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SCRIPTURE TO CONSOLE: THE NEXUS BETWEEN RELIGION AND DIGITAL PLAY

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by

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Abstract

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Billions of people organize their lives around religion. Billions of people play videogames. For the most part, the scholarship studying these two phenomena has treated them as separate worlds. This dissertation argues they are not. Religion and videogames are both mobilization systems, each capable of moving people toward shared belief, collective action, and community through narrative, ritual, and symbol. What happens when you study them as the same kind of problem, and what becomes possible when you design them to work together, is what this dissertation is about. Games have borrowed from religion for decades. Hindu deities appear as playable characters in SMITE. Islamic architecture backdrops Assassin's Creed. Biblical narratives inspire The Binding of Isaac. Games that copy religious iconography without that understanding have repeatedly generated backlash from the very communities whose traditions they draw on. This dissertation takes a different starting point: rather than studying religion as it already appears in games after designers have made their choices, it goes to the source. Through visual ethnography at Hindu temples, grounded theory analysis of sacred texts, and participatory design with game designers, I build AstraVerse, a suite of frameworks that gives designers access to the full vocabulary of a religious artifacts without requiring them to transplant worshiped figures into contexts that communities find offensive. Knowing how to design responsibly is only part of the problem. The other part is understanding who is affected and how. Through topic modeling of a large corpus of posts and comments spanning religious subreddits and game communities on Reddit, analyzed through a human-in-the-loop verification process, I identify how different faith traditions engage with these representations through fundamentally different frames. Gaming communities treat religion largely as creative material, a source of characters, narratives, and worlds. Religious communities are more divided, some excited to see their traditions reflected in games, others concerned that sacred figures

are being trivialized or that certain mechanics violate religious teaching. These two conversations are happening in parallel, rarely informing each other, and rarely informing game design. The final thread of this dissertation tests whether the deeper mobilizing logic of religion, can be encoded directly into game mechanics for learning. Through a research-through-design process involving ethnographic fieldwork at Hindu pilgrimage sites in India, iterative co-design with religious scholars, and comparative playtesting, I developed Shloka, a serious game designed to motivate climate action among Hindu players built around seven digitized ritual practices. Players chant mantras, perform hand gestures, read scripture, and conduct worship as acts of gameplay, each ritual invoking a climate deity who guides them through environmental crises affecting places they consider sacred. Compared against a corpus of existing climate change games, Shloka produces greater reflection, relatedness, and motivation toward climate action. The reason, emerging clearly from player interviews, is that grounding a global crisis in a sacred place someone has actually stood in makes it feel real in a way that melting glaciers and abstract carbon metrics do not. This dissertation contributes a replicable methodology for culturally grounded game design, a validated framework for assessing religious sensitivity in character creation and game development, and empirical evidence that faith-based game mechanics produce stronger engagement outcomes than secular equivalents for matched populations. Religion and games have spent centuries and decades respectively solving the same underlying problem: how to move people toward something larger than themselves. Studying them as parallel systems, rather than separate domains, is the central contribution of this dissertation.

To Amma, Nanna and Vikram, For Everything,

Sai Siddartha Maram,

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Chapter 1

Introduction

Verse: *Sarva-Manggala-Maanggalye Shive Sarvaartha-Saadhike /*
Sharannye Trya[i-A]mbake Gauri Naaraayanni Namo[ah-A]stu Te //
Meaning: *To the goddess who is called consciousness in all beings,*
Salutations to Her, Salutations to Her

When I first heard the mantra, 'Sarva-Manggala-Maanggalye' (Verse 1) I was a six-year-old kid, being told to chant this mantra every day for my well-being. Most Hindus would have come across this chant in prayers or at temples. Fast forward 15 years, my excitement knew no bounds when I saw such a familiar mantra being used as a background score[1] of the award-winning videogame title Razi (Nodding Heads Games, 2020b). It did not stop there, the subtitles marked the two voices shown in the trailer of Razi as Lord Vishnu and Goddess Durga, both often considered the forefront in the Hindu pantheon of Gods. However, when I shared this with my family, they were skeptical to see the use of their religion in videogames and quoted it to be commercialization of their faith. That conversation with my family helped me iron out the concept of 'Stakeholders'? Who are the stakeholders when religion is being used as game mechanic in games? This prompted two vital questions for me - (a) How do game studios use religion as a design space for videogames? and (b) How do various communities (players, religious stakeholders) view the presence of religion in videogames?

It was not just the Hindu mantras, even bigger game releases like Assassins Creed-Mirage (Ubisoft, 2023) had beautiful mosques, and the Islamic Azan audible in the background as the sunset in the game. In the trailer of Smite: Dharmic era (Titan

[1] `https://www.youtube.com/watch?v=s6GWknvdAvk`

Forge Games, 2019), Tiamat the primordial goddess who is considered the mother of the gods in Mesopotamian mythology charges towards Shiva another prominent deity in Hinduism. While religions have mostly been mutually exclusive, in terms of doctrines and roles of gods, videogames as a medium have completely changed that. Gods form various mythologies co-exist with each other, fight in same teams, and even kill each other as part of the game mechanic. The use of religion in games, goes beyond aesthetics, and character, for instance the narrative in the game Uncharted: The Lost Legacy (Naughty Dog, 2017) revolves around finding a relic associated with a Hindu god, and games like The Bindings of Isaac (*The Binding of Isaac*, 2011) presented a satirical take on popular Biblical tales. These are just a few example of how Religion and Religious symbolism was found plastered across various games, which Radde-Antweiler refers to them as 'Religioscapes' (Radde-Antweiler, 2008).

1.1 Terminology and Definitions

1.1.1 What is Religion?

While we discuss the presence of religion in games, it is vital to iron out what I mean by religion. Religion, a concept of enduring human significance, defies a singular, universally accepted definition. Scholars across disciplines have grappled with its multifaceted nature, highlighting its social, symbolic, and existential dimensions. I instead focus on how I view religion with respect to previous scholars, and the inspiration it provides me to study videogames and religion.

From a sociological perspective, Durkheim (Durkheim, 2016) viewed religion as a social system that fosters social cohesion through shared beliefs and rituals. It provides a sense of belonging and reinforces moral values, binding individuals together through a collective consciousness (Durkheim, 2016). In contrast, anthropologist Geertz (Geertz, 1973) emphasized religion's role in constructing symbolic systems – narratives, practices, and experiences – that provide meaning and order to human existence. These symbolic systems, according to Geertz, function as pervasive, and long-lasting moods that shape how humans understand the world (Geertz, 1973).

Building on these core ideas, other scholars have explored specific aspects of

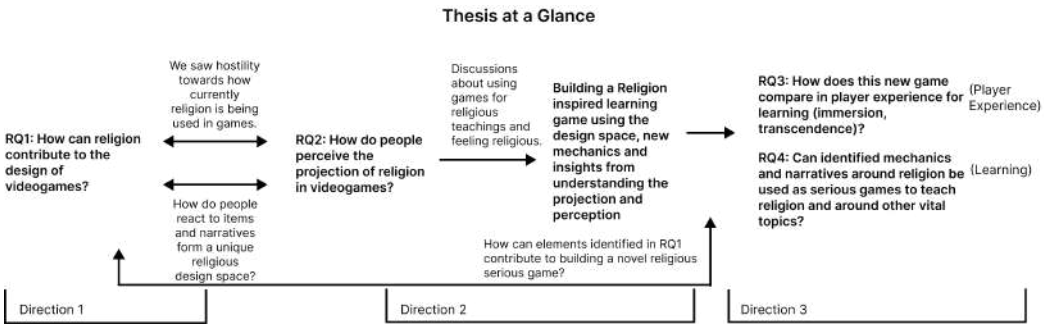

Figure 1.1: Overview of the Research Questions and goals for the proposal

religion. For instance, anthropologist Meyer (Meyer, 2006) highlights the importance of lived experience and embodied practices in understanding religion. He argues that focusing solely on beliefs neglects the embodied and emotional dimensions of religious life, where rituals and practices play a crucial role. Similarly, Davidsen (Davidsen, 2018) emphasizes the experiential nature of religion, suggesting that it can be found in unexpected places and everyday encounters with the sacred.

