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Toward Archaeological Tools And Methods For Excavating Virtual Spaces

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The prospect of “digging” as an archaeologist within a virtual world is a paradox: how do we excavate something that’s not really there? In considering the material culture of the immaterial, we must completely divorce ourselves from thinking of archaeogaming as another kind of “dirt” archaeology. We need a new set of tools to use that are the equivalent of the pick, spade, trowel, and brush, but for a space populated by pixels and sprites. Classic, realworld requirements as elementary as measuring become complex within the gaming space. Taking levels, recording GPS points, and even photography operate differently in this new dimension. As archaeologists operating in the virtual world, we not only need to define the questions that need answering but we also need to create a methodology for “excavation” that can be shared across platforms and games of all varieties. This article attempts to articulate the first unified methodology for actual archaeological survey/excavation conducted within video games, defining the tools needed and a new kind of mathematics to understand and explain virtual topography and topology.

Tools

Field archaeologists in the real world use some (or all) of the following tools in their day-to-day on site: shovel, trowel, screen, brush/dustpan, dental pick, pickax, tape measure, line level, plumb bob, camera, computer, notebook, transit/total station, and drone, as well as remote-sensing equipment and other specialized tools. Most of these tools are useless when in a gaming world, unless a game uses these as part of its archaeology game mechanic where players can pretend to excavate and recover artifacts.

What about tools used for archaeogaming? At the time of this writing it’s a computer or console (likely both), a pointing device, and software for capturing screens, audio, and video. Services such as Twitch and YouTube Gaming allow the archaeogamer to live-broadcast an expedition to the public, as well as host edited videos. Public engagement is a key to the survival of archaeology anywhere, so having a public channel for excavating in virtual spaces could be helpful. The YouTube channel Archaeosoup has already made a few attempts at broadcasting archaeogaming expeditions in real time including Elder Scrolls V: Skyrim (Archaeosoup Productions 2015a) and The Witcher III (Archaeosoup Productions 2015b).

Newer generation consoles such as Xbox One connect to an online account, which facilitates the saving of high-definition pictures and videos captured via voice command or button shortcut on the handheld controller. Macs and Pcs currently come with screen-capture software as well, and there are forpurchase programs/apps such as QuickTime Pro and Camtasia and free apps such as Open Broadcaster Software that are loaded with professional editing tools. Mobile phones require still other apps such as Bluestacks for image- and motion-capture. Still images are just as important in archaeogaming as they are to real-world archaeology. The difference between the two is with the need for motion-capture. Even the oldest games contain moving parts within a context embedded with dynamic landscapes and sound. Still images contain only partial information.

For modern games, archaeogamers share something with their real-world counterparts: drones. Games such as World of Warcraft contain fully controllable flying mounts (i.e., creatures the player rides; Figure 1), while other games such as Minecraft allow players to fly and hover. The desire and ability to view sites from above is not new and was perhaps best practiced by the team of J. Wilson and Eleanor Emlen Myers in the 1980s and 1990s (Myers and Myers 1995).

The problem of imaging games, however, lies with the software built and played on legacy hardware. Perhaps the easiest solution is to set up a camera and tripod to record what is happening on-screen. A more elegant solution might be to feed audio/video from the old hardware (or television) directly into a computer for capturing there. The former might be the only option for recording games played on handheld devices such as a Nintendo Gameboy. While it is possible to play many older games through emulators, this removes the researcher one step from the originally intended method of play, in effect removing a core element of context.

As of 2016, our toolkit is nowhere as big or as useful as it needs to be. We need archaeogaming software, and we need it now, but it’s possible that we can borrow tools from other sources to help us accomplish our documentation. Eventually these tools will be open-source (via sites such as Github). Specifically we need the ability to record on-screen locations and measurements, as well as time.

Geographic information systems (GIS) need to be able to be adapted for survey and analysis in virtual spaces, specifically for large, open worlds in contemporary games. A subset of rules could be applied to games of the 1970s and 1980s. This might place a grid over the screen to assist with documenting where things are. It can also be a "smart grid" that can expand in three dimensions to reflect the landscape/topography of a space on-screen.

In-world distances vary game to game. Archaeogamers need an app to allow them to assign a unit for a distance of measure, converting it to English/metric units for perspective. The tool can be configured to record "as the crow flies" distances as well as real distances over in-world topography, much like what is available in Google Earth. Other parameters can include volume and area for a user-defined space, or guides can identify and snap to borders for a room or region. Some games (such as those in the Tomb Raider series) contain their own versions of GPS, which can be used for relative, in-game locations of finds and features (Figure 2).

