fernandez 2018). As tends to happen when "new" phenomena start taking up a bigger part of society, it causes a lot of upheaval. However, this research wants to draw attention to what Nielsen wrote in an article in The Guardian: 'A few may sigh and drag out the old mantra of "it's just a game" […], but in a lot of ways that disrespects the medium; we're classing games lower than historical literature or film by refusing to examine them through the same lens. Games are the narrative medium of the digital age - they deserve to be taken seriously when they depict our world and heritage.' (Nielsen 2015). That is exactly what this thesis pursues and, in doing so, proposes that the cultural entity that is the gaming medium should not be left unnoticed by academic communities and instead be exploited as soon as possible.

As a step towards appropriation of the medium, this thesis combines an archaeological study with questions of output media to enhance public education through video games. In this introduction, the relevant theoretical framework of the medium will be explained, research questions will be posed and the methodology to answer them will be outlined.

1.1 Theory

The suitability of video games lies at the foundation of the medium. Video games are databases, meaning that every aspect of it is as important as the others, as easily retrievable from the horizontal plane of the database and therefore controlled by the player (Manovich 1999).

Other than that, game's most distinctive feature is interaction, which is strongly connected to the level of involvement players have with the medium. It is because of this involvement that the medium gained an enormous following in so few years. Games are able to bind the player to their virtual world by conditioning the player to always be

alert (Calleja 2011, 42). Thus, effortlessly, the player keeps paying attention for hours on end (Hawlitschek and Joeckel 2017, 84). According to Calleja, attention facilitates involvement (2011, 40), which shows just how engaging the game medium is. Most important in the case of archaeology in games, is the continued engagement when the game has been quit and the player returns to the real world. Calleja calls this "macro-involvement" and believes it is what makes a player return to a game time and time again (2011, 37).

Another principle that lies at the very core of video games is immersion. While media like literature and film can have a very immersive effect, none take a "consumer" as deep as the video game. The level of detail and the complexity of the created worlds goes beyond anything film achieves, because the player can linger in every spot and view things from many angles, not bound by a director. Ryan distinguishes three types of immersion that games make use of: spatial immersion (being part of a changing world, that the player seems to be able to influence), epistemic involvement (the possibility to discover more about the things the player encounters in the game through dialogue boxes or interaction) and lastly: temporal immersion (the surprise and suspense that originates from making choices within the game and not knowing what consequences they will have; Ryan 2009).

1.2 The research questions

These basic aspects of the video game medium are what makes it so suitable for public outreach. This thesis will try to take a first step in investigating just how useful games indeed can be for archaeologists trying to educate a wider public beyond the spectacular. It will do so through a case study and a survey, conducted in the light of the following research question and subquestion:

Can gaming as a virtual medium contribute to the outreach and impact of archaeological cultural heritage for both public and academic communities?

What is the level of archaeological accuracy in the game Assassin's Creed: Origins?

The subquestion serves to test the suitability of mainstream entertainment games for archaeological education. Therefore, the case study and survey are both based on the

blockbuster game *Assassin's Creed: Origins* (AC:O), released in October 2017 by Ubisoft Montreal. The game is the latest instalment in the now intermediary series *Assassin's Creed* (AC), of which games, books, comics and even movies have been released since 2007. It is known for its unique historical settings: Renaissance Italy, the American and French Revolution and Victorian England, to name just a few. In each game, the player is exposed to historical figures and events and gets the feeling they play a part in the course of history.

Assassin's Creed: Origins takes the series to a period in time it has not featured before: the time of Cleopatra VII and Ptolemy XIII in Egypt. The available region of the main game spans from the Western Nile Delta to a stretch of desert south of the Faiyum oasis, dotted with interesting places like Alexandria, Memphis and Cyrene.

Throughout the series, fact is very much mixed with fiction, but in most cases easily distinguishable, leaving players with a newly acquired wealth of knowledge about the historical setting they have been playing in. Everything the player does in the game is saved in their memory as an experience, and not a simple fact read in a text book, thanks to the immersive and interactive aspects mentioned in paragraph 1.1.

1.3 Methodology

The first part of this thesis consists of an extensive comparative study between archaeological sites in the real world, and those same sites as reconstructed in *Assassin's Creed: Origins* (AC:O). The main focus point is the Step Pyramid complex of Djoser in Saqqara, while three smaller case studies illustrate the effects of designers choices on the representation of archaeology. The analysis can be found in chapter 2.

While the previous AC games have always featured a database menu, providing information on buildings, people, events and sometimes even flora and fauna, AC:O lacks such a menu option. Instead, the developers released downloadable content (dlc) in February 2018 containing all such information and more. The dlc, called Discovery Tour, is fully geared towards exploration of the environment and the past. It features tours by experts, all within the virtual world, making it suitable for use at schools, the developing team claims (Reparaz 2018). Because it is presented as an educational mode, it is important that the information given in this dlc is both historically, as well as archaeologically accurate. To assess the accuracy, the Discovery Tour is shortly analysed

by reviewing the tours pertaining to the Step Pyramid complex. This review can be found in chapter 3.

The third major part of the thesis, found in chapter 4, is a survey conducted amongst "gamers" and "academics". Gamers, in this case, are people with no archaeological or historical background whatsoever; they are people that happen to have played AC:O. Academics are all those who have played the game AND are archaeologically trained – be it bachelor students or university professors.

The survey for gamers aims to get an indication of their interest and awareness of the archaeology in the game. The goal of the academic's survey is to assess the accuracy of the representation of archaeology in the game and to gauge their opinion on the concept of using games in public outreach.

The surveys are self-completion questionnaires to avoid interviewer variability and to get better response rates. For easy processing, each survey contains no more than 10 closed questions (Bryman 2012). The surveys were spread through social media and, in case of the gamer's questionnaire, were available in a game store in Leiden.

The comparison and survey results combined should provide the right kind of insight to form opinions on the use of games in archaeological public outreach.

2.

The Real and the Virtual: archaeological case studies

This chapter deals with the virtual representation of archaeology in the game *Assassin's Creed: Origins* (AC:O). Paragraph 2.1 closely examines one particular area of Egypt that is featured in the game (the Step Pyramid complex of Djoser), while paragraph 2.2 focuses on three smaller case studies that help illustrate whether designers choices benefit or disadvantage the representation of archaeology in the game.

Figure 1: The Step Pyramid complex, facing north-west (reino-de-clio.blogspot.nl).

2.1 The Step Pyramid complex

Egypt is by far most known for its pyramids. While these have been a part of the Egyptian landscape for almost 5 millennia, they were not the first stone monuments dotting the Nile valley. Egyptian kings used to be buried in so-called *mastabas*, rectangular burial tombs sometimes completely subterranean (Khallaf and Madkour 2012, 65). It was these tombs that started to evolve into the pyramids. A very famous intermediate stage in this process is the Step Pyramid of Djoser in Saqqara (figure 1). The complex was first discovered in the 19th century and excavated for many years by Jean-Phillipe Lauer in the 20th century (Bard 2007, 128).

The following paragraphs will give a detailed archaeological description of the Step Pyramid complex as it is seen today. Thereafter, a similar description is given of the virtual version of the complex as it can be found in AC:O. The focus will be on the

similarities and differences between the real and the virtual Step Pyramid complex, which will be summed up in a short conclusion.

2.1.1 An archaeological description

The complex and its surroundings

The vast desert region west of ancient Memphis is called Saqqara, home to some of the most famous funerary monuments of Egypt. It can be regarded as one huge necropolis that was used from the 1st dynasty to the 9th and again in the New Kingdom (Lehner 1997, 82-3). The Step Pyramid complex is situated in North Saqqara, which reaches from the Abusir lake in the north to the Sekhemkhet complex in the south (figure 2). In its close surroundings are two more pyramids: immediately to the south is that of Unas (2371 – 2350 BC), whose pyramid contains the first pyramid texts (Bleiberg 2005, 32); the second is located to the north-east and is dedicated to Userkaf, a 5th dynasty pharaoh who returned to Saqqara as location for his funerary monument (Lehner 1997, 82). They are both of later date than Djoser's complex, but older than the New Kingdom necropolis, also to the south (Warner 2009; Lehner 1997, 140).

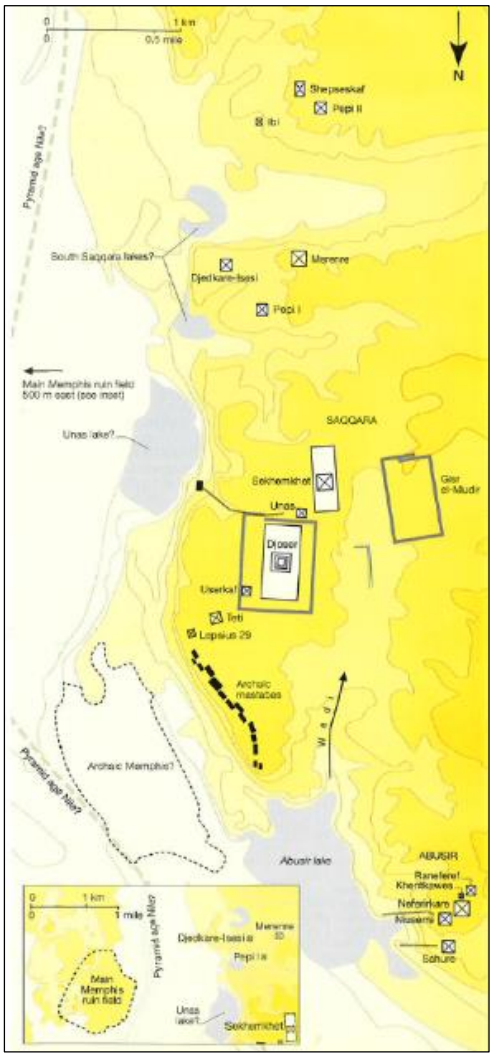


Figure 2: Map of North Saqqara (Lehner 1997, 83).

These complexes follow the angles provided by the north-south oriented Step Pyramid complex, on which the chapter focuses (figure 3). The enormous area it comprises, covering 15 hectares (545 x 278 metres), is surrounded by a 10,5 metre high wall consisting of an endless row of bastions, to resemble a palace façade, and permeated with 13 fake gates (Friedman 1995, 10). There is only one entrance into the complex, located on the southern end of the eastern wall, that leads through a colonnade into a large open court south of the centre piece of the complex: the step pyramid (Watson 1987, 20).

The construction of the complex must have started close to the year 2630 BC, at the beginning of Djoser's reign. It was unlike anything that had been built before: the size of a contemporary town, it housed courts, tombs, rows of shrines and other buildings and, of course, the pyramid itself. The latter was not only extraordinary because of its size, it was built with stone instead of the usual mudbricks, something unprecedented (Lehner 1997, 84). The architect of the complex is known by name, something rather unusual, and was deified for his efforts in later times (Bleiberg 2005, 11; Bard 2007, 128). His name is Imhotep and statuary depicting him has been found within the complex as well, for he came to be regarded as the son of the god Ptah, the deity of Memphis (Bleiberg 2005, 60).

The reason for building large funerary complexes around a small, subterranean burial tomb is explained by Lehner: 'As the kings ascended and re-established their courts in the Afterlife, generations of Egyptians moved as cohorts across death's threshold to live again as a "community of *ka*s", focused on the pyramid and its surrounding necropolis.' (2005, 24). It seems the might of the pyramid and its complex were taken into the afterlife with the deceased pharaoh, who even there needed to be powerful enough to take care of his people as they each crossed to the Netherworld.

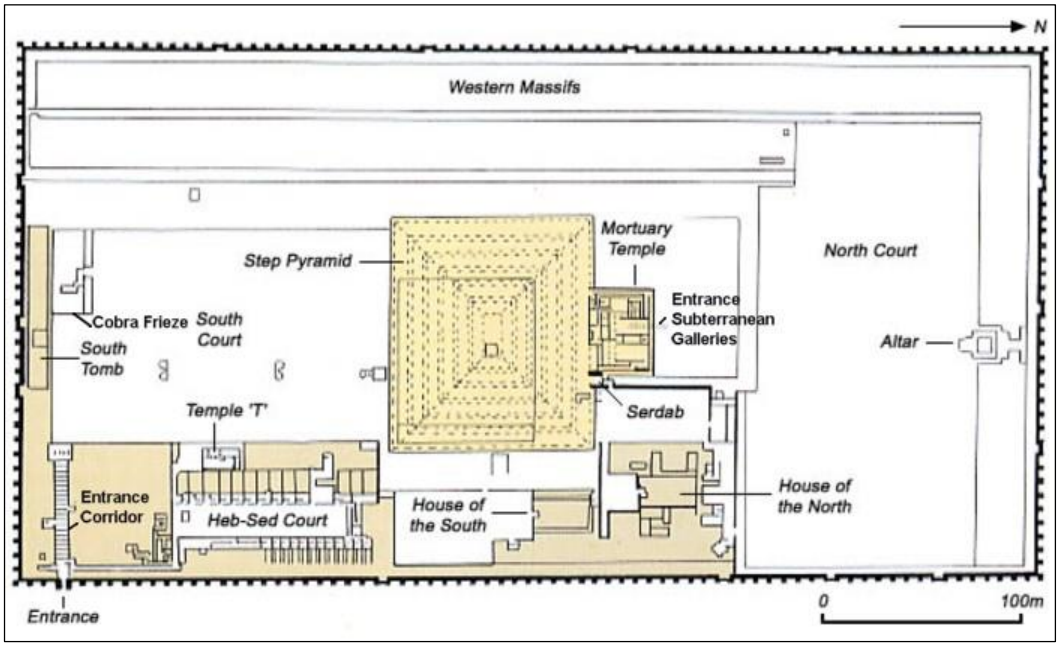


Figure 3: Map of the Step Pyramid complex (Khallaf and Madkour 2012, 64).

Description of the Step Pyramid

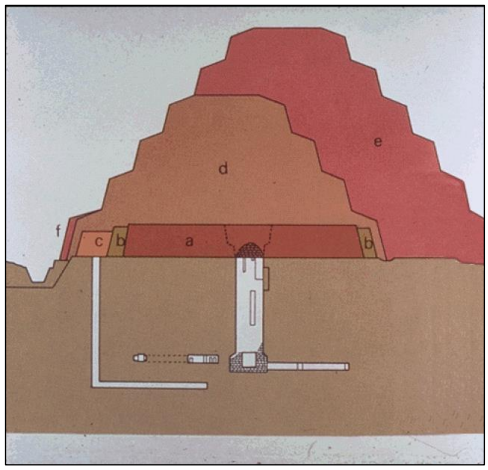


Figure 4: The inner structure of the pyramid (explorationvacation.net).

The Step Pyramid of Djoser is the first stone building of monumental size in the world. Although it is not a true pyramid, it is the first. Instead of smooth sides, it consists of six steps, formed by accretions with slanted sides, decreasing in size towards the top. They consist not of mudbrick but of large stone blocks, held in place with clay, no longer needing large amounts of mortar and packing material (Lehner 1997, 84). The rectangular base (instead of the usual square) is a result of the building history of the pyramid. Initially, Djoser's funerary monument was to be a traditional *mastaba* (Bard 2007, 129). This plan was maintained in the next building stages as well, when the mastaba was expanded by four metres on all sides and was given a casing of limestone. On the east side it was extended by another 8 metres to form the bottom step of a four-step pyramid, whose structure is still inside the current six-step construction, which extends to the north and west (Watson 1987, 18; figure 4). The dressed Tura limestone casing that was applied to the whole of the pyramid is almost completely gone today, despite repairs executed during the 26th dynasty, two millenia after Djoser (Warner 2009,

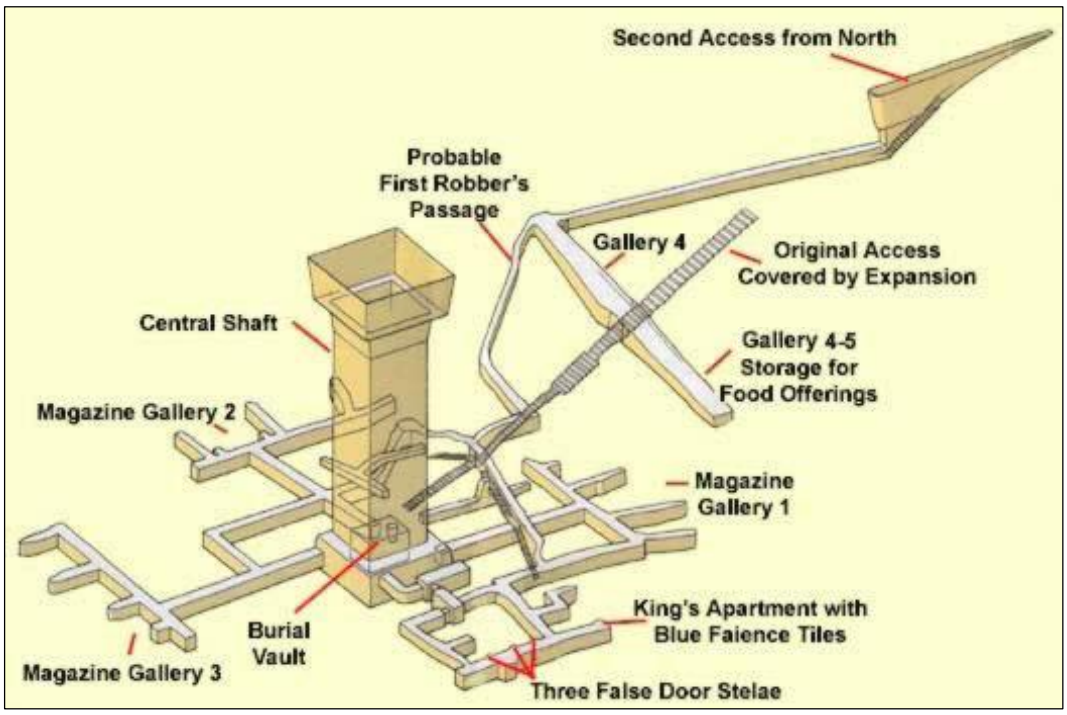


Figure 5: The substructure of the Step Pyramid (after Lehner 1997, 88-9).