Davidsen's argument highlights the ubiquity of religion, pointing out its presence in unexpected places, from Google Maps and Spotify to videogames, thus underscoring its significance in contemporary contexts (Davidsen, 2018). Similarly, religious narratives, symbolic systems, and rituals, as discussed by Geertz (Geertz, 1973) and Meyer (Meyer, 2006), are integral to videogames. In their thesis on religion and digital play, de Wildt articulates that beliefs in a supernatural substance are mediated by objects and actions, endowed with collective meaning (De Wildt, 2022). I adopt this perspective on religion to examine how various supernatural substances and belief systems contribute to the design of videogames and how videogames, in turn, help reinforcing these belief systems.

1.2 Research Questions

Given the numerous 'Religioscapes' that now exist within popular media, the embedding of religious content in widely played videogames, and the diverse, often contentious, opinions associated with this practice, a rigorous framework is essential.

For this purpose, the study is structured into three interconnected research directions, as schematically illustrated in Figure 1.1.

The first direction of this research explores the foundational question: **How can religion contribute to the design of videogames?** Religion, as a vast cultural and conceptual framework, offers a rich variety of artifacts, including profound narratives, complex characters and deities, distinct musical traditions, and highly structured rituals. While these elements occasionally appear in modern videogames, their incorporation is often limited by the designer's existing knowledge or confined to elements identified by researchers studying current popular titles. I argue for a religion-first approach to fully understand religion's potential as a creative resource. To achieve this, I systematically study religious spaces and materials through an interdisciplinary lens.

I move away from traditional methods—such as post-hoc designer interviews and in-game ethnography—to explore the use of religion as a primary design space. Instead I employ techniques like discourse analysis of religious content, grounded theory analysis of sacred texts, and visual ethnography of physical religious places. This methodological distinction is crucial; it not only allows for the creation of a taxonomy of religious elements for designers and researchers to build upon, but also fundamentally broadens the range of religious content available for design inspiration, transcending the content limitations of existing games. Ultimately, this direction aims to provide both new design spaces and novel frameworks for evaluating them.

The insights from the first direction offer designers the ability to create new elements and borrow compelling artifacts from religious sources. However, successful and responsible design requires understanding reception. Therefore, the second direction focuses on the critical question: **How do various stakeholders perceive the presence of religion in videogames?** Developing games that incorporate religious elements necessitates a deep understanding of how diverse religious communities view the use of their traditions in digital play. Previous studies on religion and games have often overlooked the perspectives of the very religious stakeholders whose traditions are being represented, a gap this research intends to bridge. Furthermore, I delve into how the general player base perceives religious content and identify which elements resonate with them. A key component of this direction involves examining social media

platforms, such as Reddit and YouTube, to systematically study how both religious and gaming communities engage in discourse regarding religious content in videogames. A crucial emerging outcome from this direction is the realization that many religious stakeholders are beginning to look toward games as a context for religious activity itself.

While the first two directions inform how religion can be used as a design space and how that use is perceived, they do not explore the ultimate potential of the convergence between these two transformative forces. The third direction focuses on the application of these findings to address critical scientific problems and create opportunities for reflection and change. It explores the concept of using religion as mechanics for serious games, specifically investigating the effect of these religious mechanics on player experience and learning.

Leveraging the innovative elements cataloged in Direction 1 and the critical sensitivities highlighted in Direction 2, I develop a unique serious game that incorporates religious narratives and rituals as core game mechanics. Our ethnographic work indicated that many religions are closely tied to the natural world, with teachings that often personify nature and establish conservation and stewardship as a religious obligation. Focusing on climate change as the central educational concept, the game will engineer innovative mechanics, such as requiring players to perform ritualistic inputs to advance the game's narrative and solve environmental crises. With this developed game, I seek to investigate the research question: **How does this novel game compare to existing climate change games in terms of player experience and motivation?** I plan to test the religious serious game against a benchmark of existing climate change games to validate the hypothesis that ritual-based mechanics elicit a stronger player experience and deeper motivation compared to conventional game mechanics.

1.3 Contributions to Religion and Digital Play

The above discussed three directions are not mutually exclusive and are intertwined, with each direction providing crucial insights to the others. Together, these directions yield significant contributions to the field of religion and digital play on various fronts, as shown in Figure 1.2 and elaborated below:

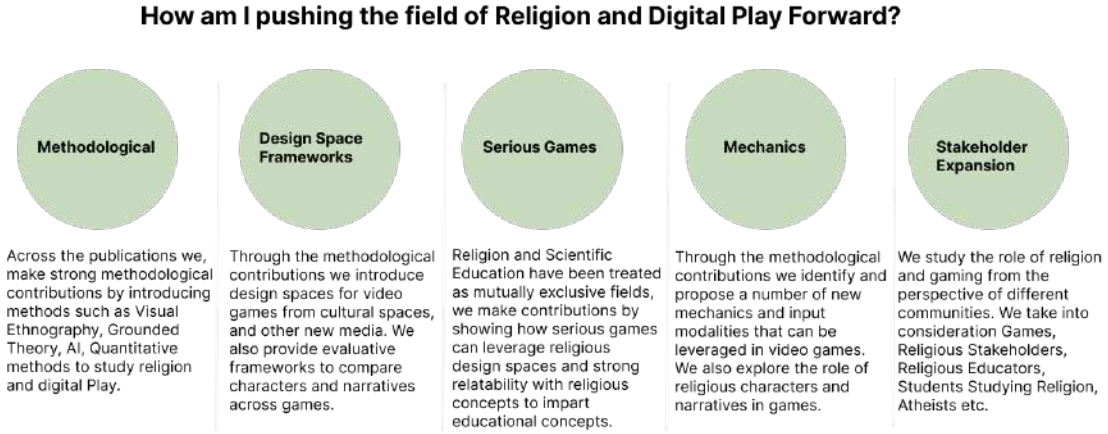

Figure 1.2: Various Directions in which I am contributing to the field of religion and digital play

- ***Direction 1 (Design Space Frameworks):*** Previous work often highlights individual elements of religious content that contribute to game design but lacks formal frameworks for systematic development. I address this gap by presenting novel frameworks for both the creation of new religious design spaces (through ethnography and grounded theory) and the evaluation of artifacts created via these design spaces, enabling designers to consistently integrate complex religious artifacts.

- ***Direction 2 (Stakeholder Perception):*** Previous research in videogames and digital play has overlooked the essential perspectives of religious stakeholders. I bridge this critical gap by collecting and analyzing perceptions from religious communities alongside player and designer insights. By studying interviews and social media discourse, I provide a nuanced understanding of opinion differences and similarities across various communities regarding the use of their religion in digital media.

- ***Direction 3 (Serious Games and Motivational Mechanics):*** The field lacks work on the empirical effectiveness of religious concepts used as game mechanics, particularly in the context of serious games. I contribute a novel model by designing and empirically validating a serious game for climate change that uses ritualized religious narratives and practices as core game mechanics. Through

comparative playtests and A/B tests against benchmark games, I demonstrate how these ritual-based mechanics elicit measurably stronger player experience, learning outcomes, and motivation than conventional serious game approaches.

- ***Overall Methodological Contribution:*** The study of religion and digital play has largely relied on qualitative approaches, often led by media scholars. As a Computational Media researcher, I introduce a rigorous UX and Mixed-Methods approach to the field. This includes the application of methods such as visual ethnography, large-scale data analysis using AI/ML techniques, social network analysis, and controlled playtesting, establishing new methodological standards for future research.

