

STAIRWAY TO HEAVEN: INSTRUCTIONAL DESIGN ALIGNMENT IN A SERIOUS GAME FOR EXPERIENTIAL RELIGIOUS EDUCATION IN VIRTUAL REALITY

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Abstract

An object of immeasurable value is stored in an ancient ascetic community. Equipped with the relic "Panagia Paramythea Code", an old map, you are invited to dress as a pilgrim, explore the monastery and communicate with virtual monks and workers in a quest to uncover the hidden treasure. To reach your goal, you are invited to explore four cardinal virtues; love, faith, patience and repentance through the lives of respective saints. In the process you will encounter unanticipated expressions of applied spirituality to reach your goal.

In this paper we present the instructional design process of an interactive serious game in a 3D virtual reality environment developed for religious education. Its purpose is to help participants experience and learn about essential aspects of the Eastern Orthodox Christian faith and spirituality in an entertaining and engaging way that increases their curiosity. There have been calls for a paradigm shift in religious education from a closed, narrow, and unreflective practice pattern towards new, open, progressive approaches that take modern educational methods into account.

Eastern Orthodox Christian theology addresses not just the mind but also the heart or nous, the existential centre of man. According to the Orthodox spirituality, the way humans can approach, know and meet God is only through personal experience. This makes immersive experiential learning a suitable medium for Orthodox Christian religious education. In the design of the game we took into account the fact that the structure of the game itself carries a fundamental ethical message and so it should reflect the values that are to be demonstrated in the game. Moreover, in this paper we describe how we addressed the main challenge of this project; the creative alignment synthesis required during the game design process. More specific, the learning experience merges and aligns harmonically multiple layers: philosophical - theological (ethical values, behavior paradigms), pedagogical - instructional, game mechanics, dynamics and aesthetics in a 3D virtual immersive environment.

Keywords: serious games, virtual reality, experiential learning, religious education, virtual worlds

1 INTRODUCTION

The 21st century is an era of religious plurality [1]. European and Western societies experience increasing religious diversity. Teaching methods in religious education have been the object of harsh criticism [2]. Traditional, rigid classroom methods of teaching in religious education based on knowledge transmission e.g. through lectures are considered as inadequate [3]. There have been calls for a paradigm shift in religious education from a closed, narrow, and unreflective practice pattern to new, open, progressive paradigms that take modern educational thinking into account [4]. Studies have revealed that religious education can benefit by using advanced pedagogical methodologies and creative expressions such as stories, role plays, drama and songs [5]. Electronic theology or e-theology, approaching theology through and in the Internet embracing e-learning, was another empirical response that was adopted early by the Orthodox Christian Church. Especially the use of computer games in religious education produced encouraging results [6]. In this paper we present the instructional design process of an interactive serious game in a 3D virtual reality environment developed for religious education.

2 METHODOLOGY

2.1 Immersive Education

Immersive Education is the use of Virtual Reality (VR) systems such as 3D Virtual Immersive Learning Environments, also called virtual worlds or multi-user virtual environments, to facilitate the social and

psychological immersion of learners into a compelling, realistic learning multimodal experience that engages multiple senses. Immersive educational experiences in social VR environments as a synthesis of learning activities can help learners achieve learning goals in multiple domains. In each domain it is possible to pursue the attainment of skills and abilities in various levels of sophistication and mastery organized in a taxonomy. More specific, immersive educational experiences to facilitate the growth in four intersecting domains [7]:

1. Cognitive (intellectual); ranging from remembering and understanding up to creating [8].
2. Emotional (perceiving, integrating and managing emotions and feelings); ranging from perceiving to influencing [9].
3. Dextrous (virtual kineesthetic skills such as doing, being, moving, organizing, communicating); ranging from imitating to mastering [8].
4. Social (fostering the sense to community, collaboration); ranging from personalising to channeling [9].

A game is a playful, rule-bound activity that is driven by a conflict of some form. A serious game can be defined as a set of meaningful choices with a primary educational purpose [10]. Serious games can be used as appropriate learning experiences according to Vygotsky's zone of proximal development [11]. Review studies have shown that serious games in virtual reality can be effective learning tools in multiple fields [12], [13] such as Computer Science for K-12 [14] and Higher Education [15]. Playful activities in virtual worlds have the potential to influence positively learning both in face-to-face [16] and distance education settings [17] especially in history and culture studies [18], [19].

2.2 Serious Game Instructional Design in VR

Religious education in the Eastern Orthodox Christian Church goes far beyond the mere intellectual attainment of knowledge and understanding of theological facts [20]. One of the unique attributes of the Orthodox Christian theology is that it addresses not just the mind but the heart or nous, the existential center of man [21]. According to the Orthodox spirituality, the way humans can approach, know and meet God is only through personal experience [22]. This makes immersive experiential education a suitable match for Orthodox Christian religious education.