98). The steps themselves have become almost rounded over time, exposing the stone bricks it is built out of.

Still, compared to many other monuments, the Step Pyramid is well preserved and the only (finished and surviving) one of its kind. The construction of stepped pyramids was soon abandoned, which by some is explained as a shift from the pyramid as a display of the power of the state, to a monument representing the pharaoh's connection to the sun god Ra (Bard 2007, 132-3). The substructure of the pyramid (figure 5) is no less impressive than the landmark above ground. As thoroughly described in Lehner (1997, 87-90) and Watson (1987, 19-22), one enters by a trench to the north of the pyramid, through a long, descending corridor. With a slight deviation to the West, it goes down a couple of meters, partially as stairwell, before taking a corner to the left, where it meets up with an older downward stairwell, referred to as the central passage. This one had become inaccessible from above when the pyramid was extended by two steps, the new base thus covering the original entrance. The gallery joining the two entrances had been used for the storage of food offerings, mostly grain, and extends beyond the junction with the central passage.

The central passage is a long staircase narrowing to 1,1 metres width, that takes one all the way down to the "manoeuvring chamber", surrounding the burial vault, some 28 metres below ground. Before this is reached, a stairwell leads off to other galleries on either side, diverting to the East and West. These stairs were used by workers to access the galleries with more ease, basically providing a shortcut. Not taking this shortcut but instead entering the burial vault, one finds oneself in a roofless chamber roughly cut from bedrock, just like most of the central passage. In the middle is the granite burial vault itself, covered by nine stone blocks that remind of a row of sleepers put closely together (see figure 6a on page 21). To the north end is a hole of 1 metre diameter, in which a granite plug was put that weighs 3,5 tons. The body of the pharaoh must have once been laid to rest under the heavy granite blocks, but no remains were ever found; the vault was likely robbed during the 26th dynasty. The gilded wooden box, that the body was probably kept in, must have been stolen too.

The chamber with the burial vault has no roof, for it is the bottom of the large (7 metre square), 28 metre deep shaft belonging to the original *mastaba* structure. As the first extensions were made, the shaft was widened at the top in order not to become buried by the heightened, second *mastaba*. Over time, rubble fell down from the top of the shaft, covering the burial vault and raising the floor of the manoeuvring chamber. Much destruction of the manoeuvring chamber will have been caused by grave robbers.

Among the rubble, Lauer discovered evidence for an older burial vault; one made of alabaster and limestone, with a roof decorated with five-pointed stars (Bard 2007, 129; figure 7a).

The manoeuvring chamber can be exited through openings in all four walls, excluding the central passage stairs. In the north wall is another opening that leads to Magazine Gallery 1, which links to the eastern galleries, which will be discussed later. West leads to a gallery that soon splits off in three more directions: right, left and straight ahead. The last option leads to a gallery perpendicular to the hallway one enters from. This is Magazine Gallery 2, containing multiple niches, some extending quite far, others less so. If one had gone left, one would be taking one of the shortcut routes from the central passage, which here joins with the gallery system and thus the burial vault. Taking a left turn would bring one to a long stretch of hallway with a 90 degree corner to the left. A T-junction is formed with the long corridor that could also have been entered through the south wall of the manoeuvring chamber. This is another straight corridor, but it should be noted that these underground galleries (including Magazine Gallery 2) are not as well explored as other subterranean areas. Magazine Gallery 3, at the end of this hallway, has four niches, again of different depths.

The most interesting (and rather well explored) part of the substructure of the Step Pyramid can be found by entering the East gallery system from the manoeuvring chamber. First, a short passage takes one to a chamber, from which, again in Eastern direction, one steps into a corridor whose walls are covered in blue-green faience tiles of about 10 x 6 centimetres (Khallaf and Madkour 2012, 65). Together with horizontal bands of limestone, they give the impression of reed mats (Bard 2007, 131). Arches seemingly supported by *djed* pillars envelop a stretch of wall, resulting in big panels of the blue-green tiles (Lehner 1997, 88; figure 8a). Many tiles have fallen off because the mortar with which they were attached detoriated due to high moisture levels in the walls, and in some cases the glazing shows cracks or a change of colour (Khallaf and Madkour 2012, 66). These tiled walls continue around the corners on both ends. The eastward corridors on either side meet again in the easternmost gallery of the substructure, where three false-door stelea of Djoser can be found in the western wall. The wall opposite is not covered in tiles, but between the recessed doorways a pattern of tiles and limestone is made to resemble the reed matting that would have been visible inside the pharaoh's palace (figure 9a). The pattern is interrupted by the frames of the doorways (which bear the Horus name of Djoser, "Netjerykhet") and the small windows they are flanked by. The pattern continues on the inner sides and top of the

doorways. The doorways are about 145 centimetres high, of which only the top 87 centimetres bear scenes in low relief (Friedman 1995, 12; figure 10). Reading them from right to left, as Friedman argues would have been the case because the gallery would have been entered from the north, the stelae show the pharaoh standing, running and running again (Friedman 1995, 12-3). In each panel, the image of the pharaoh is surrounded by other symbols and hieroglyphs, which mention places associated to the *heb sed* festival. This festival was a ceremony of rejuvenation of the pharaoh and as such, one of the rituals involved a "circuit of the walls", in which the pharaoh had to run around the palace (Lehner 1997, 92; Friedman 1995, 14). Many other parts of the complex resemble rituals or stages affiliated with the *heb sed* festival, as will become clear in the next section.

With the eastern part of the substructure discussed, there is just one part of the pyramid left unmentioned. When the monument was still a mastaba, a substructure was created that runs even deeper than the one examined above. It consists of 11 shafts, at the bottom of which long galleries run westward. Shaft galleries I to IV were used as tombs, as evidenced by human bone and two intact sarcophagi. The other shafts contain a total of 40,000 stone vessels, including alabaster cups and plates. These have been dated to before Djoser's time, which suggests they were taken from first dynasty tombs in the neighbourhood to keep them from being plundered. Some of the vessels contained names, likely of Djoser's ancestors (Friedman 1995, 10; Lehner 1997, 90).

Description of the buildings within the complex

Within the enclosure are many buildings: some are functional, others are purely symbolic dummy buildings, where only the façade matters and not the inside. These different buildings will now shortly be discussed, starting in the south and moving around the pyramid counterclockwise (again see figure 3).

Against the southern wall is a building called the South Tomb. This is its name because it has a burial vault at about 28 metres depth below a large shaft (Lehner 1997, 92). This construction was discussed before, as it is just like the substructure of the pyramid. The similarities do not stop here: the king's palace (the eastern galleries under the pyramid) is replicated underneath the South Tomb as well. Again a network of galleries with walls inlaid with blue faience tiles leads to a corridor at 33,5 metres depth, with three false doorways. They contain low relief stelae, depicting the pharaoh during the *heb sed* festival; this time, from north to south, running, standing and standing again (Friedman 1995, 11-2). When one maps the position of all six panels (the three of the South Tomb

and the three of the pyramid), one can see how they are aligned on a north-south axis that seems to be the leading orientation of all structures in the complex. The alignment, too, is associated with the *heb sed* festival, for it may be representative of the kings circling of the *wsht*-court boundary markers (see below; Friedman 1995, 11-8).

Some argue that the substructure of the South Tomb was completed before that of the pyramid, making the latter a copy of the former instead of the more obvious other way around. The argument is made because the South Tomb appears finished, while the substructure of the pyramid may have never been completed, explaining the tile-less wall opposite the panels (Lehner 1997, 88).

As mentioned, the South Tomb has a burial vault. It is much smaller than the one underneath the pyramid, but constructed in the same way, with a granite plug closing a cylindrical hole. The vault, however, is not big enough for a body. Different theories are in circulation, suggesting the vault was meant for the canopic jars or for the *ka* of the pharaoh. The latter has led people to believe the South Tomb is a precursor of the later satellite pyramids, which would have been located to the main pyramid in relatively the same way (Bleiberg 2005, 23). The manoeuvring chamber around the vault is in better condition than that of the pyramid, and was in fact used to reconstruct it. The granite plug still contained remains of the wooden beam used to lower it, which in turn still showed traces of ropes (Lehner 1997, 92).

The superstructure of the South Tomb is shaped like a mastaba, though not much of the original shape is visible. Right against it was smaller building, probably a chapel, whose walls still stand and on which a decorative band around the top displaying rearing cobra heads is visible (Friedman 1995, 14; Lehner 1997, 84; figure 11a).

North of the South Tomb and South of the pyramid is a large open court. This is the *wsht*-court, related to the *heb sed* festival. For this reason, remains of enormous half-moon markers can be found on the North and South side, about 55 metres apart. These are the symbolic boundary markers around which the pharaoh would run during the *heb sed* festival (Friedman 1995, 11).

East of the South Tomb is the colonnade that takes people from the one true entrance to the *wsht*-court. It is lined with 20 pairs of engaged columns, made to look like bundled reed. The roof of the colonnade also resembles organic materials, giving the impression it is made of logs, while in fact everything is limestone (Watson 1987, 20).

Just north of the colonnade is the *heb sed* court, on the north-south axis. Today, it is most often entered from the great *wsht*-court, by passing a building called Temple T. Not much is understood about the building, but it is likely it had something to do with a

funerary ceremony, for it has an actual interior, which makes it one of the functional buildings of the complex (Lehner 1997, 85). On both sides of the court are the remains of dummy shrines. These are a good example of buildings functioning as décor for a symbolic stage. Only their presence matters, not their interior. Therefore, the shrines are solid, with fake doorways and windows which once contained statues of the pharaoh, though not much was preserved (Friedman 1995, 11). There are about 12 on each side, though those east of the court are narrower. The ones on the West side have a flat or a rounded roof variably, which was deducted based on their walls, for most of the shrines are nothing more than a pile of rubble nowadays (figure 12a). The reconstructions show a plain wall for the flat-topped buildings and a façade with decorative columns on those with a round roof. The buildings on the East side all have a rounded roof but with fans out above the wall (figure 13a) and do not have fake doors or windows. They also do not have a small courtyard in front of them, which is typical of the shrines on the West side.

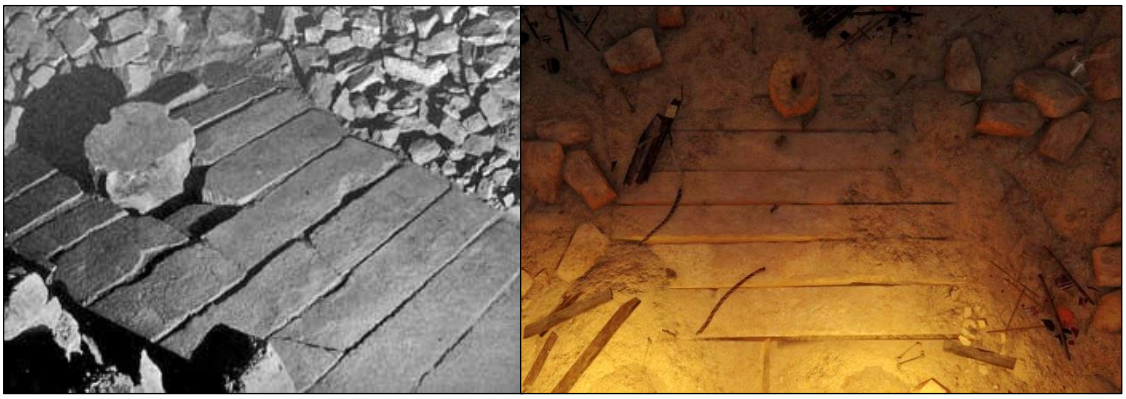
Moving along the Eastern wall to north of the *heb sed* court, one walks into another walled open space, facing the Pavilion of the South (also called House of the South). It looks like a bigger version of the round-roofed shrines in the previous court, including the decorative columns. The pillars imitate wooden log beams, further evidenced by traces of red paint, which resembles wood (Lehner 1997, 85). The pillars are topped by fluted lotus leaves, a symbol of Upper Egypt. Further North is the Pavillion of the North, which looks similar, but instead has papyrus columns, symbolic of Lower Egypt (Bard 2007, 131). In addition to the columns, the Pavillion of the South has a frieze of elongated spade-shaped plants above the door (figure 14a).

The enclosure wall extends for another 100-odd metres north of the Pavillions. Near the corner with the Northern wall, evidence was found of a ramp across the wall, that was perhaps used to bring the body into the complex, instead of taking the elaborate route past the buildings just described (Lehner 1997, 85). The walls on this end of the complex are now practically gone, as are potential other buildings.

At the base of the north side of the pyramid is the *serdab*, a small room containing a statue of the pharaoh. It is completely sealed off, but the statue can be seen through peepholes. In turn, the statue could see through the holes to the north, where his *ka* would go to live in eternity (Friedman 1995, 11). The rock crystals, once placed where his eyes should be, were stolen but the statue remained otherwise intact (figure 15a). At its base, Djoser's titulary is inscribed, naming him "king of Upper and Lower Egypt" (Lehner 1997, 90).

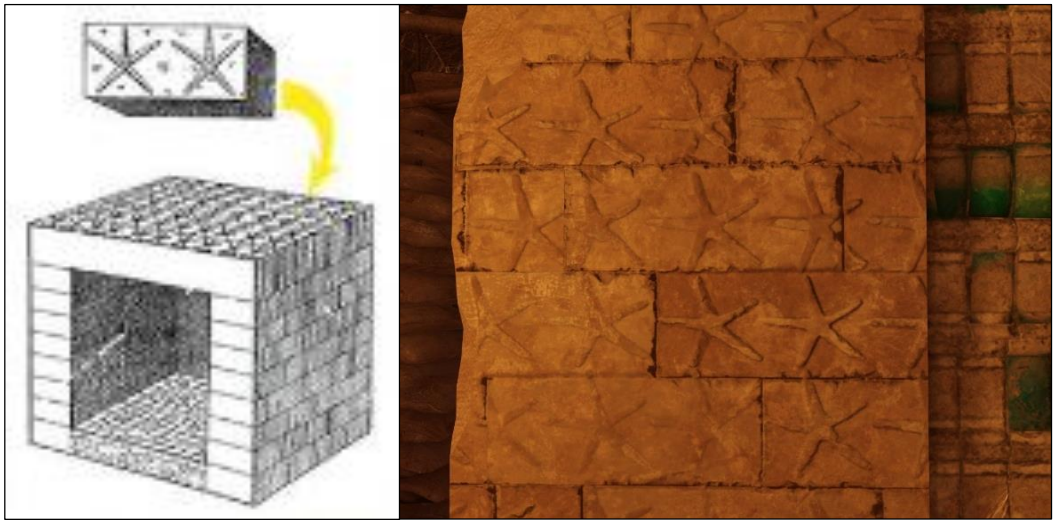
West of the *serdab* is the Northern Temple. It is one of the few buildings with actual rooms and must have been the mortuary temple. It also contains the trench leading to the pyramid's substructure (figure 16a).