Chapter 2

Previous Work

Figure 2.1: Goddess Kali worshiped in a Temple

Figure 2.2: Goddess Kali presented in a Telugu Cinema

Figure 2.3: Goddess Kali in the game SMITE

Academic literature often discusses how technology contributes to the world becoming an increasingly secular space (Kluver & Cheong, 2007; Ruck, Bentley, & Lawson, 2018). However, despite this surge in secularization, games like Assassin's Creed and SMITE, some of the best-selling games that prominently feature religious themes throughout their playtime contradict this trend. This large manifestation of religion in videogames aligns with what Luft (Luft, 2014) refers to as videogames being "awash with religious content," and Radde-Antweiler's (Radde-Antweiler, 2017) description of videogames as "Religoscapes."

The questions which then arise are: (1) How is religion presented to the people

of the 21st century in the form of videogames? (2) How do elements of religion influence the design of games? In this section, I scrutinize academic literature on Religion and Digital Play, conduct a content analysis on prevalent videogame titles, and classify the use of religion in videogames into three categories: (1) The Use of Religion as Game Mechanics, (2) The Use of Religion in the Construction of Game Worlds, and (3) The Use of Religion as Inspiration for Narratives.

2.1 Karta, Kriya, Karma (*The Doer, The Action, and The Result.*) - Using Religion for Game Mechanics

Game mechanics are rules and methods that drive the action and interactions within a game. They define the structure of a game, guide player behavior, and determine how the game responds to player input. Game mechanics can include various elements such as movement rules, combat systems, resource management, or scoring procedures. They are the tools and systems that make a game playable and provide players with challenges and goals to strive for (Salen & Zimmerman, 2004). In this section, we explore how religion can inspire various game mechanics in videogames.

2.1.1 Death and Respawn

As a regular player of Call Of Duty with my friends, I frequently hear the phrase "Mar gaya yaar mai" (in Hindi), which translates to "I died, dude!" This casual proclamation prompts me to wonder: did my friend die, or did the avatar embodying him perish? The ease with which my friend exclaims, "I died!" stands in stark contrast to the fear and dread surrounding real-life death. The death of a real person carries significant consequences, often accompanied by numerous religious rituals and a period of mourning. Malinowski (Malinowski, 1954) asserts that this fear of death serves as the primary source of religious beliefs.

Videogames, however, adopt a different perspective toward death. Krzywinska (Krzywinska, 2015) indicates that games often use death as a feedback mechanic to signal a player's failure in the game. After death, the player either respawns with the same abilities or occasionally with some abilities stripped. This concept of death and

respawning fosters an intriguing connection between religion and videogames.

Mukharjee (Mukherjee, 2009) explores the concept of death in Christian and monotheistic religions, which is often linear, meaning that death is terminal and resurrection is possible only for individuals of divine or holy status. Despite this cultural belief, it is intriguing that videogame studios have dismissed the terminal aspect of death. They've trivialized it, particularly in relation to mono-aesthetic religions, by introducing a multiplicity to the avatar through the mechanism of respawning.

Conversely, Buddhist lore and Hindu scriptures inherently embrace the concept of rebirth and respawning post-death, a stance often assumed for videogame avatars (W. Gregory, 2018). Despite these striking similarities, Flynn (Flynn-Jones, 2015) argues that it's difficult to assert that videogames directly borrowed the concept of death and rebirth from religious scriptures. He highlights that, from the perspective of Hinduism, where death is celebrated and regarded as divine, employing death as a punishment in videogames appears as a dark design choice.

In addition to the concept of respawning, Bosman highlights other ways that religion can influence death narratives in games (F. G. Bosman, 2018). One such method is through religious intervention to prevent death. For instance, in The Prince of Persia game, when the Prince faces impending death, the Non-Player Character (NPC) accompanying the Prince prays to Ormazd, the Zoroastrian deity of Light, to intervene and spare the Prince's life. Another correlation between religion and respawning centers on the replacement of avatars at different times in Hindu myths and legends. For example, in the Hindu epics Ramayana and Mahabharata, Lord Vishnu transitions from the avatar of Lord Parashurama to that of Lord Rama to vanquish a new Asura (demon). Similarly, Some Vaishnavite Hindus believe Lord Buddha replaces Lord Krishna to address the burgeoning issue of sin among humanity. This avatar replacement post-death is also present in games such as Bioshock Infinite (I. Games, 2013), and Zombi (Ubisoft Montpellier, 2012). Following the death of a playable character, the game introduces a new character from a parallel universe or the game replaces the original character with a new one.

2.1.2 Karma and Moral Scales

Karma is a concept rooted in Buddhism and Hinduism, representing, in its simplest form, the accumulation of moral and immoral deeds performed by individuals. The karma that an individual accumulates determines consequences such as rebirth, liberation from rebirth, and admittance to heaven or hell.

Knoll (Knoll, 2018a) notes the growing use of moral scales and karma systems in videogames. These karma systems manifest in various ways within games. For instance, in the game Star Wars: Knights of the Old Republic, the player frequently encounters two choices for actions or dialogues, each representing either good or evil, without the provision of a neutral option. A scale displayed on the screen illustrates the morality of their choices. Aligning with the dark side of morality associates the character with evil forces, and vice versa.

In games like Fallout 3 (Bethesda Game Studios, 2008), the player navigates a post-apocalyptic world and can accumulate or lose karma points based on their actions in the game. Good deeds, such as making donations and helping the injured, result in positive karma points, while acts of murder and theft diminish karma points.

The use of karma systems extends beyond merely creating decision dilemmas. Games like Fable (*Fable (video game series)*, 2004), Metro 2033 (4A Games, 2010), Mass Effect 2 (BioWare, 2010) allow karma systems to influence the game's narrative and aesthetics. In Mass Effect 2, players often need to demonstrate loyalty to a group or cult, typically by completing loyalty missions involving moral dilemmas that affect the player's karma. The player's choice to accept or reject these loyalty missions influences the game's narrative by introducing new characters or eliminating certain characters due to a lack of loyalty.

Similarly, karma systems in Mass Effect 2 impact the game's aesthetic. The game presents the character with facial scars and electrical implants. As the player makes more morally dubious choices, the facial scars darken, and electrical sparks emanate from the implants. Conversely, as the player makes ethically sound choices and gains good karma, the facial scars visibly heal.

2.1.3 Weapon Systems

Religious scriptures frequently depict scenes of wars, gods, and characters wielding weapons. The videogame industry has capitalized on these weapons found in religious stories, incorporating them into game weapon systems. For instance, De Wildt (de Wildt & Aupers, 2023) discusses the references to the Sword of Eden in the Assassin's Creed series. According to the Assassin's Creed fandom page, the Isu created the Sword of Eden from Pieces of Eden. While this artifact is fictional within the Assassin's Creed game series, it draws inspiration from the biblical concept of the flaming sword that guards the entrance to the Garden of Eden.

In a study conducted at Hindu Temples, Maram *et al.* identified 33 potential weapons through ethnographic research (Maram, Pfau, Dodechani, & Seif El-Nasr, 2023). Games like Smite, which incorporate gods from various mythologies, also use the primary weapons of these gods. For example, as shown in Figure 2.1, the right hand of Goddess Kali in a temple holds a sickle and trident. Similarly, in Figure 2.3, Kali in the game Smite also wields a trident and sickle.

While there is limited discussion on how religion inspires a broad range of weapon systems and what it means for players to use these weapons, Maram's work (Maram, Pfau, Habibi, & Seif El-Nasr, 2022b; Maram, Pfau, Dodechani, & Seif El-Nasr, 2023) provides evidence of how religion can aid game designers in creating new weapon systems for characters.

2.1.4 The Avatar

The term avatar has been used in multiple games since the 1980s (de Wildt, Apperley, Clemens, Fordyce, & Mukherjee, 2020b). The anglophone nature of videogame academia makes it convenient for researchers to ignore the religious significance of the term avatar, which has been found and used in Hindu households for over two and a half millennia (de Wildt & Aupers, 2021). The term "Avatar" originates from Hinduism, which refers to Lord Vishnu embodying different living forms by taking birth on earth to solve specific problems. The use of gods as playable characters has been one of the most common uses of religion in videogames, especially in popular titles like Smite (Titan Forge Games, 2019) and Hades (Supergiant Games, 2020), among many others. Maram

(Maram et al., 2022b) through content analysis of videogames presents how Hindu gods such as Krishna, Lakshmi have been used in videogames like Shin Megami Tensi. Zeiler (Zeiler, 2018) also illustrates how games like Raji, have used gods as NPCs who guide players across the narrative.

