

Gamification of the Archaeological Record – Underwater Excavations on the Carmel Coast, Israel

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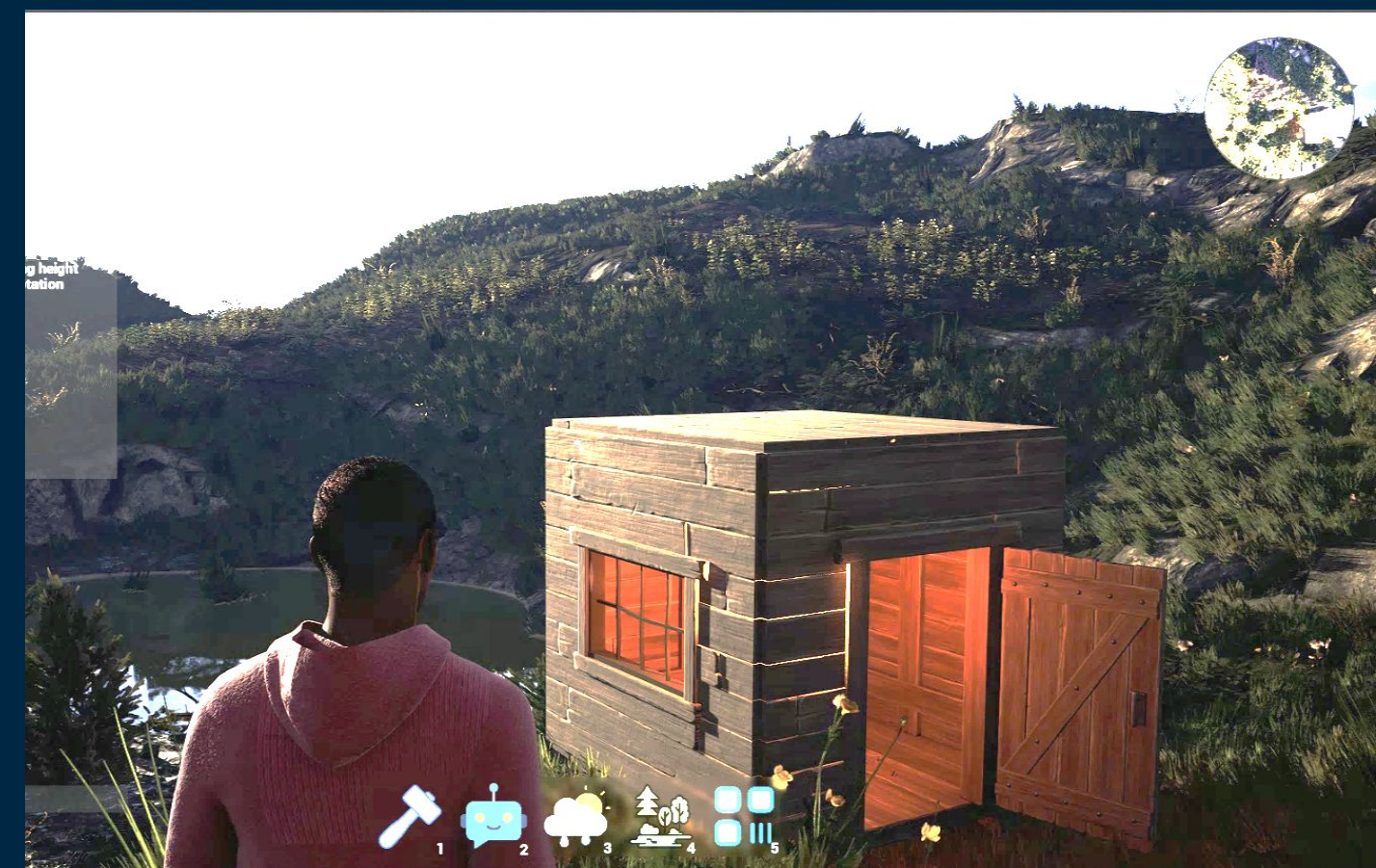
Introduction

How do we communicate to the public and fellow researchers the change in climate over millennia on the Israeli coast? We propose gamifying detailed reconstructions of the environment that allow users to interact and explore these changes using different virtual tools. For example, by integrating the profile drawings of sediment cores we can create a scented widget allowing players to peel back the different layers of sedimentation and water level through time. There are many tools that could be created to lead to better modelling of change over time both of climate, environment and human settlements.