The entire West side of the complex, from the very north to the very south, is taken up by the so-called Western Massifs. It is not completely sure what they represent or what their purpose is, but they may date from a time before Djoser. Due to danger of collapse, the many underground galleries have not been explored very thoroughly (Lehner 1997, 87).



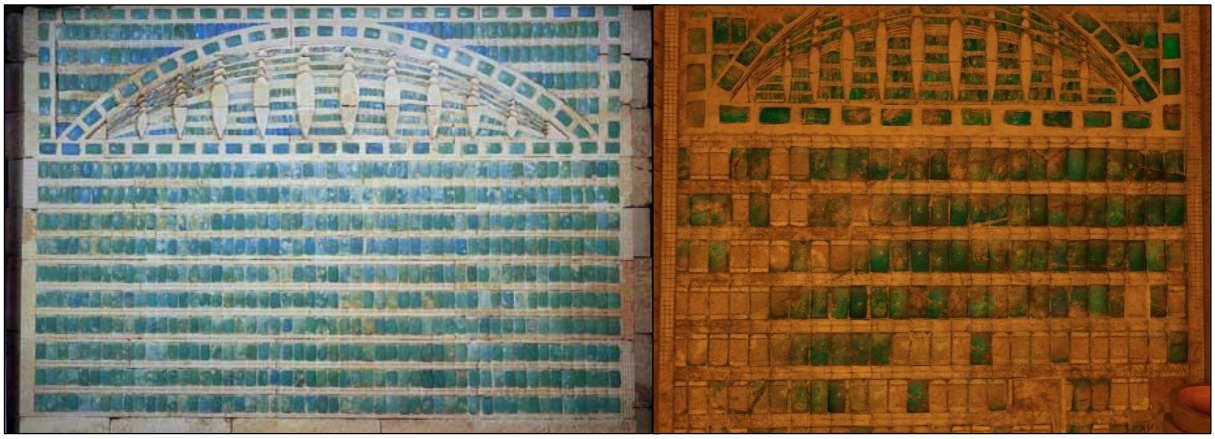
a. b.

Figure 6: a. The burial vault of Djoser (Lehner 1997, 87-8); b. The virtual reconstruction in AC:O (screenshot made by the author).



a. b.

Figure 7: a. The original burial vault, according to Lauer (Lehner 1997, 93); b. Reconstruction of the bricks of that vault in a wall in the Eastern Galleries in AC:O (screenshot made by the author).



a. b.

Figure 8: a. Panel of faience tiles (www.odysseeadventures.ca); b. Faience tiles covering the walls of the Pyramid's substructure in AC:O (screenshot made by the author).

a. b.

Figure 9: a. The corridor with the three false doorways (historypd.blogspot.nl); b. Its virtual reconstruction in AC:O (screenshot made by the author).

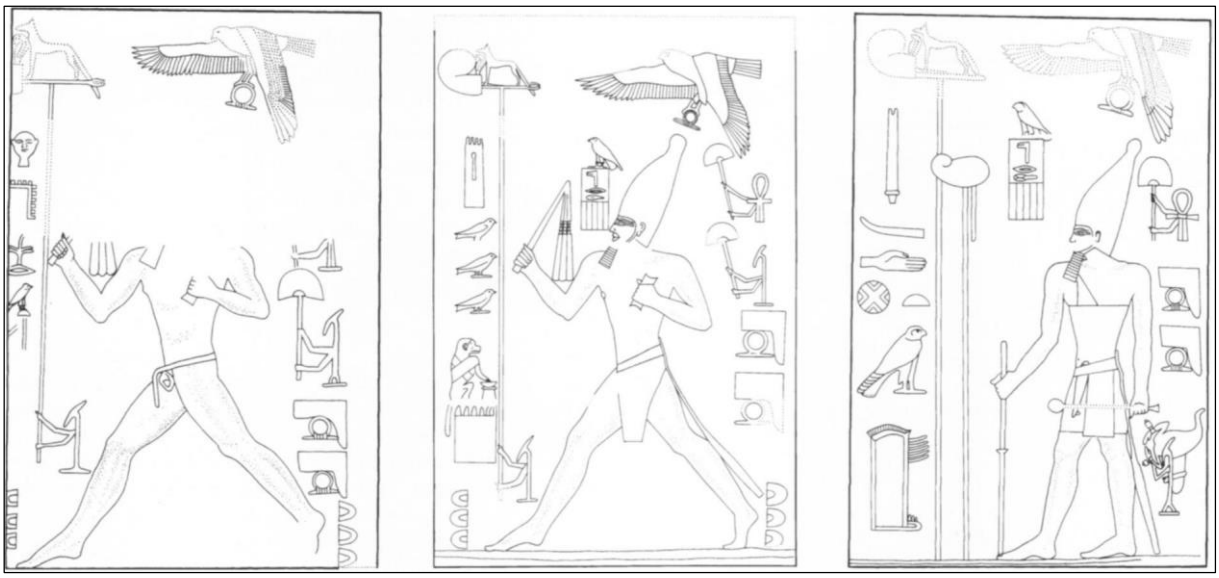


Figure 10: The relief panels underneath the Step Pyramid (Friedman 1995, 12).

a. b.

Figure 11: a. The cobra heads on the Sourth Tomb chapel (top: www.touregypt.net; bottom: hiveminer.com); b. Reconstruction of the South Tomb chapel in AC:O (screenshot made by the author).

a.

b.

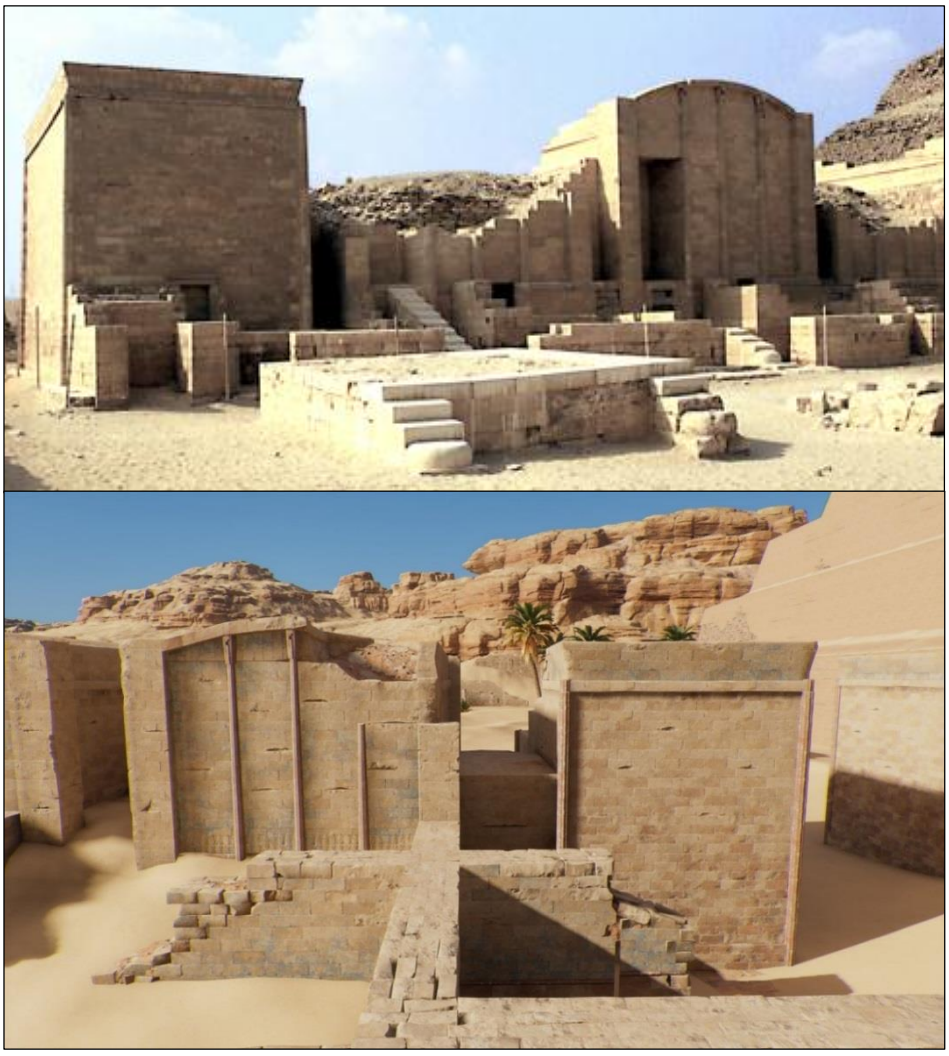


Figure 12: a. The dummy shrines on the Western side of the *heb sed* court (www.ancient-egypt.org a); b. Their reconstruction in AC:O (screenshot made by the author).

a. b.

Figure 13: a. The dummy shrines on the Eastern side of the *heb sed* court (www.ancient-egypt.org b); b. Their reconstruction in AC:O (screenshot made by the author).

a.

b.

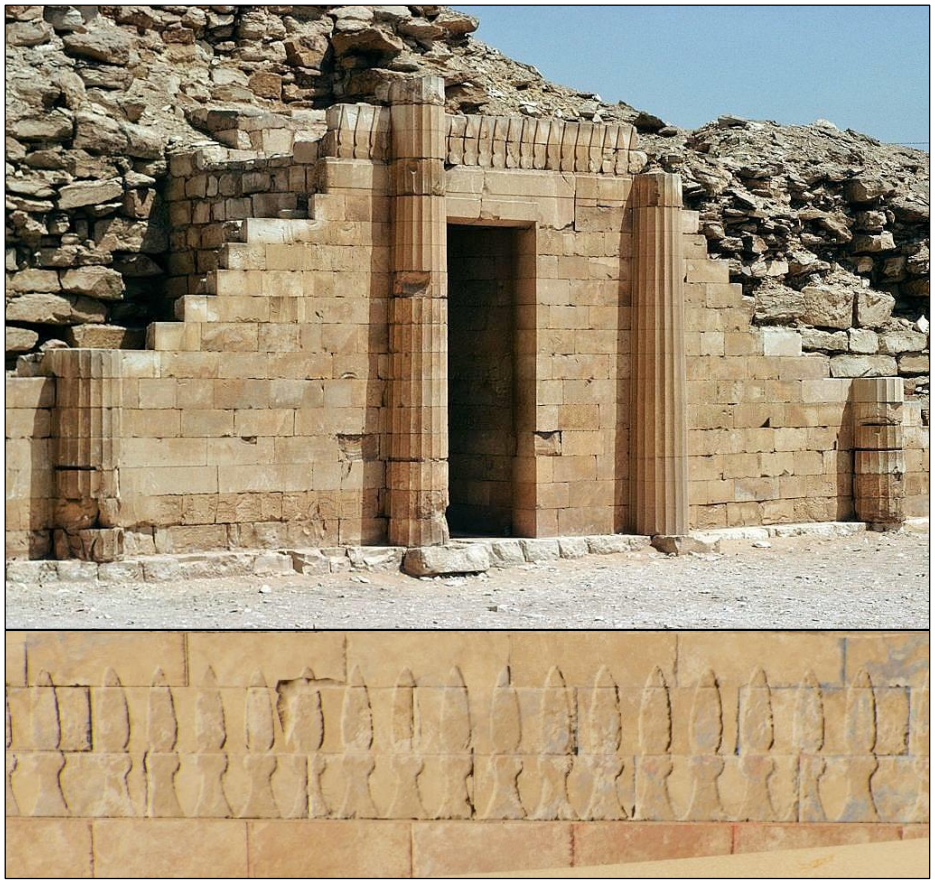


Figure 14: a. The Pavilion of the South (amntenofre.tumblr.com); b. The decorative frieze found on buildings East of the pyramid in AC:O (screenshot made by the author).

a. b.

Figure 15: a. The serdab statue of Djoser (www.timetrips.co.uk); b. Peering through the peephole in the serdab in AC:O, one faces the statue of a pharaoh (screenshot made by the author).

a. b.

Figure 16: a. The entrance to the substructure (pyramids.at); b. Reconstruction of the entrance in AC:O (screenshot made by the author).

2.1.2 Description of the game

The complex and its surroundings

The virtual Egypt of *Assassin's Creed: Origins* is a compact version of its real-life counterpart. By reducing the size of the whole of Egypt, the density of locations and objects is increased, without completely corrupting their spatial relation to eachother.

Figure 17: The Step Pyramid complex and its close surroundings as seen in AC:O from the North-East corner (screenshot made by the author).

Many areas full of interesting monuments had to be sacrificed in order to this, unfortunately. For that reason, the area around the Step Pyramid complex is not quite true to life. The monuments in close vicinity of the complex (the pyramids of Userkaf and Unas and the New Kingdom necropolis, among many others) have not been reconstructed in the game, which focuses north Saqqara around the Step Pyramid complex only (figure 17). The game designers did connect the complex to Memphis, which they placed to the East, by means of a causeway, lined on both sides with sphinxes, that starts at the colonnade entrance and swerves slightly south all the way to the Nile.

West of the complex is a mountainous area of dark rock, which in reality lies many kilometres further from the complex, a big stretch of desert separating the two.

The enclosure wall looks very impressive in the game. At least 4 times the protagonist's height, it must indeed be about 10 metres high. Parts of the wall are missing, but each

time in relatively small portions. Those parts of the walls that still stand (most of it) are full height, barely crumbling at the edges. Both western corners are covered by sand.

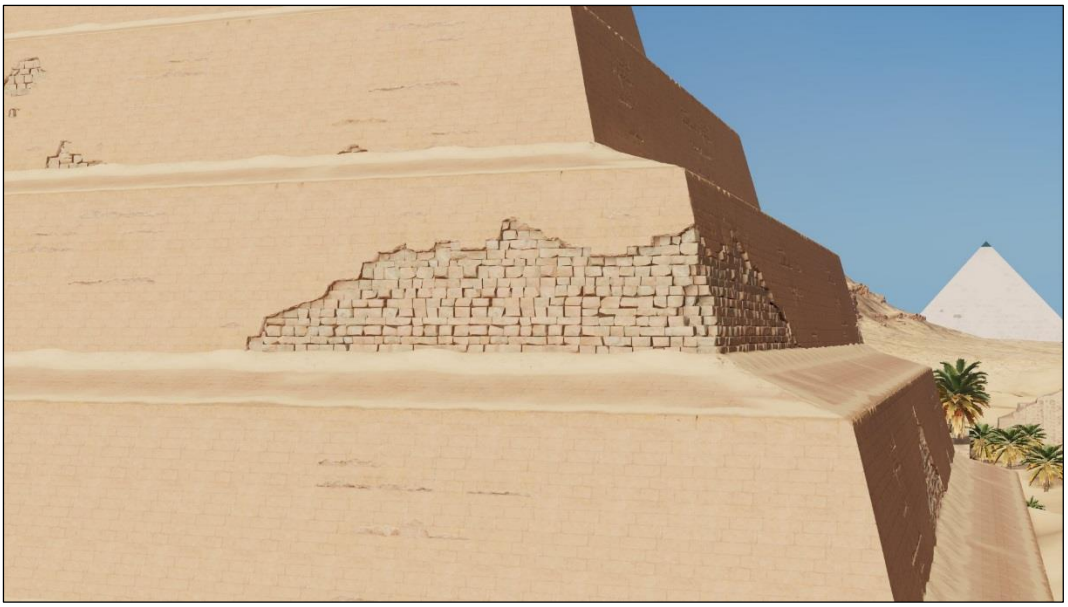


Figure 18: The limestone casing covering the stone building blocks is still mostly present in AC:O (screenshot made by the author).

Description of the Step Pyramid

The first thing one notices about the step pyramid in AC:O is that it is in better condition than the real monument. At the time of the game, it had already endured the elements for 2,5 millennia and faced the destructive acts of grave and material robbers. It had also already been restored during the 26th dynasty, when i.a. scaffolding was put up in the central shaft (Warner 2009, 98). In the game, the limestone casing on the pyramid is mostly intact, showing the incisions that resemble mudbricks (Watson 1987, 19; figure 18). In places, the actual stone construction blocks underneath are visible.

Each step (each horizontal plateau) is slightly aslope and the top is therefore not flat, although two big slabs attempt to make it so.