2.1.5 Quests, Lore, and Stories - Using Religion for Game Narratives

Game designers have often used stories derived from religion to create quests or storylines for videogames. In this section, we look at examples illustrated by various authors which reflect how religious narratives are embedded or given a fictional twist in videogames.

Kaveney (Kaveney, 2005) mentions the term 'ludic gambit' to describe how fantasy-based games draw from sources familiar to the player to create a sense of fantasy and improve player experience. For the same reason, Krzywinska (Krzywinska, 2006) discusses why the RPG World of Warcraft (Blizzard Entertainment, 2004) draws different layers of narrative from Celtic, Green, and North American mythologies.

Krzywinska (Krzywinska, 2006) asserts that integrating narrative layers borrowed from various mythologies contributes to shaping the experience of the game world and its temporal condition. This integration also influences the game's style, resonance, and rhetoric. These aspects collectively enhance the high fantasy ambiance of the game and meaningfully position players within the game world. Delving deeper into the quest systems in World of Warcraft, Krzywinska identifies parallels between the game's requirement for a player to be nomadic and the archetypal hero quest structure found in the ancient Greek mythological poem, the Odyssey.

The perspectives offered by Krzywinska (Krzywinska, 2006) and Cragoe (Cragoe, 2016) highlight the significant role mythical narratives play in shaping player experiences in RPGs. To reach their conclusions, they explore the game world studying it from a players perspective. In contrast, De Wildt (de Wildt & Aupers, 2023) and Seif El-Nasr (El Nasr, Al-Saati, Niedenthal, & Milam, 2008) employ an actor-centered approach, using semi-structured interviews to study the role religion plays in establishing narratives for videogames beyond RPGs, as illustrated in their study of Assassins Creed.

De Wildt (de Wildt & Aupers, 2023) and Seif El-Nasr (El Nasr et al., 2008) conducted interviews with the designers and players of Assassin's Creed to understand the game's narrative. Seif El-Nasr (El Nasr et al., 2008) offers a comprehensive analysis of the diverse Islamic factions and related stories presented in the game Assassin's Creed. She explicates how the narratives that emerge from Islamic inter-faction dynamics significantly contribute to the game's overall storyline. The game becomes merely a search and action game to those unfamiliar with the history of the Islamic factions. Jade Raymond, producer of Assassin's Creed, mentioned in an interview with Seif El-Nasr that they were excited to use religious crusades as a backdrop for the game narrative. Raymond states, *"We have dealt with religion as a purely historical background element. We cannot completely avoid religion because it was the impetus for the war. However, we have worked with cultural experts throughout production to ensure that we treat sensitive topics with respect. As the Saracens and Crusaders battle one another for control, the Assassins are working to find a way to end the hostilities."* This statement illustrates how narratives from actual religious history inspired the game's creation.

The arguments of Cragoe (Cragoe, 2016) and Krzywinska (Krzywinska, 2006) find resonance in the interviews conducted by Seif El-Nasr (El Nasr et al., 2008) and De Wildt (de Wildt & Aupers, 2023), with designers of Assassin's Creed asserting that the use of religion enhances the player experience. The idea of employing religious crusades to drive the narrative, iterated by Sisler (Šisler, 2017). Sisler's approach involved constructing Petri nets to represent the narrative structure of the games Age of Empires 2 and Quraish. The nodes in the Petri Net represented specific states or events in the game which are inspired by religion, while the transitions represented the player's choices to the specific religious event. By modeling the game narrative using Petri Nets, Sisler could analyze and visualize the different paths and possibilities within the game. Supporting this argument, Gregory (R. Gregory, 2014) refers to the use of religious crusades to set the narrative as *"Citing the Medieval"*.

Figure 2.4: A Sikh Warrior in the Game Assassins Creed

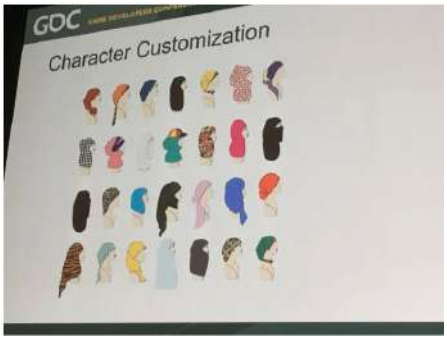

Figure 2.5: A Slide from a GDC talk talking about Character Customization using elements from Islamic origin

2.1.6 Mosque, Temple and Church - Using Religion for Creating Gameworlds

Videogames often incorporate religious buildings as part of their settings, leveraging their rich historical, cultural, and architectural significance to enhance the game's world. These structures can serve a variety of purposes within a game, from being mere background aesthetics to providing pivotal points for game-play and narrative progression. In this section, we briefly discuss how religion is used for building the game-world.

Benjamin (Benjamin, 2009) posits that the use of ruins can evoke a sense of mystery and nostalgia. Krzywinska (Krzywinska, 2006) extrapolates on this idea, using the ruined city of the Night Elves in World of Warcraft (Blizzard Entertainment, 2004) as an illustration. This pattern also emerges in games like Uncharted (The Lost Legacy), where the portrayal of the Ganesha temple in ruins sparks the storyline. Krzywinska (Krzywinska, 2006) goes on to discuss the crucial role that aesthetics, textures, and symbols play in the world design of videogames. Many games integrate religious elements into their spatial settings. For instance, Heidbrink (Heidbrink (ed.) & Knoll (ed.), 2014) demonstrates the influence of Christianity on the gameworld of BioShock.

Heidbrink describes the gameworld's winged statues, stained glasses, and biblical quotes etched on pillars, all of which closely resemble Christian sources. Similarly, Zeiler (Zeiler & Mukherjee, 2022a), in their study of the gaming community in India, notes the presence of Hindu iconography in the game Raji (N. H. Games, 2020). The

gameworld features images of Hindu deities painted on the walls, temple backdrops, and Hindu artwork across different levels, as shown in Figure 2.9. The creator of Raji, whom Zeiler interviews, confirms that the artwork draws inspiration from Hindu mythology. Zeiler (Zeiler & Mukherjee, 2022a) and Heidbrink (Heidbrink (ed.) & Knoll (ed.), 2014) also observe how the games' soundscapes reflect the religions depicted. In BioShock Infinite, players hear biblical verses and hymns in the background, whereas in Raji, the sounds of the conch, an instrument traditionally used to commence proceedings in Hindu rituals, accompany the launch of attacks.

Figure 2.6: Call of Duty during the Chinese Lunar New Year

Figure 2.7: Call of Duty during Ramadan

Figure 2.8: Call of Duty during Halloween

Maram's ethnographic research underscores the multitude of ways Hindu temples can inspire videogame space design. Their work emphasizes the role of fashion, as shown in Figure 3.10, in character creation. They engage designers in their study to design characters utilizing the fashion elements they identified. This collaborative effort gives rise to a variety of characters as illustrated in Figure 3.11. Krzywinska (Krzywinska, 2006) notes that real-world festivals such as Christmas, Halloween (See Figure 2.8), St. Patrick's Day, Ramadan (see Figure 2.7), and the Chinese New Year (See Figure 2.6) often inspire new character skins reflecting the religious festivals. In her analysis of Assassin's Creed, Seif El-Nasr (El Nasr et al., 2008) remarks on the common appearance of Islamic women in Hijabs. Expanding on the topic of the Hijab, Alex Wawro, in his GDC talk [1], advocates for a more comprehensive representation of Islamic fashion in videogames, suggesting it should extend beyond Hijabs. As shown in Figure 2.5, he presents a character creation interface for designing skins for Islamic characters in videogames. Further integrating religious elements into game characters,

[1] https://www.gamedeveloper.com/design/how-and-why-you-should-better-represent-muslims-in-your-games

Figure 2.9: The Hindu Diety Durga on a wall in the Game Raji

Gilbert *et al.* discusses the Sikh Empire in Assassin's Creed (L. Gilbert, 2017). As displayed in Figure 2.4, the Sikh warriors in the game wear turbans adorned with the Khanda, a symbol of Sikhism.