One other variable shared across all games is the relative notion of time. Time works differently from game to game, and often does not reflect the passage of time in the real world. The clock app could keep track of both real-world time and its passage in the virtual world once set for a specific game. Screen- and video-captures can include this data for record-keeping purposes. Come to think of it, recording frame-rate and number might also be helpful to the professional archaeogamer. Until that app is created, archaeo - gamers must first record the length of a "day" in a particular game (for those that use diurnal/nocturnal cycles), and then convert that to real-world time. Other games (such as arcade cabinet games) have their internal, relative time dictated by processor speed, which can potentially vary from cabinet to cabinet, making for intriguing margins of error in reporting on these games archaeologically (Shawn Graham, personal communication 2015).

The reason time is so important to archaeogaming is because certain in-game events (which can include the appearance of glitches/bugs) can happen at a certain fixed time in-game, which is completely separate from the passage of actual time in the real world. If archaeogamers wish to reproduce the appearance of glitches (which I am calling "gamifacts" for lack of a better term; Figure 3), sharing these with colleagues, recording both in-game time and location are crucial.

Two problems loom large regarding data collection in games containing their own physics and concept (or lack thereof) of space-time. First, most games just have states and no realtime change, just a variable state of "does the player have object X?" What ways of documenting change exist in games that use state machines for events (a state machine being a software routine that given one set, stable condition can change to another defined condition based on player input)? Second, most games have no traditional topography or are just facades on top of modeled structures, skins, and textures stretched across digital armature. What ways can archaeogamers document this kind of time and landscape (Russell Aleen-Willems, personal communication 2015)?

Methods

Any tool used by an archaeologist (including Wii controllers) must help answer issues that are universal to archaeology in both real and virtual worlds: recover and document artifacts and their context, analyzing assemblages and stratigraphy to make connections between their deposition and history of manufacture/use.

Archaeogamers need to be able to discover, identify, and record stratigraphy, context, features, assemblages, deposits, intrusions, spits, and artifacts, clearly defining what those are within the archaeogaming vocabulary, making these intelligible to real-world archaeologists and the public at large. There will be some natural overlapping with archaeological survey (fieldwalking) and landscape archaeology, and exploring the history of use, be it an entire game or something found within the game.

When archaeologists dig, they can either do so carefully, being mindful of stratigraphy, or they can dig "out of phase," plunging straight down without regard to stratigraphic layers. It is possible for archaeogamers to "dig" in phase when treating the games themselves as artifacts, especially when dealing with variations in game-builds and versions. Seeing something in version 1.0 might be gone in version 2.0. Revisit the findspot between versions. This is not unlike removing soil above an artifact, recovering the artifact, and then continuing down. In games, there really is no gravity or centuries of accumulated dirt. There are, however, layers of versions. This creates archaeological context within a game when viewing the game as a discrete archaeological site.

What archaeogamers are doing now is very much in line with the New Archaeology of the 1960s—basically processual. Lord Colin Renfrew (1987) once noted that processual archaeology investigates "historical processes that are at the root of change." For archaeogaming, we can explore change of the games, and of the cultures within those games, using artifacts as evidence for that change, understanding the shared histories of games, gameplay, environments, created cultures, enclaves, and economies. This is really no different than what traditional archaeologists do each day in the real world. Archaeogamers just happen to be asking these questions in a contained world. Think of it as astrophysics and quantum mechanics: the universe without, and the universe within.

By the time procedural games (e.g., No Man's Sky) reach the point of truly creating evolving cultures that contain everything from day-to-day goods to sacred architecture to everything in between, it is my hope that we will have also evolved our tools and methods to best record and explain what is happening and perhaps why. The archaeogamer can apply archaeological methods to understanding machine-created culture, and how computers and consoles interpret code to create things that the game itself will find of use and apply within the rules of a manufactured, open, virtual world. This is not to say that there is any advanced artificial intelligence at work in procedural games, only that games by their nature are complex systems, and the mathematical complexity of the code might in fact create unintended features/artifacts that should be archaeologically documented (Mitchell 2011).

That being said, the methods of recording archaeological data from digital games will not differ too much from archaeogaming's real-world colleagues: pen and paper, word processors and spreadsheet applications, relational databases. The environments may be different, but most of the archaeological vocabulary is shared. The potential for applying archaeogaming methods to real-world archaeology is also a possibility. This methodology should be explained in a peer-reviewed article for a "traditional" archaeological journal as part of an end-of-season site report about a surveyed/ excavated virtual environment.

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