The entrance to the substructure of the pyramid is a trench on the north side. It is flanked by two sphinxes (figure 16b). The descending corridor has a deviation to the West as soon as the actual tunnel is entered. The slope of the corridor is quite steep, but there are no stairs. Already in this corridor one encounters sacks of grain and wooden biers for transporting them. At the bottom of the slope, a gallery runs off to the left, stacked with more sacks of grain in wooden rack cabinets. Halfway down this gallery, to the left, is an entrance blocked with rubble and beams. In the opposite wall is an opening to another descending corridor. At the end of this, are blocked entrances ahead and to the left. Going right leads to another descending corridor, still without stairs, that

continures around a corner to the left. There, one encounters another crossing: the corridor ahead is blocked, to the right is a crack (which the player can squeeze through to find a few rooms with large jars and a black buste of a pharaoh, probably Djoser) and to the left a short passage that brings one to the bottom of the enormous central shaft. Littered with big stones and some human bones, planks and other building materials, the burial vault reveals itself. Large stone beams in the floor cover a hollow space underneath, which the player can hardly see, let alone enter. On the West side of these beams is a rounded block of stone with an indentation on the top (figure 6b).

Each of the walls of the chamber has an entrance. Those on the north and south side are blocked, but an opening in the east wall takes one to a small corridor whose walls are covered in blue-green tiles. They form big panels (figure 8b) that are repeated around the corner to the left, which is a room that is exited quickly through another small corridor to the right. Here, one finds oneself in a corridor perpendicular to that which you came from. The wall right in front creates a difference in width between the part of the corridor to the left and that to the right, which is much wider. On both sides the tile pattern is repeated, but that particular dividing part of the wall is built of limestone with decorative five-pointed stars (figure 7b).

Taking the corridor to the left, one soon finds a dead end; a wall ahead and an unopenable gate to the right. Instead taking the corridor to the right, it is possible to take a corner to the left. The tiles are still applied to all walls. The wall to the left has a niche, in which a large vase has been put. Vases are littered around all corridors and rooms of the substructure, both intact and broken. Taking another corner to the left, one finds oneself in a corridor, still lined with tiles, that has three doorways in the left wall (figure 9b). They are blocked by a layer of cracked limestone, which can be broken through. The first one has solid rock behind it, but the other two give way to small chambers filled with artefacts like boats, seats, fans and many decorated boxes.

Continuing along the hallway takes the player to a niche with more jars, but turning left leads to another blue corridor, at the end of which is the same metal gate that was encountered before. To the right is a chamber with large jars and an opening to an even smaller chamber, almost entirely filled by a buste of a pharaoh, a copy of the one in the room behind the crack.

To get out of the underground palace, the player can take the same route back, or leave through a shaft above the room that was discovered behind the middle doorway. This shaft leads the player through sloping corridors to a spacious room with some more large vases and baskets. This room is left through a crack in the wall, which brings the player to the end of the very first gallery.

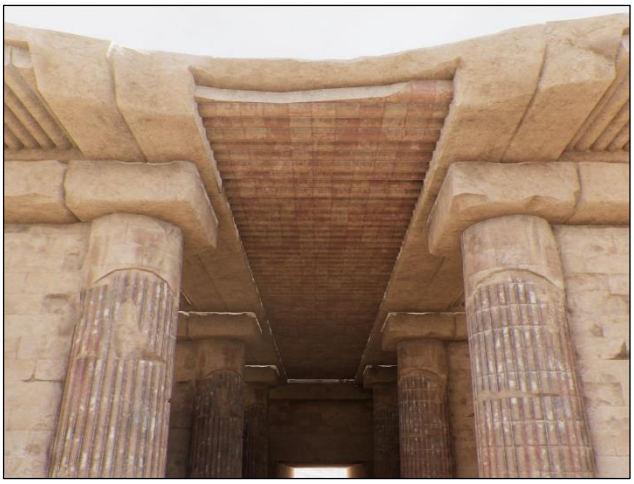


Figure 19: The ceiling of the entrance colonnade in AC:O, facing East (screenshot made by the author).

Description of the buildings within the complex

Again starting at the South Tomb and moving counterclockwise around the pyramid, short descriptions of the architecture within the complex will now be given.

The South Tomb is not very visible, for it is mostly covered in sand. The chapel abutting it does stick out, however, clearly showing the band of cobraheads around the top (figure 11b). There are no entrances to the building.

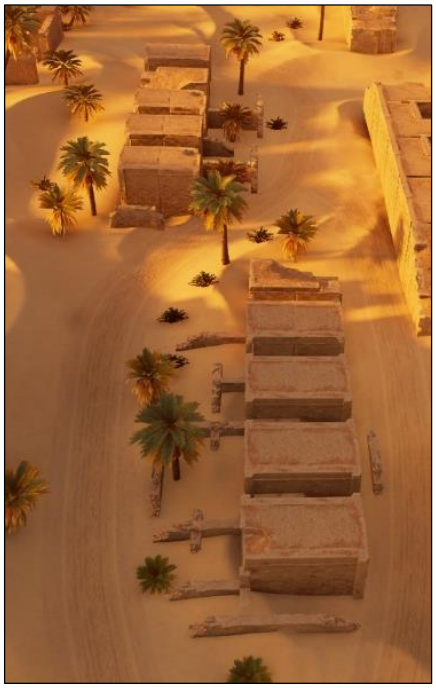


Figure 20: Two groups of buildings similar to those seen in the *heb sed* court in AC:O (screenshot made by the author).

The big *wsht*-court has some ruined bits of wall with engaged columns on its northern and western edges, a few random blocks of stone spread across it, between palm trees and bushes. Mostly, however, it is a big patch of sand.

East of the South Tomb are the ruins of the colonnade. Most of the pillar bases are still there and some reach up to their full height, but the largest part of the roof is gone. Only at the very entrance is there still some ceiling left. The stone is shaped like logs and has some traces of red paint (figure 19).

North of the colonnade is the *heb sed* court with its different dummy shrines. There are three kinds, as seen in figures 12b and 13b). In front of the

shrines on the west side are the remains of walls, forming small courts. Also the shrines are not completely intact, although most façades still stand. In the middle of the *heb sed* court are three wooden stakes, some distance from eachother.
Going north of the *heb sed* court are more buildings like those on the west side of the court, with rounded roofs and decorative columns. They are placed in two groups of five (figure 20). Just above the fake doorways is a decorative frieze of elongated spade-like reliefs (figure 14b), just as seen on most of the *heb sed* shrines as well.
Just north of the pyramid the exploring player will find a low wall with with two holes in it. Peering through these the player will see the statue of a pharaoh staring at you with his painted eyes (figure 15b). West of it are the ruins of a building whose rooms and doors are still present, though without ceiling. Amidst these partial walls is the trench leading to the pyramid's substructure.
Spread across the most northern part of the complex are palm trees and more ruined walls.
West of the pyramid are long rows of walls, often covered by sand. Most of it is roofless, but some chambers can be entered.
With that, the player has explored the entire Step Pyramid complex.

2.1.3 Conclusion on the overall accuracy

Both the real and the virtual Step Pyramid complex have been described from an archaeological point of view. Putting the descriptions next to eachother, the similarities and differences bring the overall accuracy to the fore.
Archaeological evidence of a causeway leading from the Step Pyramid complex to Memphis does not exist, since the exact location of Memphis is not even known. There is, however, a causeway from the complex of Unas (immediately south of the enclosure wall) that ran eastward with a similar offset to the south. Perhaps this was used as inspiration by the game designers.
The pavillions of the North and South have been interpreted differently by archaeologists and the game designers, but their locations are the same. The details on the walls are partially identical: the frieze of spade-like plants on the House of the South is present on both buildings, though also on the shrines in the *heb sed* court. The columns the pavillions are so renowned for are much more plain and equal to those on the shrines of the *heb sed* court. The reason the same constructs were used for the shrines in the court and those constituting the pavillions is simple: the time consuming efforts it would take to program another type of building were not worth it for the one

appearance they make in the whole game. Therefore, the designers must have settled for a combination between both types of building, resulting in some inaccuracies.
Some features of the real monument are missing: the boundary markers in the *wsht*-court are not present, nor is any trace of Temple T. Inside the pyramid are no robbers tunnels, even though looting of the pyramid would have already happened at the time of the game.
Another inaccuracy in the substructure of the pyramid is the burial vault. The granite beams that form the top have been ligned north-south in the game, while in reality they are placed west-east. As a result of this inaccuracy, the granite plug (which is insinuated with the rounded block of stone) is located on the West side of the vault, instead of the North.
The false-door stelae in the king's palace to the East of the burial vault are not present in the game as such, but their existence is not denied either. The reliefs are not recognisable due to the added cracks, but once broken through, the remainder does show hints of the original image (compare figure 21 to figure 10). The doorframe and small windows next to it are also accurate. Of course, the rooms behind the doors have been added under the guise of stimulating exploration, as is explained in chapter 3.

Figure 21: The middle of the false door stelae, broken through, as found in AC:O (screenshot made by the author).

A few features were added to the game that have not been found in real-life: of the many artefacts scattered around the substructure corridors is no evidence, nor of the sphinxes next to the trench entrance is no evidence. Their presence in the game can be attributed to a common aspect of game mechanics, which is to place items throughout the game in such a way that they guide players. The entrance can be hard to find, but the symmetrical placement of the sphinxes helps the player locate it more easily.
There are also more blue-tiled walls in the game, for example the one opposite the false doorways. It is likely that the game designers used the better preserved substructure of the South Tomb for their reconstructions, as this was done in reality as well when restoring the pyramid.

2.2 Choices of representation

The previous paragraph showed that the Step Pyramid complex in the game is an almost exact copy of its real-life counterpart. To recreate a famous monument is different from some smaller choices that the game designers faced in the conversion from real to virtual. The following three case studies demonstrate situations in which the designers had to decide whether they would make a "game choice" or not. Making a game choice indicates picking entertainment over archaeological and historical accuracy, or being limited by the possibilities of the game medium.

2.2.1 The mummy portraits of Faiyum

In the south of the map of AC:O lies the Faiyum Oasis; a large body of water, in the east connected to the river Nile, that is quite densely populated with Greek settlements and temples. The real Faiyum Oasis, just south of Cairo, is best known as the area where Graf and Petrie found hundreds of death masks; portraits of the deceased painted on wooden boards that were incorporated in the linen bindings of mummies during Roman times (Zaloscer 1961, 13-6). In the game, the portraits can be found in a house south of

Figure 22: Left: Faiyum portrait of a young man as found in real-life (www.gnostiek.nl); right: the same portrait as found in AC:O (screenshot made by the author).

the town of Philadelphia, but occasionally also attached to a mummified body in temples elsewhere in the game.

However realistically the portraits have been recreated in the game (see figure 22), the chronology is wrong: mummy portraits only started to be produced in Roman times, primarily in the 2nd and 3rd centuries AD (Ramer 1979, 1). The historical researchers employed by Ubisoft were aware of this without a doubt. What then made them incorporate the famous Faiyum portraits in their game? The author believes it was exactly that: their fame. While the portraits were made in Roman times, with Greek techniques, they are Egyptian in their essence; strongly connected to beliefs of the afterlife and placed on otherwise traditionally mummified bodies (Ramer 1979, 1). Therefore, they have become one of Egypt's most well-known trademarks, in line with the pyramids and hieroglyphs, though part of a much more recent history. Leaving them out of the games would feel incomplete to some while for others it may mean they never get acquinted with the portraits at all, despite their importance in Egyptian heritage. The game choice that was made gives a wrong image to the players but it *does* enhance access to archaeology.

2.2.2 Marble statues

The game world of AC:O is littered with statues, both Greek and Egyptian and even hybrids. They can be found on temple façades, in gardens, as decoration of bridges and streets – truly everywhere. The distinction between Greek and Egyptian statues is easily made: the Egyptian statues are clearly pre-Hellenistic, showing animal bodies with human faces or vice versa, often fashioned from basalt or granite. They contrast strongly with the Greek statuary one encounters most frequently in Alexandria and the Faiyum: white marble statues of lifelike heroes, rulers and deities in contrapposto on pedestals (figure 23) or incorporated in temples as pillars (most often caryatids).

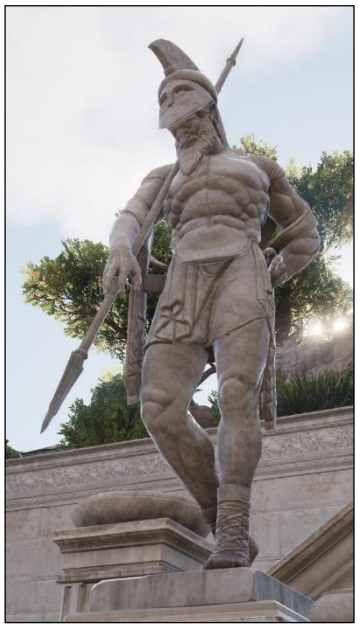


Figure 23: White marble statue of Mars in AC:O (screenshot made by the author).

This is where the game deviates from reality, because Greek statues were in fact not white, but painted in the brightest colours (Bradley 2009, 429). Research into the colour coatings on Greek sculpture has been done for

multiple centuries, yet still does not seem to be able to change peoples image of Classical sculpture. Recently, attention was drawn back to the topic after published works by, most notably, Vinzenz Brinkmann (Bradley 2009, 427).

Although the game developers had a great platform to spread this information, they decided not to. It can be argued that this game choice was made from an aesthetic as well as immersive point of view. Leaving the marbles white, in accordance to the general perception, contributes to recreating how people envision antiquity. Thus, when they walk through virtual antiquity, it feels right; they are surrounded by people dressed in tunics, intact temples and… typical Greek, white marble statues. Still, it should be noted that some of the statues related to a temple's construction (as caryatids or akroteria), are in fact coloured (see figure 24). It is unclear why the designers made the choice to correctly represent statues in these cases.

Figure 24: Left: Painted Serapis on the Serapeion in Alexandria in AC:O; right: painted statues functioning as caryatids in a temple in Alexandria in AC:O (screenshots made by the author)

2.2.3 Temple access

As would have been the case in ancient times, virtual Egypt is filled with temples. These can be explored just like every other building in the game; one simply walks through the doorless entrance or climbs over one of the decorated walls. However, this freedom to roam around a temple is not in correspondance with ancient Egyptian custom. The temple could only be entered by a select group of people: priests and sometimes elite members of society (Baines 1997, 218; Sauneron and Stierlin 1975, 40). While the temple's physical presence was a symbol for the presence of the gods and cosmos to the common people, it was the interior that was regarded as sacred. Therefore, all the

impressive statuary and hieroglyphic texts can only be found on the inside, resulting in clusters of high-cultural artefacts (Baines 1997, 219).

Not incorporating all this artefactual richness in the game would be a shame. The author argues this must be one of the reasons temples were turned into accessible areas in the game, allowing the player to explore the wealth inside. It also provides plenty of mission oppurtunities, in which the player not only interacts with the priests, but sometimes also partakes in certain rituals that would have been performed in the past (for example in the side quest “The Festival”). Another reason the player is allowed access could be the position of the protagonist; Bayek is a Medjay, a group of fighting men who appear to not only have functioned as a police force or mercenaries, but were at times recorded as temple personnel (Liszka 2012, 260-5). This explains the tasks Bayek completes for priests in side missions and his admission into the temples. Either way, this game choice greatly enhances the entertainment, but at the same time also access to Egypt’s archaeology.

3.

Review of the Discovery Tour

From *Assassin's Creed II* onward, the *Assassin's Creed* series has always featured a database, accessible from the in-game menu. The database is divided in categories (e.g. "people", "locations", "documents"), which vary each game and which often lead to further division into subcategories (e.g. under "people": "individuals" and "groups"). The entries contain information about people, locations and events encountered while playing the game. The information is of historical nature and provides players with interesting background knowledge. Reading the database entries is completely optional, but the player is constantly reminded of them as new entries shortly appear on the HUD (heads-up display).

While a trademark of the series, *Assassin's Creed: Origins* (AC:O) does not include a database, despite claiming: 'We spent years researching […] We had Egyptologists on the team, and we have historians embedded with us on the floor. Sometimes it's researching online, finding the people who know the time period well and just contacting them, asking them to help join us or help feed us information.' (Nielsen 2017). The information was in the developing team's possession; they had even gathered more than they had for previous games. So, instead of creating another database, they created the "Discovery Tour". Ubisoft historian Maxime Durand explains: '[Discovery Tour set out with a different purpose, where] keeping the interactivity, keeping the movement, keeping the climbing, the parkour, the everything, was central. We didn't want a static experience. It's all about having fun, still. Visiting Egypt in a new way, and learning about it.' (Reparaz 2018). In fact, the developers of *Assassin's Creed* had always wanted more than just a database, but the technology did not allow them to create the experience they now have been able to give to players through the Discovery Tour. Essentially, the Discovery Tour is a database narrated by a voice-over and inaccessible while playing the actual game. The Discovery Tour is acquired as dlc (downloadable content), released on 20 February 2018. People in possession of the main game were able to download it for free and access it via the main menu of the game. Atypical for dlc, the Discovery Tour can also be purchased and installed as a standalone game, which allows schools to use it. The reason it works as standalone game is because nothing was changed about the game's environment, which means it is still a complete sandbox (an open world environment that lets the player roam freely). What differs with the main

game is that all game elements were taken out; movement is still the same (everything can be climbed) but combat and danger have been removed, along with missions and storylines. The open world of AC:O has been made even more accessible and has turned into a friendly playground.