2.1.7 Gaps

In the previous section, we discussed the literature associated with games and religion. Through multiple papers, we constructed arguments on how religion inspires the creation of narratives, worlds, and aesthetics. Although previous research has not collectively examined these aspects with the goal of creating design spaces, we were still able to highlight instances where religion serves as an inspiration for games. However, this discussion uncovered some gaps that need to be addressed, which correlate with Direction 1, as illustrated in Figure 1.1.

Firstly, there is a need to develop a concrete design space that goes beyond merely exploring elements from religious themes present in videogames. This design space should stem from a religion-first approach. The first direction precisely addresses this challenge by employing ethnography and discourse analysis methods on religious

spaces and content to develop a design space.

Next, merely developing these design spaces is not enough. We must verify their usability and provide evaluative frameworks to ensure that designers utilize the design space accurately. Within the first direction, in addition to creating design spaces, I bridge the gap in evaluating religious design spaces (which can be extended to other design spaces) by developing novel frameworks for designers to adopt.

2.2 Stakeholder Perceptions of Religion in Videogames

The previous section delved into the incorporation of religion in videogames. Throughout the discussion, numerous authors pointed out that the inclusion of religious elements enhances the immersive experience, evoking a sense of myth, curiosity, and relatability. While enhancing immersion might be a key motivation for designers to integrate religion into videogames, it's worth asking if the dissection of religious elements solely leads to enriched player experiences. Are there other consequences aside from increased immersion? What are the various ways players interpret religious content in videogames, and what could be the potential outcomes of this process?

In this section, we aim to explore these questions, starting with an examination of de Wildt's various classifications of player interpretations of religious elements in games, as presented across his numerous studies. Lastly, I present an argument, gathered from the work of various literature that discusses how the presence of religion in videogames might be considered offensive to certain stakeholders.

2.2.1 De Wildt's Decoding Religion

In his thesis, De Wildt (De Wildt, 2022) introduces the concept of encoding and decoding religion. de Wildt (de Wildt & Aupers, 2019) studies how role-playing other religions in videogames feels. He conducts qualitative interviews with players of different religions and shares three ways players role-playing in religious games encounter other religions in videogames: (1) Secularism to Enchantment, (2) Religious tradition to perennialism, and (3) Assumed Atheism. De Wildt expands on his first theme (secularism to enchantment) by mentioning how participants in his interviews who identified as

atheists slowly started believing in gods they played in videogames. He then describes his second theme as how gamers that identify with one religion role-play other religions in videogames and can identify, empathize, and relate to other religions. Finally, in his third theme, he discusses how deeply religious players could correlate with non-religious or immoral acts in games (de Wildt & Aupers, 2019).

To gain a deeper understanding of gamers' perspectives on the presence of religion in videogames, de Wildt (De Wildt & Aupers, 2017) explores online discussion forums. Through thematic analysis of these conversations, he identifies players' perceptions as falling into four categories: (1) Rejecting, (2) Debunking, (3) Connecting, and (4) Debating. The first theme, Rejecting, looks at how players outright reject the inclusion of religious elements in videogames, expressing offense and condemnation. The second theme, Debunking, shows how players often trivialize the role of religion in videogames, treating it as merely a game and displaying indifference towards religious elements. In the third theme, Connecting, de Wildt finds players who neither reject nor debunk the presence of religious elements but actively engage with them, seeking out games with religious themes to explore their religious aspects. Lastly, the fourth theme, Debating, describes users who engage in discussions about what the presence of religion in games means to them.

Designers might hope for players' interpretations of religion in videogames to align with their intended design; however, this alignment does not always occur. In the following section, we explore instances where the deconstruction of religious elements by players has led to controversy. Although no explicit work has highlighted how different religions might find games offensive, I aim to synthesize an argument from selected readings. Furthermore, as part of Direction 2 in my proposal, I address this gap by identifying elements considered sinful and blasphemous through engagement with videogames.

2.2.2 The Lens of Blasphemy

Game rules govern the in-game universe, while real-world laws and, in some instances, religious scriptures regulate reality. We discussed in the previous section how vital it is for a game's success to have players embody the virtual character or

avatar. This brings up the question: does this embodiment pose a religious dilemma when encountering religious elements, playing religious characters, or performing specific actions in the game? Do players or religious stakeholders consider these elements blasphemous? In the following subsections, we delve into the concept of perceived blasphemy in videogames. We'll synthesize findings on how videogame elements have been considered blasphemous or encouraging stereotypes due to their mechanics, aesthetics, and narratives.

2.2.3 Mechanics

Sicart defines games mechanics as - 'game mechanics are methods [behaviors] invoked by agents, designed for interaction with the game state' (Sicart, 2008). Games provide players with agency through mechanics to progress in the narrative or explore the game world. We are particularly interested in examining how in-game actions can be construed as blasphemous.

For instance, while playing BioShock Infinite, players must undergo an in-game baptism ritual to commence the game (I. Games, 2013). This is one of four baptism rituals in the game that must be undertaken to avert "Game over" scenarios. Malmberg, a practicing Christian, was offended by the use of baptism as a mechanic and requested a full refund for the game (F. Bosman, 2017b). Another significant element in games is the concept of respawning or rebirth, which contravenes the beliefs of certain Abrahamic religions (Gonzalez, n.d.). Most Abrahamic religions uphold the belief in a single life and do not endorse the concepts of rebirth or reincarnation (Nagaraj, Nanjegowda, & Purushothama, 2013). For example, Islamic theology posits that humans have only one life on Earth and will be accountable for their actions in the afterlife.

Furthermore, many simulation games necessitate players to manipulate people, bribe authorities, and commit violent acts in order to advance in the narrative, which is in direct contradiction to the teachings of most religions. From an Islamic perspective, games like GTA (R. Games, 2022) and others contain content that is inconsistent with Islamic teachings and values. The game frequently features violence, theft, explicit language, sexual content, and other immoral activities. These elements are deemed haram in Islam as they encourage behaviors that are forbidden, such as engaging in

Figure 2.10: A typical Sadhu

Figure 2.11: Mumbai Master a protagonist from the game Hitman

Figure 2.12: Dome of the Rock an Islamic Shrine shown in Assassins Creed

criminal acts, promoting promiscuity, and using explicit or offensive language.

2.2.4 Aesthetic

SMITE (Titan Forge Games, 2019) is a videogame that portrays itself as the battlefield of the gods. Among its most prominent characters is the Hindu Goddess Kali. Maram's mixed-methods study (Maram et al., 2022b) underscores the objections raised by cultural stakeholders and religious gamers regarding Kali's representation in SMITE. Figure 2.1 displays the form of Kali worshipped in religious contexts, Figure 2.2 portrays a rendition of Kali from Indian cinema, and Figure 2.3 illustrates how Kali is depicted in SMITE. Temple priests and devout followers of the religion have condemned this representation, contending that depicting Kali in such a manner is blasphemous (Maram, Pfau, Dodechani, & Seif El-Nasr, 2023).

Aesthetics in videogames are not limited to character portrayals but also encompass symbols, iconography, posters, attire, and architecture within the game world (see Figure 2.12). These elements often bear religious significance and have recurrently contributed to perpetuating negative stereotypes in videogames.

Bushara (Wingfield & Karaman, 1995), in discussing the portrayal of Islam and the Arab world in videogames, points out the oversimplification of centuries of history into a handful of images. Sisler (Šisler, 2008) analyzes iconography across various games

Figure 2.13: The worshiped form of Hanuman

Figure 2.14: Hanuman in a TV series

Figure 2.15: Hanuman in the game Game Hanuman the Boy Warrior

and observes that certain aesthetic elements in videogames have resulted in an 'othering' effect toward Islamic culture. Sisler also notes that the Arabic backdrop is frequently depicted with recurring motifs such as headscarves, tiles, and camels, often portraying it as detached from modernity. In the post-9/11 context, the Middle East has become a favored setting for war zones in videogames, where antagonists are often depicted with dark skin and clad in Thobes, traditional attire for men in the Arabian Peninsula (Šisler, n.d.).