The purpose of the game is to help participants experience and learn about essential aspects of the Eastern Orthodox Christian faith and spirituality in an entertaining and engaging way that increases their curiosity. Indicative target audiences for the game are people interested in philosophy, theology, or Orthodox Christian faith and catechetical (faith) school students.

The most significant design layer of the epistemic game was its purpose and learning objectives, the articulation of the guiding principles of the game. As the game is intended as a tool for the Orthodox mission we adopted as the purpose of the game the *increase of curiosity and interest in the Orthodox Christian Church*; to provide enough stimulating experiences that would motivate participants to seek to learn more after the game, possibly in the physical world.

We felt as priority to give to participants the opportunity to see, hear, read and experience virtually some characteristic aspects of the Orthodox spirituality and discover some unexpected, somewhat unknown sides of Christianity associated with the Orthodox Church. Hence, our prime learning objective was in the emotional domain (level 5): *increase learners' capacity to build empathy towards Orthodox Christian faith*. A secondary learning objective adjacent to the latter was in the cognitive domain (level 2): *help learners understand specific facets of the Orthodox Christian faith & spirituality*.

The serious game was designed using the MDA Framework [23] that analyzes the playing experience in three levels; Game Mechanics, Dynamics and Aesthetics. The mechanics define the high-level basic parameters and rules of the game. These include the story, avatars, and levels. The dynamics describe how players use these rules, while aesthetics how players experience and feel playing the game. Example of dynamics are chance, collaboration and competition. Aesthetics involve motivational elements and desirable responses evoked through the interaction with the game system. Next we describe in depth the main game elements.

3 RESULTS

3.1 Story

The game's narrative puts learners into the role of a thief¹ who is enticed by the tale about the treasure of Panagia Paramythea Monastery². An object of immeasurable value is stored in an ancient ascetic community. Equipped with the relic "Panagia Paramythea Code", an old map, they are invited to dress as a pilgrim, explore the monastery and communicate with virtual monks and workers in a quest to uncover the hidden treasure. In the process they will encounter unanticipated expressions of applied spirituality to reach their goal. Players soon find out that there is a sealed gate that leads to the Monastery's mysterious treasure.

The gate will only open if you assemble an ancient relic that opens the gate, the "Cross of Truth", the main quest of the game. The key has four pieces scattered in four locations (Reception Hall, St. Nicholas Church, Library, Monk Cell). Learners have to complete a quest level to acquire each piece. Each level is a dialog with a monk NPC or interaction with an object that ends with one or more questions that challenge learners to demonstrate their understanding and "worthiness" in four cardinal virtues through the lives of respective saints.



Figure 1. Monastery's Entrance (avatar landing area).

After participants assemble the relic that opens the sealed door, they access the hidden location, where they have to complete a final quest to acquire the secret treasure, the prayer of the heart or Jesus prayer, a short, formulaic prayer. After the game's completion you are encouraged to visit the Guard House to learn more about the game and its content.

3.2 Heads-Up Display

The main instrument to play the game is a two-sided heads-up display (HUD), the Panagia Paramythea Code as demonstrated on Fig. 2. Players received the HUD at the entrance of the monastery. The HUD serves as map, progress tracker of the main quest, feedback mechanism and score keeper of side quests. Players can change the side of the HUD by clicking on it.

¹ The story does not take place in a particular time period so it has a sense of timelessness.

² Panagia is a Greek word meaning "all holy" attributed to Virgin Mary. Panagia Paramythea is a miraculous icon that resides in Vatopediou monastery in Mount Athos.



Figure 2. The two sides of Panagia Paramythea Code (game HUD).

In order to enhance immersive educational experiences for flexible, asynchronous learning we used extensively Non-Player Characters, NPCs or conversational agents. NPCs can be programmed to communicate in a structured way.

Another method we used to increase the multisensory character of the game was the systematic incorporation of music, audio and sound effects and auditory experiences that increase the realism of the environments and support the feeling of game scenes and the story.

The main interaction mechanism in the game is scripted, structured dialogs with NPCs via multi-branched dialogs. In total we developed nine (9) dialogs with NPCs.

3.3 Realism and Fiction

In the game we made the conscious decision to blend realistic with fictional elements. On the one hand we found it imperative to achieve a high degree of realism in all facets of the experience to accommodate the necessary fidelity associated with the learning domain, religious education connected with the Eastern Orthodox Christian faith. For instance, we used actual 3d models of existing building exteriors and building components of a monastic complex in Mount Athos³ (Fig. 3). All used models were freely available in the Internet under a creative commons license and used fairly for an educational purpose with permission by their respective creators. On the other hand, we also introduced fictional elements to implement game play elements, facilitate and enhance the learning experience by adding playful elements, e.g. navigational elements such as locked doors and teleportation gates. Fictional elements were also essential to respect existing entities, religious figures and monastic communities. This is why the name of the monastery and the virtual monk characters were all imaginary.



Figure 3. Realistic 3d model of the Filotheou Monastery in Mount Athos, Hellas/Greece.