Scattered across this playground are golden, shimmering markers, which indicate the

Figure 25: The golden line indicates the route of a tour in AC:O Discovery Tour (screenshot made by the author).

start of a tour. There is a total of 75 tours available, each on a different aspect of Egyptian society both in ancient and Ptolemaic/Roman times. They are divided into 5 categories: Egypt, pyramids, Alexandria, Romans and Daily Life. The latter is arguably most interesting to archaeologists, for it is dedicated to showing the customs and activities of the common citizens of Egypt, instead of spectacular historical events. Durand explains the decision to implement this kind of information as well: '[…] history is not just about famous people, about Cleopatra and Julius Caesar - who are still very interesting, and we have tours dedicated to them - but we also want to talk about all the different aspects of life in that era.' (Reparaz 2018).

When any of the tours is entered, a golden line appears on the ground, which the player can decide to follow (figure 25). The line takes one to the various "stations" of which each tour consists. When a player arrives at a station, the game momentarily takes control of the camera and the voice-over starts narrating. Often, the player resumes control over the camera once it is in place, allowing one to look around while the information is provided. During the talk of the voice-over, it is also possible to press a button and enter a screen called "more information". Usually there is an image of a

specific artefact or map displayed here, or a photograph of the real version of whatever one was looking at in the game. The screen needs to be exited again, as well as the station itself, bringing the camera back to the avatar and putting the player in control again. Most tours also contain a station labelled “behind the scenes”. These offer insight in designer choices, in essence explaining why some aspects of the game are incorrect or what their representation was based on. An example of this is the Great Library in Alexandria, whose façade, as a station explains, was based on the ruins of the Celsus library at Ephesus.

Some tours contain 18 stations, while others only 4. An indication of the length of a tour is given before the tour starts. When a tour has been completed, it becomes golden in the player’s “passport”, a menu function listing all tours (figure 26).

Other menu functions allow the player to pick an avatar of their choice (for example Cleopatra) and enable fast travel directly to the starting points of the tours. The layout of the menu is just one of the many things about the Discovery Tour that shows it is still a game and not an extended version of the databases seen in the previous games.

Figure 26: The passport tab in the menu of AC:O Discovery Tour (screenshot made by the author).

‘Ever since the first game, we also had a lot of testimonies from teachers, from professors, asking, ‘Would you consider making a version of AC without conflict, without narrative?’ They'd been using *Assassin's Creed*, recording sessions with their own consoles, trying to bring it into classrooms – but the age rating, for instance, was an issue. A lot of teachers understood that the attractiveness of a video game was important, was interesting, and people engage with that. But they couldn't bring the

game [as it was] to classrooms.' This citation of Maxime Durand (Reparaz 2018) explains one of the main drives behind the Discovery Tour; the information of the game should be brought to schools *as a game*.

Despite this claim, the stations of the tours offer only snippets of information, resulting in the use of complicated terminology that is generally not further explained. The information can therefore seem lacking or meaningless, especially with no prior knowledge of the subject. The use of complicated language is also not conducive if *children* are to easily pick up knowledge, which is exactly what the game medium could otherwise excel in.

Another point of critique was given by an online reviewer, who argued that the Discovery Tour mode is nothing more than listening to an audio tour in a virtual museum. It must not be forgotten, however, that the player is still completely in control and is released into the open world each time a tour ends. The player can then go and explore, climbing on buildings to see some details from up close or to take in the view of the surroundings. It allows the player to navigate through a world and take as much time as they want, without being harassed by a group of bandits or soldiers. It also leaves the world much more objective, for there is no influence from a storyline that may change the player's view of specific areas.

Still, with the intention of the developers in mind, a critical analysis remains important. Most notably, the facts presented in the tours need to be completely accurate. Creative director Jean Guesdon himself said: 'We do our maximum to be as accurate as possible […] It's always as much a creation as it is a recreation, so technically the idea is that we gather a lot of resources that are really details and pieces, basically, from a lost world. And then we have to fill the gap and […] glue that together and […] build a different world, so it will never be a hundred percent accurate, that's for sure.' (www.trustedreviews.com). Even so, to evaluate the accuracy of the tours, the following section will look at the two tours dedicated to the Step Pyramid complex, as the research on that particular monument can be found in the previous chapter.

There are two separate tours; one on the complex itself, consisting of 20 stations and with an estimated duration of 13 minutes, and one on the inside of the pyramid (10 stations and an estimated time of 6 minutes).

While listening to the tours, it is wise to take into account who made them. Archaeologist and historical illustrator Jean-Claude Golvin was very much involved in the process, but, as mentioned before, most other members on the team (apart from the

designers) were historians and Egyptologists (Nielsen 2017). Because of this, the focus of the tours is not only on what the reconstructed structures show, but also on what they perhaps *mean*. As a result, historical speculations (along with facts) and mythological beliefs are incorporated as well. However, even in the archaeological literature that was read for last chapter's research, such information often came to the fore and can therefore be confirmed as valid, in most cases. When it comes to the archaeological (mostly architectural) information that is given, the resemblance to the information from literature is striking. It is clear that the research for the reconstruction was done very thoroughly, though references are only given of the images shown in the "more information" section. The narrator does, however, mention Jean-Philippe Lauer as the main excavator of the pyramid, which could be interpreted as an indirect reference. This perhaps suffices for teachers who want to find more information themselves, but is not ideal for players of the main game, who happen to give the free Discovery Tour a try.

A lot of attention is paid to the details that have been incorporated in the game and even those that have not to their fullest, of which the Pavilions of the North and South are a good example. As can be read in paragraph 2.1.1, these were not reconstructed after common interpretations and drawings, but the narrator does describe them as such: 'Rectangular in shape, the two replica structures face one another.' In addition, the "more information" section shows a drawing by Golvin on which the correct layout of the buildings is visible.

As concluded in chapter 2, the inside of the Step Pyramid is almost completely true to life, apart from the addition of treasure rooms behind the false door stelae in the palace section of the substructure. By means of a "behind the scenes" station, the narrator explains these were added purely for exploratory entertainment, admitting they do not exist in real-life.

After taking the tours about the Step Pyramid complex in particular, but also others, it seems only right to conclude that the provided information is representative of facts and theories found in literature. This research affiliates with a statement by Maxime Durand: 'We try to make people learn something new, but at the same time, we want to bridge back to formal education and institutions. We never made the Discovery Tour to replace teachers; we've made it as a tool to make history broadly accessible.' Indeed, the Discovery Tour alone may not function as a teaching system, but it certainly functions as a tool. Teachers have been using *Assassin's Creed* games in their lessons for years, but were restricted by the violence and narrative (Reparaz 2018). The Discovery Tour allows them to finally incorporate teaching through gaming in their

lessons. Apart from that, for regular gamers, this dlc can be seen as a step to increase interest and as a very rough foundation of knowledge about Ancient Egypt.

4.

Public and Academic Opinion: survey research

Apart from investigating the representation of archaeology in virtual games, the reception of that archaeology needs to be tested before considering the gaming medium as a tool in public outreach.

To gather insight in both the archaeological impact of the game on players of *Assassin's Creed: Origins* (AC:O) and the academic opinion on using it in public outreach, two surveys were created. More information on their structure and aim will be explained in paragraph 4.1, after which a summary of the results is given in 4.2. Paragraph 4.3 means to outline which parts of the gathered information are directly relevant in answering the research question of this thesis.

4.1 Data collection

Creation of the surveys (Appendix 2) was done using an online tool, www.survio.com. The questionnaires that were made here could be shared via unique online links, the responses to which were collected again on www.survio.com.

Two surveys were made:

1. A survey directed towards gamers, who have played AC:O for at least 2 hours (considered long enough to get a solid first impression of the game), was spread by sharing the link online, firstly through acquaintances of the author but also via the game store Game Mania in Leiden. A total of 83 responses was collected for this survey.
2. The other survey is directed to those members of the academic community that have played AC:O for more than 2 hours. In order to reach academics, the link to the survey was spread within the Faculty of Archaeology at Leiden. As a result, bachelor and master students but also PhDs and professors, have filled out the questionnaire. Whether the link was also spread to scholars of other disciplines cannot be traced, but in order to keep track of the level of relevance of the answers, the survey contatins a question pertaining to the participant's prior knowledge of Egyptian archaeology. The survey yielded 19 responses.

The difference in response rate to the two surveys is not a problem in their analysis; the questions differ greatly and they are not to be compared to each other. The high response rate to the gamer's questionnaire is convenient, because, in the end, they form the target audience of any research into this type of public outreach. The academic's questionnaire merely functions as an indication of the willingness within the academic archaeological community to employ the gaming medium in public outreach. Of course, it should be taken into account that those academics that filled out the questionnaire have played AC:O for at least 2 hours, which already marks them as a select group within the field of archaeology.

As mentioned before, the questions in the gamer's survey are very much geared towards acquiring an understanding of whether players have any interest in the archaeology in the game and what they remember about it. The following is a short explanation of why each question was asked in the gamer's survey. The word 'history' is used instead of 'archaeology', because non-academic participants are likely to understand it better. As the questions are object-focused, the two words are expendable in the interpretation of the responses.

1	*How many hours have you played* Assassin's Creed: Origins*?*	This question serves only as indication of the validity of the rest of the answers; the more the participant has played, the more grounded their answers.
2	*Did the historical setting of the game influence your decision to buy it?*	The answers to this question will give an insight in prior interest in the historic theme of the game.
3	*Do you think the things you saw in the game are historically accurate?*	This question probes at how gamers conceive accuracy of things in the game; do they believe it is accurate or do they assume it is all just entertainment?
4	*Has your interest in Egyptian history increased?*	Did the game elicit any interest in the "truth" behind the explored world?

5	*How did you spend most of your time in the game?*	This is another question in service of the others that gives the author an indication of the focus of gamers while playing AC:O.
6	*Did you take a closer look/pay attention to the objects lying around in the world, such as vases and statues etc.?*	This question tests the awareness of and intrigue for the archaeological objects scattered around the game world; are they worth the player's time? Do they care the objects are there?
7	*Did you read the scrolls and other interactive objects without apparent mission purpose?*	Building on the last question, an even higher level of interest in the reconstructed artefacts is tested, that is more time-consuming.
8	*How often did you look up more information about something you encountered in the game?*	This question aims to get an assessment of how active the player thinks about the encountered archaeology during and after a playing session.
9	*Do you remember the name of the deity that is venerated in Alexandria? Write down the name.*	This is meant as an exam question: what information was retained? Except this time, the player will have remembered without ever meaning to - the ultimate goal of the use of games in public outreach.
10	*Optional: what new thing(s) have you learned about Egypt?*	If the participant is willing to write something down, it will show enthusiasm about the knowledge they unknowingly acquired, along with *which* information has stuck with them.

A similar explanation to the questions in the academic's survey follows. This survey is more focused on current opinions in the field of academic archaeology about the game medium as tool in public outreach and not on the objects seen in the game.

1	*How many hours have you played* Assassin's Creed: Origins*?*	This question serves only as indication of the validity of the rest of the answers; the more the participant has played, the more grounded their answers.
2	*How acquainted are you with Egyptian archaeology?*	Another question to give the author an indication of the validity of the other answers.
3	*What was your first impression/reaction like (after playing for 2 hours)?*	The first impression is very important when it comes to the overall accuracy of the game, which is what the author wants the academics to give their opinion on.
4	*How accurate would you rate the overall representation of Ptolemaic Egypt?*	With the academic's (partial) expertise in mind, they should be able to give an indication of this after playing for a few hours.
5	*Would you say archaeological objects are clearly presented in the game?*	Does the academic think archaeology was taken serious enough to feature prominently in the game or could the presence of artefacts be more illuminated?
6	*Does the game make you feel like you have been taken back in history?*	Especially for archaeologists and historians, who spend their lives (re)imagining the past, the game could feel completely right or completely off, unlike the vision in their heads.
7	*It is important to communicate all kinds of archaeological finds to the wider public – not just famous examples.*	Academics can give their opinion on this statement on a scale from strong disagreement to complete agreement.
8	Assassin's Creed: Origins *could help elicit interest in Egyptian archaeology among the public.*	Same as the previous question. Focusing more on the opinion of the academics on AC:O as an instrument for archaeologists

		and historians in reaching the public.
9	*Do you think the gaming medium is a good way to communicate archaeology to the wider public?*	The key question in the academic's survey; what is the opinion of the academic community when it comes to the game medium as a tool in public outreach?
10	*(Optional) Explain your answer to question 9:*	The answers to this question will provide more thorough insight into the reasoning behind negative and positive reactions to the previous question.

4.2 Results of the surveys

The results of the surveys (Appendix 3: Results of the gamer's survey; and Appendix 4: Results of the academic's survey) are analysed in comparison to a prediction model (frequency expected). The answers to each question form a uniform frequency distribution – in effect just a tally of the responses in relation to each value. The value labels differ per question and, therefore, so does the calculation of the expected frequency.

Because the answers to questions based on a Likert scale are ordinal, the author decided not to treat them as uniform, the assumption being that people are less likely to pick extreme options, preferring more reserved answers. Instead, a binomial distribution is assumed, supposing the middle class is seen as neutral, on one side declining to a negative extreme and on the other to a positive extreme. The questions this applies to have a frequency expected based on the binomial distribution table, where p=0,5.

4.2.1 Results of the gamer's survey

In appendix 3, graphs of the results in percentages can be found, along with a table showing the raw data in number of selected answers.

Most participants have played the game for more than 40 hours, which means their answers are based on thorough knowledge of the game. For many of them (84,3

percent), the historical setting was attractive and influenced their decision to buy the game. In accordance to this, many also believe that the game world offers a mostly accurate version of the past; 71,1 percent is convinced the game is accurate “most of the time”, while 28,9 percent thinks it is “sometimes”.

Only one participant was not interested in Egyptian history prior to playing the game nor after. The biggest part of the participants (62,7 percent) was already interested, but this interest has increased after playing AC:O. Interest was sparked for the first time for only 10,8 percent of the participants.

While exploration of the game world seems to be important to many gamers (25,3 percent), the greater part of them (65,1 percent) is very meticulous and attempted to complete everything the game has to offer, which again indicates very extensive knowledge of all game aspects.

By far the majority of the participants showed interest in the archaeology displayed in the game: 85,5 percent of them took time to take a closer look at objects and the same number goes for reading scrolls and stelae that had no clear mission purpose. Although the figures are the same, it is not the same participants that make up these answers, which means some did read the scrolls but did not examine artefacts and vice versa. Interestingly, very few participants (9,6 percent) did not ever look up more information about the people, objects, monuments and events they encountered in the game. An equal amount did so more than 4 times during or after a play session.

Question 9, which meant to test the subconscious recollection of information that could have been acquired in the game, was an open question, but after counting the given answers the result was this: 37 participants remembered that the deity most venerated in Alexandria was Serapis, while 46 did not.

The entries in open question 10 exhibit enthusiasm among the players about things they learnt whilst playing. One player wrote he learnt ‘Too many [things] to be written down. I’ve learned about daily life, religion, culture, politics, war, Egypt’s geography, cities and [their] landmarks and many other things I didn’t learn in school.’ Another respondent made a similar remark, stating ‘The history is a lot more [vast] than we see in history books.’ Both answers display a certain awareness of the players that the game is able to give them a much more complete image of Ancient Egypt than texts can. One respondent hit that same nail right on the head, commenting: ‘[I got] more information about daily life instead of [what] a lot of historical texts/documentaries are focused on (pharaohs and architecture sorts of things).’

4.2.2 Results of the academic's survey

In appendix 4, graphs of the results in percentages can be found, along with a table showing the raw data in number of selected answers.

Among the academics, the total amount of playtime is less than the playtime of the gamers, but still more than 50 percent has spent over 40 hours in-game. Of all the academic participants, only 31,6 percent was never taught about Egyptian archaeology, the majority of 68,4 are well-informed; 10,5 percent (2 participants) of which even qualified themselves as experts.