Furthermore, examining the depiction of cultures in game design, Figure 2.11 features an antagonist from the game Hitman 2 (Interactive, 2018) whose hair and attire closely resemble those of the figure in 2.10, who is revered as a sage in Hindu culture (Maram, Pfau, Dodechani, & Seif El-Nasr, 2023). This resemblance underscores the tendency for generalization and misrepresentation of cultural identities in videogames.

2.2.5 Narrative

When game designers incorporate symbols, iconography, characters, and other elements from religions and cultures into videogames, they transport not only the associated imagery but also the myths, legends, and narratives linked with these elements. The interactive nature of videogames allows players to deviate from the original narrative, both intentionally and unintentionally (Radde-Antweiler, Waltmathe, & Zeiler,

2014b).

For example, consider Sony's "Hanuman: The Boy Warrior" (Aurona Technologies & Sony PlayStation2, 2009). Sony did an admirable job aesthetically, accurately reflecting the worshipped version and the version depicted in the media (Figure 2.14 and Figure 2.13). However, despite this accurate 'transcendence of a media artifact' (Zeiler, 2020), "Hanuman: The Boy Warrior" still ended up in controversy [2]. The controversy centered on the portrayal of Hanuman, who, according to Hindu scriptures, is one of the seven immortals capable of leaping over large oceans, being susceptible to drowning, being hit by enemy fire, and ultimately losing the game.

Similarly, in the game "Shin Manga Tensei," the Hindu deity Krishna is cast as the antagonist, which was seen as counter to the cultural narrative (H. A. Campbell & Evolvi, 2019). Lord Krishna in Hindu mythology is considered the protector of righteousness. But in the game, Shin Manga tensei he is presented as an evil boss who the player must defeat before progressing in the narrative. Even though the player does not play the God (Krishna) like in the previous paragraph, the player is forced to defeat the Krishna to progress in the level.

The popular game "The Bindings of Isaac" (*The Binding of Isaac*, 2011), a spin-off from a Biblical story, also sparked controversy [3]. Bosman (F. Bosman & Wieringen, 2018) notes how the designers gave the original biblical narrative of Abraham's willingness to sacrifice his son a dark twist, leading to disappointment among certain users. He mentions, how the game incorporates religious imagery, symbols, and references throughout its gameplay and argues that religious individuals might find the game trivializing or mocking religious beliefs, by presenting a distorted or sacrilegious portrayal of sacred stories.

2.2.6 Gaps

In this section, we explored how the presence of religion in games is deconstructed, primarily by players, and identified some areas where stakeholders might take offense at seeing religion in games. However, the existing research is still in its early stages, and we aim to make a systematic contribution to this specific area, as highlighted

[2]https://kotaku.com/indias-first-game-gets-indias-first-game-controversy-5217826
[3]https://www.polygon.com/2015/1/26/7907061/binding-isaac-fundamentalism

in Direction 2 in Figure 1.1.

We seek to understand how the presence of religion in videogames is discussed by various communities beyond just the player base. By analyzing social media and studying digital media sharing platforms that host a mix of different stakeholders—including religious figures, players, and even non-players—we aim to distill themes from these conversations. Our goal is to inform readers about how the presence of religion in games contributes to both design and critical conversations. Additionally, we aim to share discussions on how games contribute to the understanding and interpretation of religion.

2.3 Pray For Green, Play For Green

In the previous sections, we have navigated through the intersections of religion and the digital world, understanding how religious interactions have found new avenues within the boundless expanse of the internet. We've seen how it diversifies religious communication and engagement and reshapes our understanding and experience of religion. Furthermore, we've delved into the realm of digital play and its links to religious narratives and symbolism. We've recognized that gaming, a seemingly secular domain, can also be a platform for religious exploration and discovery, where players can interact with implicit and explicit religious content in ways that affect their beliefs and attitudes. This section delves deeper into the complex interplay between religion and digital arenas. We explore how two powerful mobilization forces (games and religion) address one of the most pressing issues of modern times: Climate Change.

Verse 1:

> *The waters rose and covered the mountains to a depth of more than fifteen cubits. Every living thing that moved on land perished—birds, livestock, wild animals, all the creatures that swarm over the earth, and all mankind. Everything on dry land that had the breath of life in its nostrils died. Every living thing on the face of the earth was wiped out; people and animals and the creatures that move along the ground and the birds were wiped from the earth.*

Verse 2:

Under a scorching sun, the factions of Heathmoor long fought for water. But what was once scarce then came in overwhelming abundance. The unbearable heat of the drought melted the glaciers of Valkenheim and as a result, the water levels rose dangerously. Torrential rains and violent winds fell upon Heathmoor, with no end to the storm in sight. The tempest had a devastating effect on the landscape, with flooding and landslides becoming the new norm [...] With the home they once knew overrun with water, warriors found themselves out of their element. All except the Vikings, for whom the storm had brought about rebirth… and an opportunity to reign supreme.

The biblical verse in Genesis 7:19-23 vividly portrays the catastrophic power of floods, illustrating the devastating consequences they can bring. Regardless of one's familiarity with the Bible, this verse offers a compelling depiction of the destructive force of such natural disasters. In parallel, Ubisoft's game, For Honor (Montreal, 2017), explores a similar theme, emphasizing the profound impact of floods (Verse 2) and landslides on entire groups of people. Unlike the biblical verse, this narrative stems from a gaming context, injecting an exciting dimension into the discussion of how climate plays a pivotal role in ancient texts and modern interactive experiences.

Religion has long served as a conduit for change on many fronts, impacting the mental, physical, and societal aspects of life. The powerful narratives, moral imperatives, and community structures inherent in religious institutions provide a framework for engaging individuals in a collective goal (H. Koenig, McCullough, & Larson, 2001). For instance, religious belief and participation have been linked to improvements in mental health conditions, such as depression, due to the sense of purpose, social support, and hope often cultivated within religious communities (H. Koenig et al., 2001).

In a similar vein, gaming has gained recognition as a significant tool for facilitating change. The immersive and interactive nature of gaming can elicit empathy, improve cognitive skills, and educate players about critical issues in a way that traditional learning methods may not (J. J. Lee et al., 2013). Furthermore, the shared experience of online gaming can forge powerful social connections and communities, mobilizing players toward collective goals (Cole & Griffiths, 2007).

Both religion and gaming can thus serve as potential vehicles for positive change, influencing diverse realms, from mental health to social issues. The intersection of these two powerful societal elements provides a fascinating opportunity to approach

one of the most pressing issues of our time – climate change.

Climate change is not only a scientific or political problem; it's a deeply spiritual one, given that it is a threat to the very essence of life. The various religious traditions have intricate teachings about the relationship between humans and the environment. For instance, the biblical story of Noah's Ark (Genesis 6-9) provides an early narrative of extreme weather, while Hinduism presents deities, such as Varuna and Vayu, who personify water and wind, respectively. Moreover, in Greek mythology, deities like Zeus, Poseidon, and Demeter governed different elements of climate (Maram, Pfau, Habibi, & Seif El-Nasr, 2022a; Kinsley, 1998).

Religious narratives and teachings can be pivotal in mobilizing communities to combat climate change. Religion can inspire believers to take action through their moral responsibility to protect God's creation or by following the principles of their faith that emphasize respect for nature (Tucker & Grim, 2001).

Gaming, on the other hand, offers an immersive platform where players can witness and understand the impacts of climate change. Through gameplay, players can engage in simulations of environmental crises, witnessing the consequences of their actions in a virtual world, which can inspire change in the real one. Some games have already been designed to promote ecological awareness and stewardship, highlighting the medium's potential as a tool for environmental education (Bogost, 2010).