³The Monastic Republic of Mount Athos is the thousand-year stronghold of Eastern Orthodox Christian monastic ascetism & spirituality in northern Greece.

3.4 3D Environments

The virtual world features twelve (12) learning environments in total where all game levels take place. All environments were developed in the open-source virtual worlds platform Opensimulator. Some of the environments were the following:

- Monastery Entrance: The landing spot of visitors and new players.
- Reception Hall: the welcoming area where guests are treated snacks and drinks, and register their personal information in monastery's visitors' book.
- Library: The book and manuscript archive and study space of the monastery.
- Workshop: The tinkering place of the monastery where book binding, painting of icons and the display of innovative "Saint Machines" (Fig. 4) takes place.

3.5 Navigation and Gameplay

Our main concern for the gameplay, was to provide clear guidance and choices to learners at all times so that they won't be wondering about what to do next in the virtual world. Therefore, we added multiple layers of navigation and assistance to guide learners. First, the HUD itself is a map for constant reference. Second, we made a stone pathway from the monastery's entrance that leads to all locations. Third, we added signs that point to the monastery's key locations. Fourth, we added signs in front of the entrance of each visitable space.

3.6 Game Layer Alignment

The essential challenge in this project was the manifold thinking and creative synthesis required during the game design process; the learning experience should merge and align harmonically multiple layers:

1. Theological / philosophical
2. Pedagogical / instructional
3. Game mechanics
4. Game dynamics
5. Game aesthetics

The pieces of the Cross of Truth -the key that opens the sealed gate to the treasure- are to be acquired by completing quests. The quests are associated with respective virtues that contribute to the discovery of the truth; love, patience, faith and repentance. These virtues were associated with events in the lives of specific Saints venerated by the Orthodox Church. Finally, these quests take place in the appropriate environment that connect the virtue with the primary function of each space. The following table describes this synthesis.

Table 1. Main Quest Levels Alignment.

Virtue	Saint	Characteristic	Environment
Love	Saint Dionysius	Forgiveness of the murderer of his brother	Reception Hall
Patience	Righteous Job	Endurance of long suffering	Library
Faith	Saint Luke the Doctor	Combined faith with science	Church
Repentance	Saint Mary of Egypt	Gave up life as prostitute to become a hermit.	Monk Cell

In this regard, we strived consciously for diversity and representativity in multiple ways to demonstrate the global, ecumenical dimension of Orthodox Christian Church; we chose to focus on men and women Saints that lived both in older and contemporary times, were rich and poor, of different ethnicity, continents and race.

3.7 Side quests

Next to the main quest, we added the possibility to complete several side quests. Side quests are coined 'acts of joy'. Completed side quests are recorded in a subtle way in the back side of the HUD.

Table 2. Side Quests.

Side quest	Location	Objective
Candle	St. Andrew Church St. Nicholas Church	Light a candle in a Church ⁴
Byzantine Music	St. Nicholas Church	Stay in the Church longer than 5 minutes
Iconography	St. Nicholas Church	Examine closely or pray in front of an icon
Lost page	Workshop	Help a monk find a missing object
Saint Machine v1	Workshop	Test your knowledge about saints' lives
Saint Machine v2	Workshop	Identify a saint
Saint Machine v3	Warehouse	Learn about some notable Saints

Some side quests are hidden, so you find out only after you complete them, rewarding spontaneous behavior.



Figure 4. Saint Machine v.1 and v.2. side quests

3.8 Future directions

The game can be expanded in various directions. First, the game itself is easily modifiable and expandable. Educators that are interested in the game will be able to add different or new spaces, levels, quests and characters so as to address deeper goals or specific content domains in religious education.

Also, depending on the interest received from educators, we are contemplating creating more modes of experiencing the environment; for example, we can implement a flexible guided tour mode. With the help of non-playing characters or virtual bots we can organize either a universal tour of the monastery or specialized guided tours that explain different topics related to religious education such as monasticism, ascetics, church architecture, iconography, music etc.

⁴ Lighting a candle in the Church is a symbolic act meaning glorifying God, manifest inner joy or bestow honor to the saints etc.

4 CONCLUSIONS

Eastern Orthodox Christian theology addresses not just the mind but also the heart or nous, the existential centre of man. According to the Orthodox spirituality, the way humans can approach, know and meet God is only through personal experience. This makes immersive experiential learning a suitable medium for Orthodox Christian religious education. In the design of the game we took into account the fact that the structure of the game itself carries a fundamental ethical message and so it should reflect the values that are to be demonstrated in the game. Moreover, in this paper we describe how we addressed the main challenge of this project; the creative alignment synthesis required during the game design process. More specific, the learning experience merges and aligns harmonically multiple layers: philosophical - theological (ethical values, behaviour paradigms), pedagogical - instructional (learning activities), game mechanics, dynamics and aesthetics in a 3D virtual immersive environment.

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