The first reactions to the game were all positive, a slight majority (52,6 percent) of arguments being that the participants felt like they were finally able to walk through Ancient Egypt. Only one participants rated that world as "mostly inaccurate", 3 decided to remain neutral, no less than 52,6 percent thought the game made a "good attempt" at representing Ptolemaic Egypt and the last 26,3 percent would even call it "overall accurate". When it comes to more specific points of representation, which the following question (question 5) focuses on, all but one participant (5,3 percent) agree that the game clearly represents archaeological objects, in contrast to the expected 50 percent. The feeling of being taken back in history overcame all respondents, 57,9 percent of them more so than the other 42,1 percent.

The discussion that comes before the issue of adequate public outreach is whether it is at all important to let the wider public know about all kinds of archaeology and not just the sensational examples. The academic's opinions on this were mostly in one line, agreeing that indeed all kinds of archaeology need to be communicated to the wider public, but one of them "strongly disagreed" with that statement and one remained undecided.

A majority of 84,3 percent is convinced that *Assassin's Creed: Origins* could help elicit interest in Egyptian archaeology. Only 15,8 percent remains undecided while not a single participants disagrees. The follow-up question (question 9) finally truly uncovers the academic's view on use of the gaming medium in public outreach, as it comes straight to the point. A good 94,7 percent (which equals 18 out of 19 participants) believes the gaming medium is a good way to communicate archaeology to the wider public. One participant disagrees and explains in optional question 10 'there's too much else happening', but does not reject the game as a way of 'raising general awareness'.

4.3 Summary

From the responses to the surveys, a few trends can be identified that influence the answer to the research question of this thesis. Most importantly, question 4 from the gamer's questionnaire shows an increased interest in Egyptian history. Therefore, one is able to say that question 4 shows increased interest in Egyptian archaeology as well. What was most important to retrieve from the academic's questionnaire was whether the archaeological community generally believes the gaming medium is worth considering for public outreach. The author did not expect the positive response that emerged from the results. Of course, this positivity could be explained by the fact that the scholars that participated in the survey are also gamers, but looking at the game from an academic perspective (which the questions compelled the participants to do) is very different from looking at it as gamer. Therefore, the general agreement that the medium is indeed suitable or at least worth considering for public outreach, is still reflective of the opinion of the archaeological community.

The academics that participated in the survey have spent their full careers (re)imagining the past, so if the game is able to make them feel like traveling back in time, the vision the game brings across must be right. That vision is what is also conveyed to the unknowing player.

Further discussion of the survey results can be found in the next chapter, which will link them to the research question and other chapters more concretely.

5.
Discussion

Before answering the research questions drawing on the results from the previous chapters, certain aspects they entail require further discussion or clarification.

5.1 Is video gaming an educational medium at all?

There would be no point to this research – to test whether the gaming medium can contribute in archaeological public outreach - if the foundations were not stable. In this case, that foundation is the gaming medium's ability to transfer information of whatever nature.

Some arguments regarding this were given in paragraph 1.1, focused on those characteristics of the gaming medium that stimulate the brain to retain knowledge acquired in-game. These characteristics included player involvement, immersion and interaction, which all aid in the retention of information without the player realising the effort it takes (Hawlitschek and Joeckel 2017, 84; Calleja 2011, 42). It is memory from experience, rather than from observation, that leads to this. A player is in control and replaces the 'director', who dictates a consumer's attention and who places time constraints in other media. Critique on this independency of the player is the very same fact that their attention is *not* drawn to, in this case, archaeological objects or architectural features on Alexandrian temples, to give an example. Will players see and find the archaeological information spread throughout the game world if nothing directs them there?

As Calleja states: 'Human players and, to a more limited degree, AI [artificial intelligence] behaviour modulate what designers intended or expected players to experience […]' (2011, 141). Inherent to games is a means to guide players - be it through spatial organisation of levels or through the narrative and side quests - greatly decreasing the number of ignorant players. As the gamer's survey results showed in questions 6 and 7, nearly all participating videogame players took time to look at archaeological objects in the game and interacted with them (Appendix 3).

A game cannot decide to only represent those areas seen in a linear experience, like the sets of a movie; out of cameraview, the world ends. In open-world games, however,

everything needs to be created in 360 view and fit the player's experience. Because of this, a game will be able to show all aspects of a past world and not focus on famous monuments alone. The less spectacular material culture automatically gets a place in the reconstructions, for they complete the world. Such objects are often part of "daily life", an aspect the designers put a lot of emphasis on in the Discovery Tour as well, as explained in chapter 3.

Studies show that multimedia learning, and gaming specifically, results in better learning achievements, as processing information by visual and auditive methods can simultaneously lower loads in the working memory (Kiili 2005; Katsionis *et al*. 2005). Not only has the educational potential of video games been tested before, the medium has also been explored to serve as a purely educational tool. This research deliberately does not consider the games that result from the latter, for they are not the games that are so widely played by all ages and all over the world. As will be discussed below, it is the appeal of the mainstream game that actuates the potential of being used in public outreach. It appears teachers have recognised this potential for many years, as they have tried to implement games from the *Assassin's Creed* series in their classes since *Assassin's Creed II* came out in 2009 (Reparaz 2018). Teachers are a providing factor within the field of public outreach, as they are an influential authority in almost every child's and young adult's life. Therefore, for Ubisoft to create the Discovery Tour and gear it towards schools, is a positive step in the direction of public outreach.

However, the matter remains (as mentioned in chapter 3) that the language in the tours is often complicated and the provided information is unsourced. If a teacher is involved, they will be able to fill in those gaps and offer additional information, using the Discovery Tour as a means to give their students an impression of Ancient Egypt. The developing team did research themselves to test the applicability of the game in schools (Donlan 2018). After a general test, a group of students was split in two; one group played the Discovery Tour before taking another test, while the other was taught by a teacher. Scores for both groups went up by a lot: the Discovery Tour group from 22 to 41 percent correct, the teacher's group from 22 to 52 percent (www.youtube.com). It shows that without effort or teacher guidance - just *play* - the students managed to acquire a lot of knowledge. This is in line with the research done by Hawlitschek and Joeckel (2017), who employed the game *1961*, about the building of the Berlin wall. They told one group of middle school students to play the game and in the meantime learn about its historical content, on which they would be tested afterwards. Another group was told 'Now you can play a computer game. Have fun!' The results from the

subsequent test showed that 'Students in the group with learning instruction had significantly ($p < 0.05$) lower scores in the transfer test.' (83). It proves the ability of the gaming medium to transmit knowledge without the player even realising it.

A very different aspect of the gaming medium that should be discussed is the matter of game choice, as explained in chapter 2. In essence, it would be a negative factor when considering games for public outreach, for it inherently means decisions were made in benefit of the gamic elements of the game. However, as demonstrated in paragraph 2.2, this is not always the case. Gamic elements can also contribute as incentive to find bits of information hidden in the world or to complete all tours in the Discovery Tour. Gamers tend to want to complete all "achievements" a game offers them. Question 5 of the gamer's survey shows most gamers (65,1 percent) indeed tried to complete everything the game has to offer. This is part of the entertainment nature of games, even though it not necessarily subsumes 'fun'. Calleja argues that, especially now that games are often partially online, 'players often spend extended periods of time engaging willingly in activities which even the players themselves view as tedious and laborous.' (2011, 52). In the case of the Discovery Tour, the designers made use of this knowledge by implementing what is arguably a gamic element: the passport that shows the player which tours they have already completed. Judging from Calleja's text and the results of the survey, players are stimulated to complete all tours in order to get a complete passport. This not only means the players hear and read all the information the Discovery Tour has to offer, it also shows their dedication to the game they play. Public outreach could certainly make use of that.

5.2 Are *blockbuster* games suitable for public outreach?

Because this research focuses on a mainstream game, developed by a major company, with lots of money and people to create it, it is necessary to discuss how this is problematic to archaeological public outreach, or how it is a positive contributing factor. The most obvious disadvantage of a blockbuster game are the high financial stakes it depends on. Fortunes are invested in these types of games and so their main purpose becomes to *sell* to the average gaming community and make profit. Because of this, the designers are bound by mainstream views and gamer's wishes. On top of that, they cannot make radical statements and must be extremely inclusive, resulting in certain

wrong representations, such as girls taking classes in Alexandria, in the case of *Assassin's Creed: Origins* (AC:O). Unlike indie-game developers, who often work in very small teams with a low budget, big companies do not programme a game they are passionate about or that is an alternative to most games. Their restrictions by political correctness and maintaining a good image for the company, leave no room to experiment, the result being that similar products can be expected from all major game developing companies, including Ubisoft.

At the same time, because these games are created with a profit objective, they are played by millions of people, which is desirable in the scope of public outreach. Blockbuster games, due to their mainstream aspects and great appeal, reach the biggest and most varied public. As such, within the gaming medium, they are the most direct channel between the academic community and the people they mean to educate.

The large amount of money spent on blockbuster games like AC:O also gives rise to state of the art graphics, resulting in a game that is nearly photorealistic and a visual feat. It is one of the reasons most people play mainstream games; they are an audiovisual spectacle. The aesthetically pleasing virtual worlds can evoke various affective states (Mayr 2014, 63) and make the player feel "a sense of inner peace" (Calleja 2011, 39). This is part of the macro-involvement that was mentioned in paragraph 1.1: the idea that players have postgame experiences, which range from emotions to continued thought about what they just experienced. This is evidenced in the answers to gamers survey question 8, which shows that nearly all participants looked up more information during or after a play session (Appendix 3).

Apart from the above, high graphics are able to show the smallest of details, allowing the designers to make almost exact copies of real-life monuments, as is seen in paragraph 2.1. A smaller company would not have the time and money to invest in details like that, unless that were the main point of the game, which would again make it an educational game that does not reach a wide public. In fact, most educational games are directed to children, which makes sense in that they can probably still learn the most, but is also very niche. Developing a game for children yields completely different mechanics and looks. A clear example of this can be found in the Discovery Tour (which, on itself, is an educational game), where female nude is covered up by shells. The historic accuracy and representation of Greek statues is altered just to make the game more "suitable" for children (Van Ammelrooy 2018). Yet, when children visit museums, nude parts on statues are not covered, which shows the triviality of doing so in the game. However, the developers needed the Discovery Tour to get a lower age-rating than the

main game (which is rated “M” for mature) in order for it to be accessible to the younger target audience (Good 2018).

5.3 Why the use of *Assassin’s Creed: Origins*?

Since *Assassin’s Creed: Origins* (AC:O) as a case study is so vital in answering the subquestion of this research and the subquestion so vital in answering the main research question, it is important to explicate why AC:O was chosen.
The most important reason is the series its famous characteristic of featuring precise historical settings. It differs from other games in that it builds its narrative around history and not the other way around. Other games are arguably more accurate in their display of historical trends (games that simulate the general course of history, such as many civilisation-building games), but they are not usually threedimensional, open world blockbuster games.
In addition, with AC:O, Ubisoft took a step that has not been taken before by big game developing companies: they added an educational aspect – the Discovery Tour mode. The main game was released very recently (at the moment of this research) and so maintains the potential to become a trendsetter. More and more companies may follow in Ubisoft’s wake, adding educational aspects to their games that are not out of place. It might just be the latest way to design commercial games.
The setting of the game is another reason to choose AC:O for this research. Egypt has an incredibly long history of archaeology; it has been the fascination of many explorers for hundreds of years and continues to intrigue the entire world. Because of this, it is a region exposed to misconceptions and the imagination of alien fanatics, just to give a common example. While the game links to such misconceptions in some ways (the narrative is certainly not entirely ridden of fantastical phenomena either), it is also able to provide an accurate representation of Ancient Egypt, as can be read in chapter 2. The substructure of the Step Pyramid has been altered slightly by the addition of two extra rooms and another gallery, but it did not add traps or portals to other dimensions, as some people believe to find inside of pyramids. The game’s representation of Egyptian and Ptolemaic architecture was purposefully kept as close to reality as the designers could possibly make it. Within the art design department alone, a team of 300 people in different countries around the world worked on crowding the game with hand-crafted monuments and realistic filler (Takahashi 2017). The Step Pyramid is a good example of

the level of accuracy that was thus achieved. In places, the designers made game choices in favour of game flow (blocking certain entrances to guide the player more naturally through the pyramid) and entertainment (adding rooms for exploration). Because of the enormous team and the extra year taken by the developers (ending the traditional yearly releases of the *Assassin's Creed* series since 2009), the details are often true to life, as seen in the figures in chapter 2. The fact that Ubisoft dared to take the extra year, gave the gaming community, and especially the AC fanbase, high hopes for a revival of the series. The attention that was thus drawn to the game resulted in record sales for the series and AC:O became the third best-selling game of 2017 in Europe and the Middle East region (Takahashi 2018). This is exactly the scale archaeologists should address if they want to appeal to a huge population that is already willing to try every new game that is released and one that continues to grow every year since the medium's breakthrough to the masses in 2001 (Aarseth 2001).
These are the reasons AC:O meets all the demands the author places on the type of game that archaeologists should consider in public outreach.

5.4 The adequacy of the research methods

The answer to the research questions, as found in chapter 5, is based on literature, an archaeological comparison and a user survey. Therefore, it is important to both identify flaws in the research methods and argue the results are adequate for answering the questions. Starting with the utilisation of surveys, moving on to the comparison of the real and the virtual through selected case studies and lastly suggesting potential other methods, the following paragraph will discuss any ambiguities the reader may have left.

The results of the gamer's survey are generally in line with what was to be expected according to literature and experience in playing AC:O and other threedimensional games. The author deliberately did not employ a hypothesis, in order to ensure objective analysis of the results. Instead, the frequency expected was calculated based on a prediction model, which the survey results were compared to (see the graphs in appendices 3 and 4). According to this comparison, some of the frequencies observed differed greatly from the frequencies expected. Notably, the unexpected divergences are nearly always in positive direction when considering the gaming medium as an educational tool in public outreach. The fact that by far most participants of the gamer's

survey paid closer attention to objects and interactive texts in the game than expected (f(e): 50%, f(o): 85,5% in both question 6 and 7), is an example of that. Likewise, the answers to question 4 indicate increased interest in the history and archaeology of Ancient Egypt to a much greater degree than expected (f(e): 25%, f(o): 62,7%).
The academic's survey, according to the prediction model, has quite a few extremes as well. Mostly, they seem more enthousiastic about using the gaming medium than expected (question 9), and also their opinion on the accuracy of AC:O is more positive than expected (question 4). Taking into account that the academics that participated in the survey have played AC:O, these results are less surprising. The survey did not manage to get the opinion of the average academic community, which would include non-gamers as well. One way to gauge a grounded opinion of said group of academics would be to show them footage of the game, displaying as many aspects as possible one would normally encounter while playing. Still, they would not easily become as acquainted with the medium as the game playing academics, which is the factor that validates the opinions in the survey. The current academic's survey demonstrates that, generally, the gaming medium is considered a useful tool. Without having done research into it, many participants came to similar conclusions as this research does. In question 10, where the academics were able to justify their opinions, things were stated that are the core of this research's results. Three of the most specific quotes:
'Games are one of the primary mediums for communication of ideas in the 21st century (very similar to books in the 18th century, cf. Moby Dick's endless digressions into nautical terminology). This means that it is in fact ideal for such a purpose.'
'It is a medium with a wide range of people interested in it and thus can reach people that would normally not come into contact with archaeology.'
'Gaming involves a strong immersion aspect, which is lacking in paintings/films, as gamers have to actively engage with the virtual environment. Also, because gaming worlds are so detailed, there is more room for specific archaeological content.'

The major concern in the comparison part of the research is that the reconstruction of the Step Pyramid complex may not be representative of other reconstructions in the game, and therefore not a valid indication of the accuracy of the game. Considering the vastness of the game and the huge amount of monuments it contains, it would not be surprising if efforts had been concentrated on only a few, in some way more important locations. However, the Step Pyramid complex does not feature in any of the main missions of the game and only scarcely in a side mission, which makes the player explore

the inside of the pyramid until they find the pharaoh's stele. Within the game, then, it does not play a very big role. It is representative of the many buildings that are featured because they are famous and complete the landscape, and with that it is representative of the overall accuracy and detail of the game.