In conclusion, the potential for religion and gaming to act as forces for societal change, particularly in response to climate change, is substantial. By harnessing the narratives, teachings, and community-building potential of religion and the immersive, educational, and community-building potential of gaming, there is an opportunity to inspire and mobilize diverse individuals to actively engage in combating climate change.

Although existing literature on the intersection of religion and gaming in facilitating climate change solutions is limited, there is substantial research on how each can independently contribute to addressing climate change. This literature review is foundational and explores how religion and gaming contribute to reflection and action in response to climate change. In this section, I will leverage various methodologies, including academic literature reviews, religious books, content analysis of blogs and videogame trailers, ethnographic studies of videogames, conference talks. The objective

is to garner insights into how religion and games can independently bolster initiatives combating climate change. The section will culminate with a synthesis of findings, outlining how religion and gaming could potentially collaborate to tackle the global challenge of climate change.

Figure 2.16: Religious Leaders in COP27 discussing climate change

In ancient times, floods and landslides were often associated with the wrath of god. Religious communities would offer sacrifices and prayers to pacify god's wrath. Even today, we have seen multiple instances where people turn up to prayers against hurricanes, floods, and drought [4]. As science evolved, answers to climate disturbances were found in nature, and climate change has largely become a secular problem (Hulme, 2017). Only recently, scientists and policy drafters have considered how religion can contribute towards drafting a response to climate change and, as Al-Delaimy mentions, how climate change affects religion (Al-Delaimy, Ramanathan, & Sánchez Sorondo, 2020).

Hulme argues that (Hulme, 2017) religion offers a deeper insight into ethics regarding our action, hence giving a stronger arm towards the battle against climate change compared to the 'weak' global secular calls against climate change. Reinforcing the argument, Gardiner (Gardiner, 2004) mentions how the role of religion is not to

[4]https://www.thehindu.com/news/national/telangana/special-puja-for-rains/article28430198.ece

spin up solutions for climate change but enable the reflection of our ethical treatment of nature and climate and that religion can act as a catalyst to judge our actions harming nature.

Hulme (Hulme, 2016), emphasizes the influence of religious scholars, religious organizations, and institutions in constructing the meanings of climate change. He claims that religion can contribute to an increased public understanding of climate change and can help create a single voice in how climate change is experienced and politicized. He further writes, "Science is never enough to resolve problems that are cultural in origin" (Hulme, 2016). Grim and Tucker (Grim & Tucker, 2014) highlight the role of religious institutions in addressing climate change, noting that these institutions not only possess moral authority over their followers but also have substantial infrastructure and financial resources. They emphasize that the effort to combat climate change extends beyond the responsibility of secular entities.

In this section, we will focus on the three most active religions at present and their scholarship concerning climate change. These religions include Christianity, Islam, Hinduism, and we will also briefly touch upon Buddhism. For each religion discussed, we will examine the following aspects: (a) The interpretation of religious texts regarding climate change by academic scholarship. (b) The Paradoxical relationship between religion and climate. (c) The mitigation strategies implemented by religious groups to address climate change.

2.3.1 Hinduism and Climate Change

Hindu Scripture and Climate Change: Williams (Monier-Williams, 1891) quotes, "A Hindu is prepared to worship every object in heaven and earth - the sun, moon, stars, rocks, trees, shrubs, pools, seas, rivers, animals, and even noxious reptiles." This quote highlights how Hinduism, a religion that emphasizes the presence of the divine in everything. Given the significant population and growing diaspora associated with Hinduism, as well as its close ties to elements of nature (Rukmani, 2000), understanding the relationship between Hinduism and climate change becomes crucial. Lal (Lal, 2015) phrases the interest in Hinduism's perspective on climate change as follows: "What wisdom might Hinduism contribute to our understanding of climate

change? Does it offer a unique perspective that Abrahamic faiths cannot draw upon?"

Skarpeid (Skarpeid, 2020) discusses the Hindu Declaration of Climate Change, which interprets and calls for Hindus to take action against climate change. The declaration emphasizes how Hindus should hold on to the Hindu concept of 'Vasudhaiva Kutumbakam', which translates to "The whole world is a family," and how individuals must maintain a frugal lifestyle, ensuring that future generations receive a healthy planet.

Lal (Lal, 2015) and Saryal (Saryal, 2022) discuss how Hinduism, as depicted in its scriptures, encourages vegetarianism. They derive their arguments from the foundational scriptures of Hinduism, particularly the Manusmriti, which quotes, "He who permits, he who cuts it up, he who kills it, he who buys or sells, he who cooks it, he who serves it, he who eats it are all considered slayers." India, predominantly a Hindu country, has been found to have the lowest per capita meat consumption according to various studies [5]. This minimal demand for meat in India contributes to a limited meat market, resulting in reduced greenhouse gas emissions, water usage, and land requirements associated with the meat industry.

Prime (Prime, 2002) introduces the concept of "Vedic ecology," explaining that Hinduism embodies narratives associated with climate elements and personifies various rivers and mountains. He cites the traditions and practices of the Bishnoi tribe and underscores the Hindu tradition that asserts, "A village should not merely contain trees, but should exist among them". To illustrate the profound respect for trees within these traditions, he highlights the worship of the Neem, Banyan, and Tulsi trees, and the importance placed on their planting and maintenance. Haberman, in a similar vein, (Haberman, 2006) discusses the sacred personification and worship of rivers and mountains.

A Paradoxical Take on Hinduism and Climate Change: Although Hindu scriptures and traditions emphasize ethical treatment of climate elements, the practicality of these teachings is highly debatable. For instance, despite the high regard for the Ganges, it remains a severely polluted water body. Traditions such as idol immersion in rivers and the burning of crackers during Diwali have incited considerable

[5]Source: `https://www.worldatlas.com/places/10-countries-that-consume-the-least-meat.html`

debate (Alley, 2016). Lal (Lal, 2015) highlights the discord between the intention to preserve, respect, and maintain the purity of river and mountain pilgrimage centers, and the reality of these sites often being littered with trash. Lal (Lal, 2015) also discusses how the pollution of the Ganges has not only provoked debates around climate change but also led to communal clashes due to the high concentration of leather tanning farms owned by the Islamic population around the Ganges.

This failure to uphold environmental principles in the Hindu heartland might affect the Hindu religion most significantly (Rana & Pandit, 2006). Rana (Rana & Pandit, 2006) describes how rituals closely intertwined with climate and nature are being impacted for the Hindu population. For instance, he points to the annual pilgrimage to Amarnath (a shrine that hosts a natural occurrence of a snow statue in the Himalayas), which is now reliant on artificial coolers due to global warming. Drew (Drew, 2012), similarly discusses the necessity to regulate bathing in the Ganges and Yamuna due to river contamination. He also mentions traditional festivals like Sankranthi, associated with crop harvesting, which no longer coincides with successful harvests due to changes in rainfall and harvest cycles.

Mitigation Efforts of Hindu groups: As climate change increasingly impacts Hindu traditions and culture, the Hindu population is undertaking initiatives and mitigating steps. The ongoing restoration initiatives for the river Ganga (With respect to the religious naming of the river, we avoid using the anglicized name "Ganges."), encompassing extensive cleaning efforts, have been met with considerable approval and substantial financial contributions from the Hindu community. This endorsement stems largely from the river's economic significance to Varanasi, a town revered in Hinduism [6]. Religious foundations such as the Isha foundation have been actively campaigning and taking tree planting initiatives to preserve the river Cauvery (Kaibara, 2021). Governments of various Indian states have started imposing bans on the bursting of firecrackers during Diwali (A. Saha et al., 2021) to counter air pollution. Although these initiatives have recently been implemented, various government sources assert significant improvements in the water quality of River Ganga(Dutta, Dubey, & Kumar, 2020). Additionally, they report a modest reduction in pollution levels following the

[6]https://www.thehindu.com/sci-tech/energy-and-environment/clean-ganga-changes-course-to-conservation-tourism-livelihood/article66251290.ece

comprehensive ban on firecrackers during Diwali.