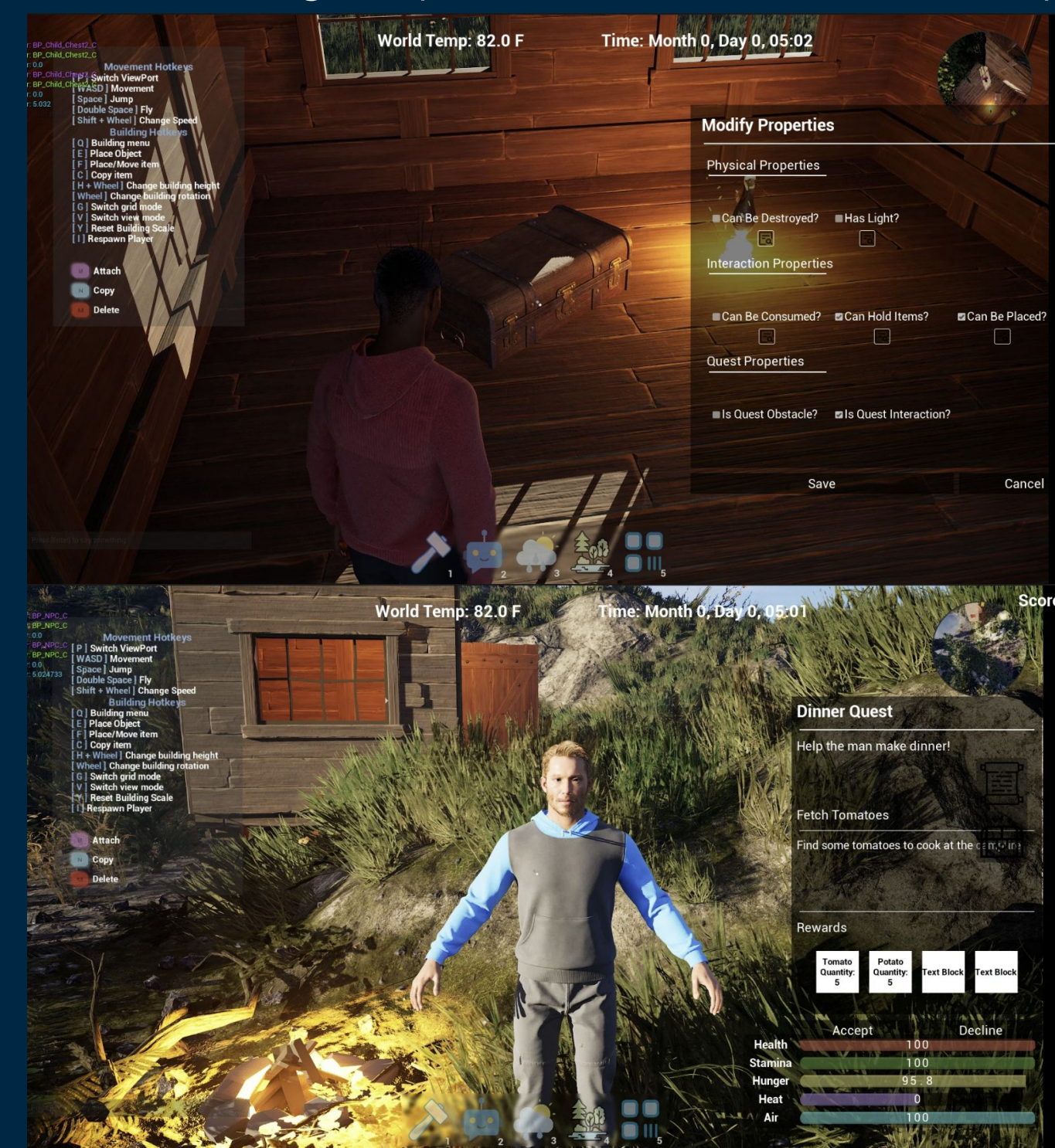
Approach

The Climate Games is intended to be an online multiplayer game that teaches players about change in the climate and the environment. Through virtual interactions with other players, NPCs (Non Player Characters), and APCs (Artificial Player Characters), players can work together to complete quests in various levels. These levels and quests are built by the players for the players, and provide new experiences for people regardless of location. Thus, the Climate Games is a medium to share these stories found in any part of the world and at any time. The Carmel Coast Case Study serves as an example of one of the stories that can be told through the Climate Games.



Applications

The implementation of various game systems allow for the robust modifiability of the Climate Games. These systems allow players to modify virtually anything they want in order to better tell their story, including but not limited to: climate, time, terrain, environment, buildings, quests, dialogue, NPCs, and artifacts. We follow a similar approach to *Minecraft*™ by providing creative and survival game modes. In creative mode players designing their worlds, quests and quest items. In survival mode players carry out these quests and get to dialogue with the NPCs. However, now they also have the potential to die, starve, drown, burn, etc. Players actions have consequences. Through storyline, dialogue and quests players learn through interaction and play about important climatic and archaeological problems that we face today.