The other three case studies each highlight an issue connected to game choice, but, as mentioned above, paragraph 2.2 demonstrates this does not obstruct the representation of archaeology. Of course, the three case studies do not highlight all mistakes and inaccuracies; there are many more, from small things like orange carrots (they first became orange in the 17th century; Khimm 2011) to furthering misconceptions about Cleopatra's clothing (which was a lot less promiscuous; Van Ammelrooy 2018). They do, however, each showcase a different type of error and the consequences it has for the archaeology in the game. Other case studies could have been picked, but would have roughly fallen under the same categories of inaccuracies. Therefore, these case studies, too, are representative of the game. Online one can find many videos about the inaccuracies in the game, but also on the many details that are fact. These videos focus on smaller issues such as the carrots. This research, however, is more concerned with details pertaining to the material culture that is found as artefacts today by archaeologists. Comparison between those artefacts and their virtual counterparts is the main, and in many cases only factual analysis that can be done.

6.
Conclusion

The author noticed how archaeological knowledge does not always reach the general public through traditional media and therefore investigated the medium of video games as an alternative way of public outreach. This was done by trying to answer the research question: Can gaming as a virtual medium contribute to the outreach and impact of archaeological cultural heritage for both public and academic communities?
The case study necessary to do analysis on was investigated through the subquestion: What is the level of archaeological accuracy in the game *Assassin's Creed: Origins*? Concluding that the level of accuracy is high, is a requirement before further considering the medium. Therefore, this conclusion will first answer the subquestion, continue with a two-part answer to the main question and close with a few suggestions for further research.

The level of archaeological accuracy in *Assassin's Creed: Origins* (AC:O) is certainly high, as became evident in chapter 2 and 3, and as is acknowledged in the results of the academic's survey.
When comparing the Step Pyramid complex of Djoser in Egypt to that same complex in the game, many details became apparent that warrant the reconstruction an almost exact copy of the real monument. The information given in the tours dedicated to the complex in the Discovery Tour further proved that the game designers had extensive knowledge of the archaeology and history of the site and used this when recreating the pyramid. In those instances the game diverged from reality, it was minimal and easily ascribed to decisions necessary to make more efficient use of the mechanics and programming of the game. Issues such as downscaling the size of the complex highlight that the medium can still be restrictive, both technically and because play needs to remain fluid and entertaining. However, if the medium continues to grow as fast as it has since its emergence, these restrictions will become fewer and fewer.
The other kinds of representation (which the thesis discussed in paragraph 2.2) highlighted some issues that were not as easily explained by the limits of game design, but instead by game choice. As such, anachronisms found their way into the game (the Faiyum portraits), historical fact was ignored (temple access) and incorrect common views were incorporated (unpainted Greek statues). These types of errors will continue

to occur as long as game developing companies exalt entertainment over accurate representation of the past, which they will. However, increased involvement of archaeologists in the game developing process, especially from the very start, may shift some more attention to archaeological fact.

Concluding from the research done for this thesis, *Assassin's Creed: Origins* is deemed sufficiently accurate to be considered for the wider scope of public outreach. The main research question will therefore be answered next, by dividing it in two parts. Firstly, can the gaming medium contribute to increased and improved reception of archaeological cultural heritage by the public?
The results from the gamer's survey show increased interest in Egyptian archaeology and history, as indicated by the participants themselves and as deducted from their answers to other questions in the survey (see chapters 4 and 5).
Studies into game theory and the educational value of games demonstrate the ability of the medium to transfer knowledge to the player, especially when that player is simply having *fun* and not trying to *learn*.
Both these components of the research indicate increased reception of archaeological material. *What* is received is an improvement on traditional outreach media as well. One of the medium's preconditions is not only to create a complete world, which compounds architecture, artefacts and people (not normally put together in museums), but a three-dimensional world that can be viewed from all angles (unlike in documentaries).

The other part of the main research question remains: does the gaming medium contribute to the archaeological academic community? It does in multiple ways.
The video game medium has characteristics that fit better with the discipline of archaeology than many other media do. It is a visual medium that allows for minute details (as seen in paragraph 2.1) and leaves the player free to explore and spend time viewing those details from more angles than images could ever provide.
Spreading archaeological knowledge beyond the academic community is important, though underestimated. When archaeologists excavate and investigate a site for years, the results should be shared not only with the community that lives nearby, but with the whole world. The gaming medium extends its influence across the globe and permeates households of all social and economic classes. It is a network that archaeologists should not be afraid to join. The discipline of archaeology is in need of tool that lets them communicate their findings to the public. The game medium could do just that. It is an

excellent addition to the range of public outreach options archaeologists have at their disposal.
Next to contributing to public outreach, the medium can also aid in the area of heritage management. This thesis has not dealt with it specifically, but elaborates in the future research section below.

The author would like to propose further research that elaborates on the specific research of this thesis, but also on extension into other fields.
Only four case studies were examined, but applying the same archaeological lense to other areas in the game (or, alternatively, a focus on the representation of smaller artefacts rather than architecture) may yield very different results regarding accuracy. It should be noted, however, that adding a game designer's lense or thorough understanding of the game medium are necessary for a balanced conclusion.
An interesting addition to this research would be the analysis of other entertainment-based games with historical settings, with the specific idea of public outreach in mind.
As touched upon above, the suggestion should be made to look into the heritage management potential of games. Virtual reconstructions can represent archaeological objects in great detail, which can be useful for investigating and displaying artefacts not otherwise accessible. In addition, the process of creating these reconstructions requires new ways of thinking. Often, remains need to be interpreted to such a level that it becomes possible to imagine their original state. Once the reconstruction is then made, it is kept forever in the digital realm, a harmless form of preservation. Physical and cultural heritage becomes available to the public as well as the academic community all over the world through games like AC:O.

Games are the medium of the twenty-first century. In the future, instead of hoping for some gold thread in a "boring" piece of cloth, archaeologists will be able to implement that cloth (gold or no gold) in a game, worn by one of the many characters in the extensive virtual world, who is using his "boring" pots to store his wares in the shadow of the impressive reconstruction of a Greek temple with painted caryatids.

Abstract

This thesis assesses the suitability of the video game medium in archaeological public outreach. It does so by examining the blockbuster game *Assassin's Creed: Origins* (Ubisoft 2017), gauging its accuracy through a comparative archaeological study between the Step Pyramid complex at Saqqara and its virtual reconstruction in the game. Further case studies display designer choices and their relation to the representation of archaeology in the game.

Other than examining the accuracy of the virtual reconstruction of the complex, the information given about it in the Discovery Tour mode is also analysed.

A survey conducted amongst gamers that have played *Assassin's Creed: Origins* is meant to give insight in the level of interest in the archaeology of the game and the consumers' perception of that archaeology. A different survey, conducted amongst academics of the Faculty of Archaeology of Leiden University, evaluates the opinion of the academic community on using the gaming medium in public outreach, along with their view on the accurate representation of archaeology in the game.

Additionally, an assessment is made of the ability of an entertainment-based blockbuster game to transfer knowledge. The core aspects of the medium, such as immersion and interaction, are shown to promote effortless learning and absorption of information as a byproduct of having fun playing the game.

This thesis therefore deems the medium suitable for the transfer of knowledge to the public. The gamers survey results do not prove that specific information is retained, but it shows that a general image of Ptolemaic Egypt has been gained along with increased interest in its archaeology. The academics survey results display general agreement that the game provides a rather accurate rendition of Ptolemaic Egypt and nearly all participants believe the medium should be used in public outreach. From the comparative study and the analysis of the Discovery Tour, it is deduced that the virtual reconstruction of the Step Pyramid complex is indeed very accurate. The other case studies show that designer choices could disturb historical and archaeological accuracy, but that this does not necessarily interfere with the representation of archaeology.

Thus, this thesis advises the archaeological academic community to invest in the gaming medium and approach game developers about incorporating archaeologists in the design process from the very start of the developing process.

Samenvatting

Deze scriptie evalueert de geschiktheid van het videogame medium voor archeologisch publieksbereik. Dit wordt gedaan door het onderzoeken van het blockbuster spel *Assassin's Creed: Origins* (Ubisoft 2017), waarvan de correctheid wordt gemeten door vanuit archeologisch oogpunt het Trappiramidecomplex in Saqqara, Egypte, te vergelijken met diens virtuele reconstructie in het spel. Aansluitend wordt er ingezoomd op drie andere aspecten van het spel die elk een voorbeeld geven van designkeuzes en hun relatie tot de vertegenwoordiging van archeologie in het spel.
Behalve het bestuderen van de accuraatheid van de virtuele reconstructie van het complex, wordt ook de daarover verstrekte informatie in de Discovery Tour modus geanalyseerd.
Een enquête onder gamers die *Assassin's Creed: Origins* hebben gespeeld verschaft inzicht in de hoeveelheid interesse onder consumenten naar de archeologie in het spel en hun perceptie daarvan. Een andere enquête, afgenomen onder academici op de Faculteit der Archeologie van Universiteit Leiden, tracht hoogte te krijgen van de mening van de academische gemeenschap betreffende het gebruik van videogames in archeologisch publieksbereik, evenals hun opvattingen over de correctheid van de representatie van archeologie in het spel.
Daarnaast worden op entertainment gebaseerde blockbuster videogames geëvalueerd op hun vermogen kennis over te dragen op de speler. De basisaspecten van het medium, zoals immersie en interactie, geven blijk van het kunnen stimuleren van moeiteloos leren en de absorbatie van informatie als bijproduct van het plezier van het spelen. Deze scriptie acht het medium daarom geschikt voor het overbrengen van kennis op het publiek. De gamer-enquête laat niet zien dat zeer specifieke informatie wordt onthouden, maar geeft aan dat de speler een algemeen beeld vormt van Ptolemaeïsch Egypte en verhoogde interesse in de archeologie daarvan. De academici-enquête toont overeenstemming wat betreft het vermogen van het spel om een correct beeld te verschaffen van Ptolemaeïsch Egypte, en zijn bijna allen van mening dat games geschikt zijn voor publieksbereik. Ook de vergelijkende studie en de analyse van de Discovery Tour geven aan dat het spel accuraat is. De andere voorbeelden laten zien dat designerkeuzes dergelijke correctheid kunnen verstoren, maar dat dit niet in de weg staat van de representatie van archeologie. Daarom adviseert deze scripie de archeologische academische gemeenschap om in het medium te investeren.

Bibliography

Aarseth, E., 2001. Game Studies, Year One. *Game Studies* 1(1), accessed through http://gamestudies.org/0101/editorial.html, on 4/6/2018.

Baines, J., 1997. Temples as Symbols, Guarantors, and Participants in Ancient Egyptian Civilization, in S. Quirke (ed), *The Temple in Ancient Egypt: new discoveries and recent research*. London: British Museum Press, 216-241.

Bard, K.A., 2007. *Introduction to the Archaeology of Ancient Egypt*. Oxford: Blackwell Publishing Ltd.

Bleiberg, E., 2005. *Arts and Humanities through the Eras: Ancient Egypt (2675 B.C.E.–332 B.C.E.)*. Farmington Hill (MI): Thomson Gale.

Bradley, M., 2009. The Importance of Colour on Ancient Marble Sculpture. *Art History* 32(3), 427-457.

Bryman, A., 2012. *Social research methods*. Oxford: Oxford University Press.

Calleja, G., 2011. *In-Game: From Immersion to Incorporation*. Cambridge (MA): The MIT Press.

Daniels, C.M. and Welsby, D.A., 1991. *Soba: archaeological research at a medieval capital on the Blue Nile*. London: British Institute in Eastern Africa.

Friedman, F. D., 1995. The Underground Relief Panels of King Djoser at the Step Pyramid Complex. *Journal of the American Research Center in Egypt* 32, 1-42.

Hawlitschek, A. and S. Joeckel, 2017. Increasing the effectiveness of digital educational games: The effects of a learning instruction on students' learning, motivation and cognitive load. *Computers in Human Behaviour* 72, 79-86. https://doi.org/10.1016/j.chb.2017.01.040

Katsionis, G., K. Manos and M. Virvou, 2005. Combining Software Games with Education: Evaluation of its Educational Effectiveness. *Journal of Educational Technology & Society* 8(2), 54-65.

Khallaf, M.K. and F.S. Madkour, 2012. Degradation Processes of Egyptian Faience Tiles in the Step Pyramid at Saqqara. *Procedia – Social and Behavioral Sciences* 68, 63-76.

Kiili, K., 2005. Digital game-based learning: Towards an experiential gaming model. *The Internet and Higher Education* 8(1), 13-24.

Lehner, M., 1997. *The Complete Pyramids*. London: Thames and Hudson.

Liszka, K., 2012. *"We have come to serve Pharaoh": A study of the Medjay and Pangrave as an ethnic group and as mercenaries from c. 2300 BCE until c. 1050 BCE*. University of Pennsylvania: ProQuest Dissertations Publishing

Manovich, L., 1999. Database as Symbolic Form. *Convergence: the International Journal of Research into New Media Technologies* 5(2), 80-99.

Mayr, S., 2014. *Immersion in a Virtual World: Interactive Drama and Affective Sciences*. Hamburg: Anchor Academic Publishing.

Ramer, B., 1979. The Technology, Examination and Conservation of the Fayum Portraits in the Petrie Museum. *Studies in Conservation* 24, 1-13.

Ryan, M.-L., 2009. From narrative games to playable stories: Toward a poetics of interactive narrative. *Storyworlds: A Journal of Narrative Studies* 1(1), 43–59.

Sauneron, S. and H. Stierlin, 1978. *Die letzten Tempel Ägyptens: Edfu und Philae*. Zürich etc.: Atlantis Verlag.

Warner, N., 2009. Protecting a Cemetery in Saqqara: Site Works 1975-2009. Conservation and Management of Archaeological Sites 11(2), 98-132. https://doi.org/10.1179/175355210X12670102063625

Watson, P.J., 1987. *Egyptian Pyramids and Mastaba Tombs of the Old and Middle Kingdoms*. Aylesbury: Shire.

Zaloscer, H., 1961. *Porträts aus dem Wüstensand: Die Mumienbildnisse aus der Oase Fayum*. Wien: Verlag von Anton Schroll & Co.

Internet pages

Donlan, C., 2018. Ancient History shines in Assassin's Creed new Discovery Tour – but it's the gaps that are truly thrilling, *Eurogamer* 13 February 2018, https://www.eurogamer.net/articles/2018-02-13-ancient-history-shines-in-assassins-creeds-new-discovery-tour-but-its-the-gaps-that-are-truly-thrilling, accessed on 22 April 2018.

Fernandez, M., 2018. Professional Competitive Gaming on the Rise, Overwatch Shows Olympic Potential, *Variety* 19 March 2018, https://variety.com/2018/digital/news/esports-video-games-olympics-1202709110/, accessed on 4 June 2018.

Good, O.S., 2018. Assassin's Creed Origins guided tour mode covers up nude statues, *Polygon* 21 February 2018, https://www.polygon.com/windows/2018/2/21/17037958/assassins-creed-origins-discovery-tour-statues-nudity, accessed on 8 June 2018.

Khimm, S., 2011. Are carrots orange for political reasons?, *The Washington Post* 10 September 2011, https://www.washingtonpost.com/blogs/ezra-klein/post/carrots-are-orange-for-an-entirely-political-reason/2011/09/09/gIQAfayiFK_blog.html?utm_term=.7cea20aa93f4, accessed on 11 May 2018.

Nielsen, H., 2015. Reductive, superficial, beautiful – a historian's view of Assassin's Creed: Syndicate, *The Guardian* 9 December 2015, https://www.theguardian.com/technology/2015/dec/09/assassins-creed-syndicate-historian-ubisoft, accessed on 5 June 2018.

Nielsen, H., 2017. Assassin's Creed Origins: how Ubisoft painstakingly recreated ancient Egypt, *The Guardian* 5 October 2017, https://www.theguardian.com/technology/2017/oct/05/assassins-creed-origins-recreated-ancient-egypt-ubisoft, accessed on 11 April 2018.

Reparaz, M., 2018. Assassin's Creed Origins – Discovery Tour Q&A with historian Maxime Durand, *Ubisoft* 13 February 2018, https://news.ubisoft.com/article/assassins-creed-origins-discovery-tour-q-and-a-with-historian-maxime-durand, accessed on 24 April 2018.

Takahashi, D., 2017. Assassin's Creed: Origins - How Ubisoft created the art for the massive open world, *Venture Beat* 17 December 2017, https://venturebeat.com/2017/12/17/how-ubisoft-created-the-art-for-the-massive-world-of-assassins-creed-origins/view-all/, accessed on 4 June 2018.

Takahashi, D., 2018. Assassin's Creed: Origins pushes Ubisoft to $889.4 million in sales for holiday quarter, *Venture Beat* 12 February 2018, https://venturebeat.com/2018/02/12/assassins-creed-origins-pushes-ubisoft-to-889-4-million-in-sales-for-holiday-quarter/, accessed on 4 June 2018.

Trusted Reviews – The why before you buy 5 March 2018. Assassin's Creed Discovery Tour will teach you about Ancient Egypt as you play, http://www.trustedreviews.com/opinion/assassins-creed-discovery-tour-3397547, accessed on 24 April 2018.

Van Ammelrooy, P., 2018. Geen opdrachten, geen gevechten: dit is de openluchtmuseum versie van Assassin's Creed en klimmen mag, *De Volkskrant* 7 May 2018, https://www.volkskrant.nl/cultuur-media/geen-opdrachten-geen-gevechten-dit-is-de-openluchtmuseum-versie-van-assassin-s-creed-en-klimmen-mag-~bde28a1c/, accessed on 11 May 2018.

9 Fascinating Facts You Should Know About Assassin's Creed Origins: Discovery Tour, https://www.youtube.com/watch?v=x5350LoFn9s, accessed on 5 June 2018.

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Appendix 1: E-mail contact with Dr. G. Vogelsang-Eastwood

Dear Lenneke,

Many thanks for your question about the Soba textile. Interesting how a story stays in the mind.

The group of textiles I was talking about was from Soba, Sudan. They were in a very poor condition and so it was hard to make a good 'story' out of them to get people really interested in these finds!

However, one small fragment included a piece of gold thread and so it was possible to describe these pieces/garments as originally being richly embroidered. Not suprisingly, this group of textiles suddenly became much more interesting for the museum.

Such is life.

Bye for now,
Gillian Vogelsang-Eastwood

Appendix 2: Presentation of the surveys

Gamer's Questionnaire

Assassin's Creed: Origins - Gamer's experience

This survey is part of a bachelor thesis in archaeology at the University of Leiden. The aim of the research is to assess the potential of using the video game medium in archaeological public outreach.

For how many hours have you played Assassin's Creed: Origins?

- Less than 25 hours
- 25 to 40 hours
- More than 40 hours

Did the historical setting of the game influence your decision to buy it?

- Yes
- No

Academic's questionnaire

Assassin's Creed: Origins - An archaeological investigation

This survey is part of a bachelor thesis in archaeology at the University of Leiden. The aim is to test the accuracy of the game *Assassin's Creed: Origins* and its potential value for archaeological public outreach.

For how many hours have you played Assassin's Creed: Origins?

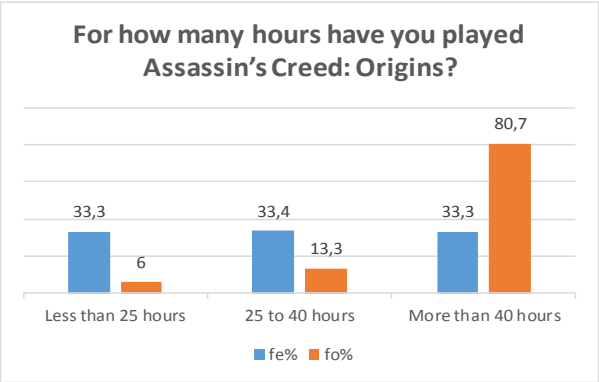
- Less than 25
- 25 to 40 hours
- More than 40 hours

How acquainted are you with Egyptian archaeology?

- I was never taught about Egyptian archaeology
- I have followed bachelor classes about it
- I have followed master classes about it
- I am specialised in it

Appendix 3: Results of the gamer's survey

1



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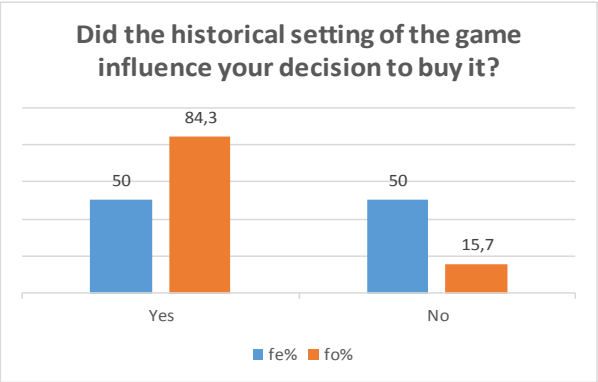

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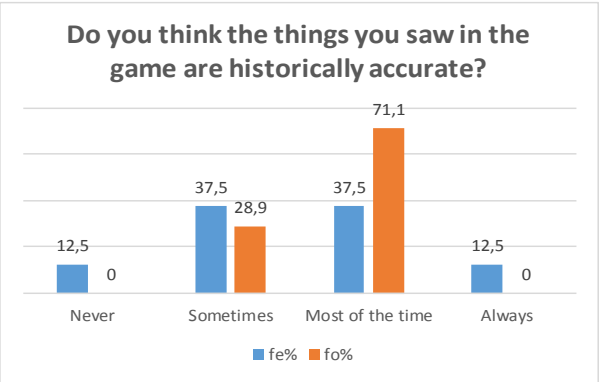

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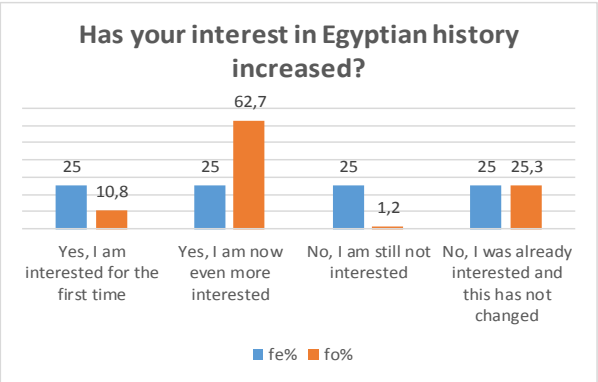

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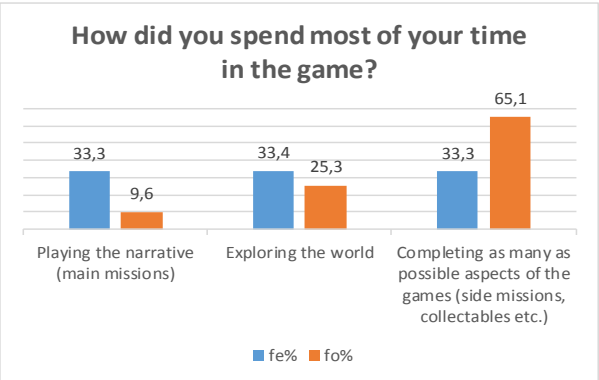

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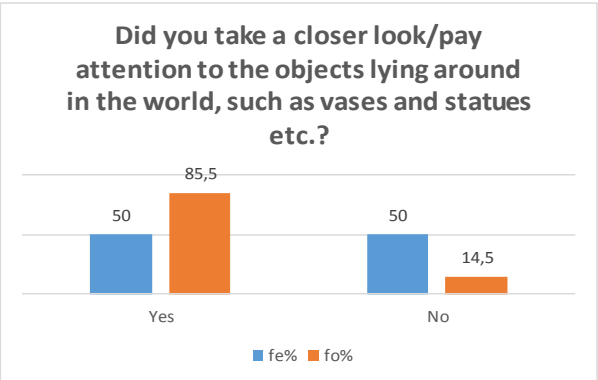

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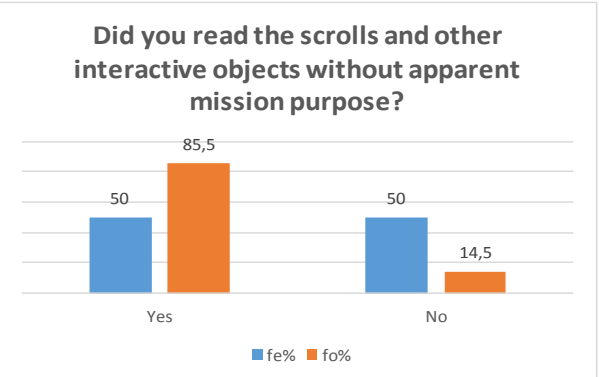

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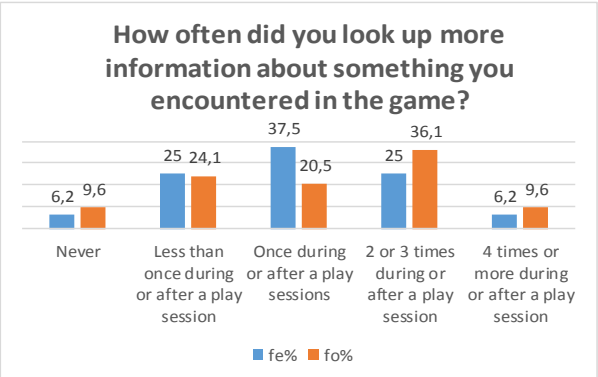


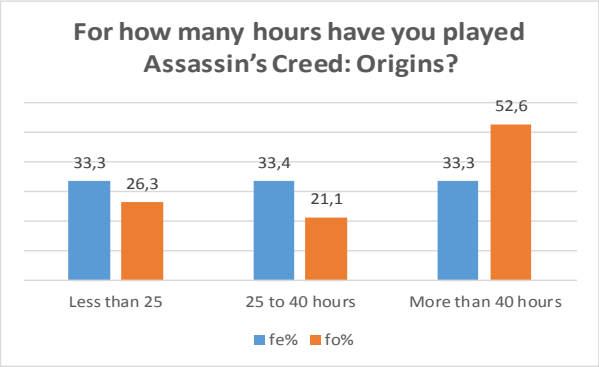
Gamers: *n*=83

Question	A	B	C	D	E
1	5	11	67	X	X
2	70	13	X	X	X
3	0	24	59	0	X
4	9	52	1	21	X
5	8	21	54	X	X
6	71	12	X	X	X
7	71	12	X	X	X
8	17	30	8	20	8
9	37 remembered correctly; 46 did not -> 44,5%:55,5%				

n = number of participants

Appendix 4: Results of the academic's survey

1



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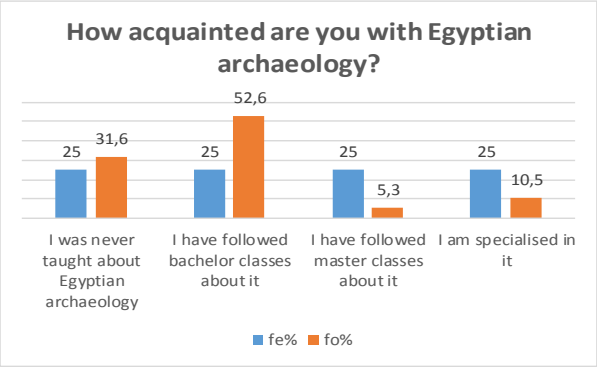

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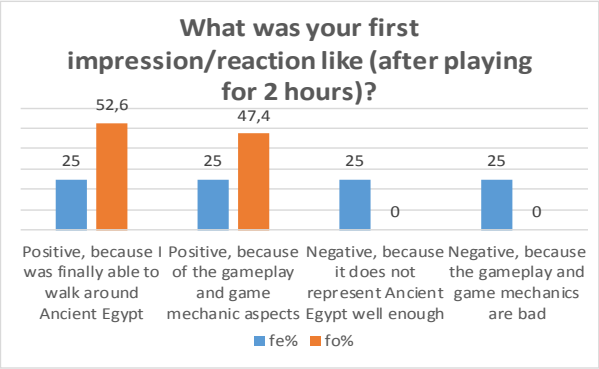

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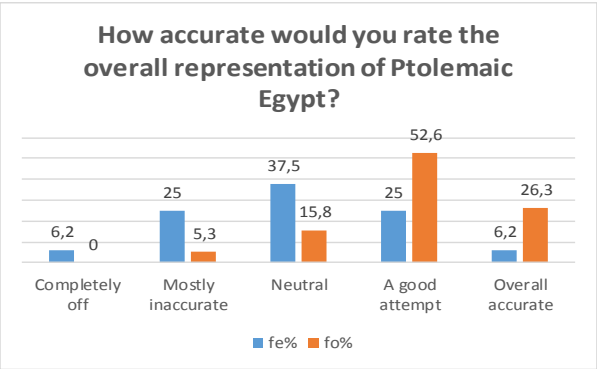

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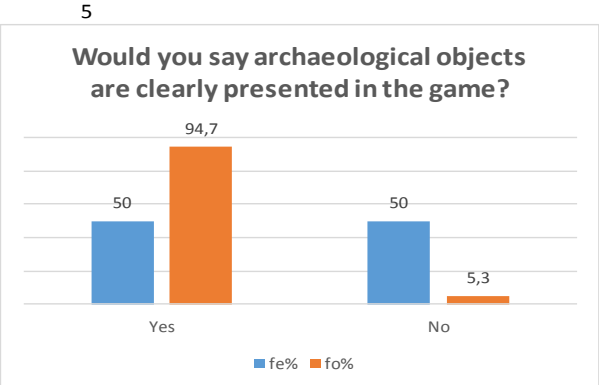

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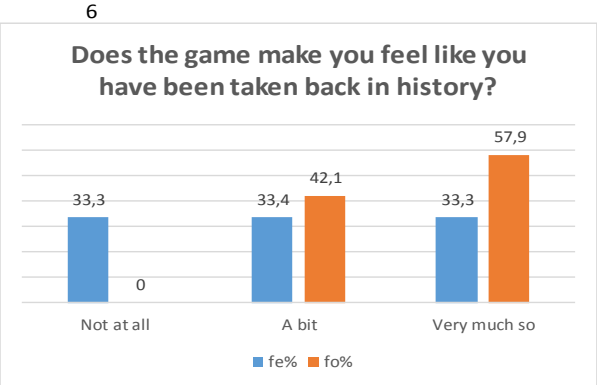

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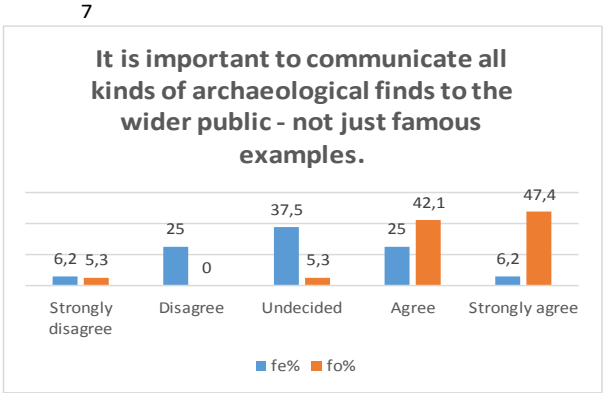

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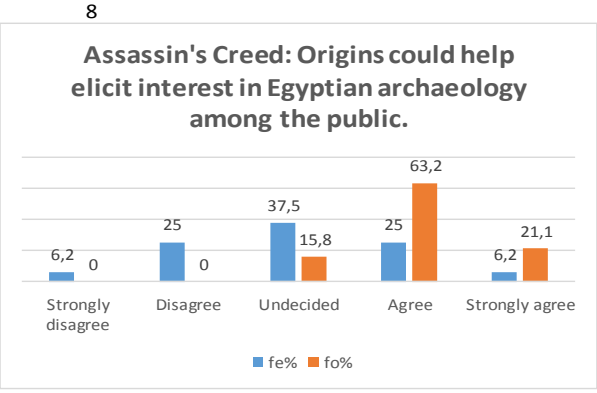

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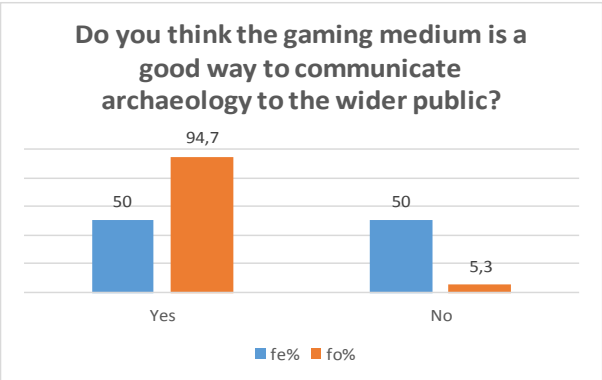

Academics: *n*=19

Question	A	B	C	D	E
1	5	4	10	X	X
2	6	10	1	2	X
3	10	9	0	0	X
4	0	1	3	10	5
5	18	1	X	X	X
6	0	8	11	X	X
7	1	0	1	8	9
8	0	0	3	12	4
9	18	1	X	X	X

n = number of participants