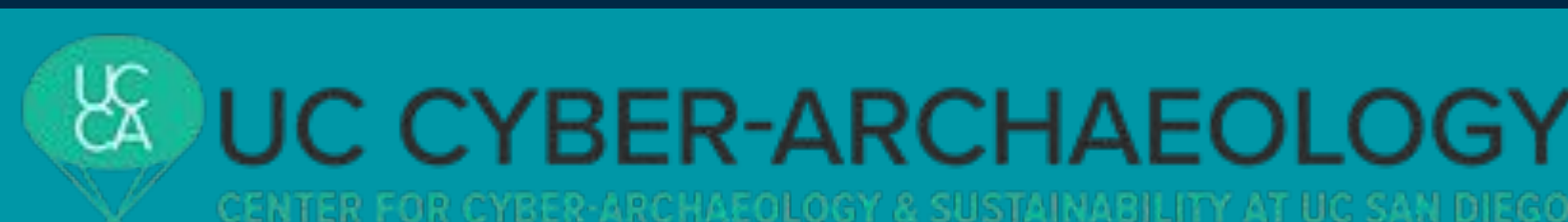
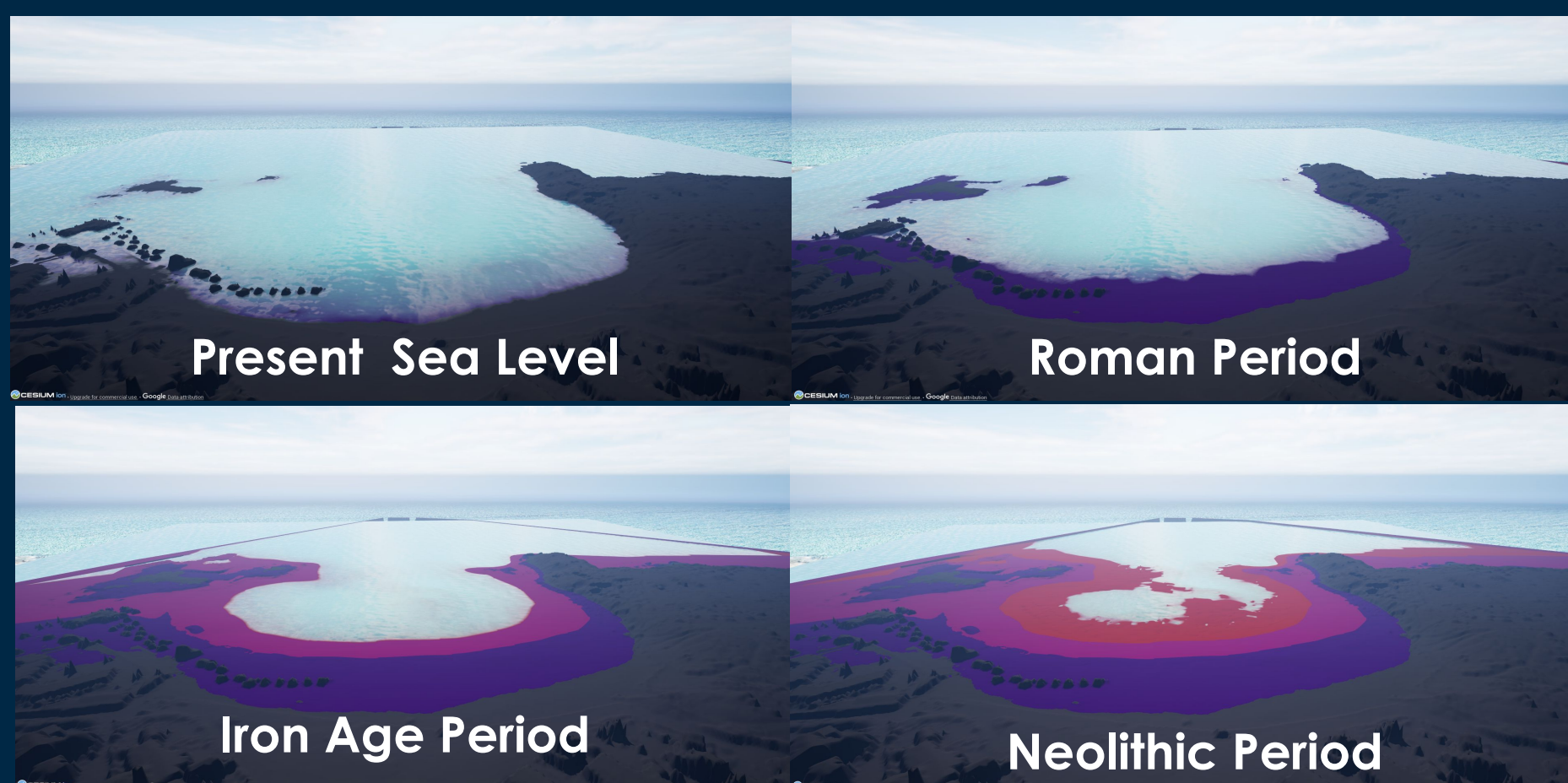


The image on the left (top) shows the quest item system. Every item in the game can be given unique interaction properties (store in inventory, consumable, holdable, destroyable etc) and be assigned to quests. The bottom left image shows a simple “activity” quest (e.g. making dinner) that the NPC can assign to players. After completing a quest players can receive rewards or continue a story dialogue with the NPC. The bottom image depicts the placeable objects widget. Using the pinwheel selection players can construct buildings, encampments and entire level layouts.



Carmel Coast Case Study and Future Work

Whether it is a story about the coral bleaching in Australia, or about the threat of wildfires in California, the Climate Games provides the tools to build these situations and then allow players from around the world to come together and collaborate to solve them. As one of the first case studies, we chose the Carmel Coast of Israel centered around the bays surrounding the ancient site of Tel Dor. Extensive marine archaeology has been conducted in this area allowing a rich context to teach the players about changing sea levels over time and how this has impacted both the climate of the region and its inhabitants through multiple centuries. A major goal of The Climate Games is to simulate real world locations to bring authenticity to what is being taught about climate change. We dynamically load in digital terrain models of the coast and its bathymetry into the game in its real world location. By using a water volume simulation we can incrementally change the sea level simulating how in early periods of the Carmel Coast more land was exposed. It is clear that even a meter change in sea level drastically changes the landscape. In future work we will use dynamic vegetation to represent the changing biospheres over time.



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