2.3.2 Islam and Climate Change

Islamic Scripture and Climate Change: The OPEC (Oil and Petroleum Exporting Countries) is a coalition of countries, many of which are major oil exporters with economies heavily reliant on the export of fossil fuels. The Arabian peninsula, both vulnerable to rising sea levels and the largest exporter of petroleum, plays a crucial role in the global battle against climate change. Among the 13 countries in OPEC, eight have a Muslim majority. Despite Islam's significant influence in the governance of these countries, there is a lack of empirical studies on the attitudes of the Islamic population towards climate change, as pointed out by Koehrsen (Koehrsen, 2021).

Muslim environmentalists have sought to interpret the Qur'an and Sunna concerning their relevance to climate change (Abdelzaher, Kotb, & Helfaya, 2019; Binay & Khorchide, 2019). In particular, they often refer to two concepts, Tawhid and Khalifa, to construct arguments in support of action for climate change.

Khalid (Khalid, 2005) elucidates the concept of Tawhid and climate change. Tawhid, in Islamic theology, signifies the oneness of God, acknowledging His absolute singularity, sovereignty, and divinity. Haq (Haq, 2001) and Foltz (Foltz, 2003) link the concept of Tawhid with *Mizan*. In Islam, Mizan represents the divine balance, justice, and equilibrium governing the universe and all creation aspects. The term Mizan translates as "balance" or "scale" in Arabic. Haq (Haq, 2001) interprets this as Mizan emphasizing the duty of humans to act as custodians of the Earth and maintain a balance in the natural world, encompassing sustainable resource use, responsible consumption, and environmental preservation.

Hancock (Hancock, 2020) and Bagir (Bagir & Martiam, 2016) contend that the Islamic concept of Khalifa advocates actions towards climate change. The term Khalifa, in Arabic, signifies the role of humans as stewards or vicegerents on Earth. This stewardship implies responsibility and the need for action against climate change. Abdelzaher (Abdelzaher et al., 2019) introduces the Shari'ah perspective towards climate change, employing interpretations of the Islamic concept of Maslahah (public interest). He ties it with the concept of Khalifa, arguing that Islam as a religion promotes fore-

thought for future generations and argues that Muslims should feel obligated to combat climate change for the safety of those generations to come.

A Paradoxical Take on Islam and Climate Change: Despite the diverse interpretations of Islamic principles in relation to climate change, these interpretations have encountered significant criticism. Hancock (Hancock, 2020) and Gade (Gade, 2019) discuss how the traditional concepts discussed in the previous sections have been cherry-picked and associated with environmentalism. They fear that such selective picking and reinterpretation might not appeal to the broader Islamic audience. Moreover, Saniotis points out how Islam is highly decentralized with multiple groups, teachers, and schools of thought, leaving the interpretation of verses and attitudes towards climate change dispersed, thus making it difficult to call for universal action against climate change (Saniotis, 2012). Finally, Bagir and Martiam (Bagir & Martiam, 2016) note that major Islamic nations are currently prioritizing issues such as radical Islam, terrorism, and human rights. Consequently, the discourse around Islamic action against climate change is often relegated to the background.

Mitigation Efforts of Islamic groups: Heat stress and droughts across the Muslim-populated regions of North Africa, coupled with devastating floods in Indonesia and Pakistan — both home to the largest Islamic populations — have heightened interest in climate change mitigation policies through Islam (Koehrsen, Blanc, & Huber, 2022). Sovereign Islamic states such as Saudi Arabia and the UAE are creating alternative income sources in technology and tourism sectors (Ali, 2016; Kaminski, 2019). Haron (Haron, 2017) introduces the concept of 'Jihad against Climate Change', wherein Islamic scholars and organizations encourage religious believers to take measures against climate change. In a similar vein, Amir (Amri, 2019) discusses how Islamic scholars, serving traditionally as gatekeepers of information at rural grassroots levels, have dissuaded locals from deforestation and river pollution.

Other climate change mitigation strategies adopted by Islamic communities include the Islamic Declaration on Global Climate Change (Kaminski, 2019), and institutions like the Islamic Foundation for Ecology and Environmental Sciences that advocate for decisive actions by Muslim states against climate change (Ali, 2016). Apart from organizations and campaigns to spur action against climate change, initiatives like eco-

friendly mosques (A.-A. Ahmed, 2019), eco-Haj (Mangunjaya, Tobing, Binawan, Pua, & Nurbawa, 2015), and eco-Iftars are being pursued to promote sustainable practices, reduce carbon emissions, and minimize waste (Azmi & Kandar, 2019).

2.3.3 Christianity and Climate Change

Christian Scripture and Climate Change:

Hulme (Hulme, 2017) referring to the biblical concept 'Kingdom of Heaven on Earth' suggests that religion offers people a lens of ethics and morality, compelling them to consider climate change through moral reasoning. He says the biblical concept emphasizes the importance of stewardship and responsibility towards the planet. Similarly, Hayhoe (Hayhoe, 2019), a renowned climate scientist and evangelical Christian, posits that faith can drive action on climate change. She asserts, "The Bible tells us that God loves all people, and we should too. That means caring for the poor and vulnerable is a Christian responsibility, and climate change is a poverty issue."

Jenkins (W. Jenkins, 2013) reflects on Genesis 2:15, which establishes the human role as caretakers: "The Lord God took the man and put him in the Garden of Eden to work it and take care of it." This scripture suggests a divine mandate for humans to nurture and protect the natural world, which implicitly includes addressing climate change. Pope Francis, in his publication Laudato Si, advocates that it is the sacred duty of Christians to act as stewards of climate change and protect the planet. Myers (Myers, Roser-Renouf, Maibach, & Leiserowitz, 2017) analyzed the impact of Pope Francis's publication and showed that it significantly influenced public opinion towards climate change positively. Other Christian leaders have also supported the interpretation of Genesis 1:28, asserting that humans should prioritize caring for nature and the environment over dominating it (Wilson, 2012).

A Paradoxical Take on Christianity and Climate Change: In 1967, the Lynn White Hypothesis (White Jr, 1967) posited that "Western Christianity is a major cause of worldwide ecological crises." White's hypothesis was built on his interpretation of the biblical belief that man was supposed to rule over the world. His hypothesis sparked intriguing debates on its validity and how varying religious commitments or identities contribute to different levels of environmental destruction and climate change

(Sherkat & Ellison, 2007).

Smith and Jones conducted several surveys and interviews with American Christian populations (N. Smith & Leiserowitz, 2013; R. P. Jones, Cox, & Navarro-Rivera, 2014). Their survey results revealed that white US Evangelicals are likely to acknowledge the reality of climate change. Barker (Barker & Bearce, 2013) ties these results to "end times beliefs" prevalent among a significant portion of the white US Evangelicals. They quote the religious population believes in the concept of Doom's Day and climate change. Similarly, Schwadel (Schwadel & Johnson, 2017) shows a strong correlation between an individual's "biblical knowledge" and their disbelief towards climate change. However, these claims face vigorous debates in academia. Scholars such as Chaudoin (Chaudoin, Smith, & Urpelainen, 2014) and Ecklund (Ecklund, Scheitle, Peifer, & Bolger, 2017) attribute Evangelicals' stance on climate change primarily to their distrust in the ethics and authority of scientific claims and the mistrust of governmental institutions.

Discussing Laudato Si, authored by the Pope, Kahan (Kahan, Jenkins-Smith, & Braman, 2011) suggests that the intervention of influential figures in contentious debates can often polarize the issue further. In other words, it could solidify the beliefs of individuals on either side of the argument.

Similarly, Li and Landrum (N. Li, Hilgard, Scheufele, Winneg, & Jamieson, 2016; Landrum, Lull, Akin, Hasell, & Jamieson, 2017) illustrate the repercussions of Pope Francis's pronouncement on climate change in their work. They argue that this statement has caused those with conservative views on climate change to fortify their stance further. The stance that religious leaders take on climate change affects not only believers' reactions but also international policies, as highlighted by Murphy (Murphy, Tembo, Phiri, Yerokun, & Grummell, 2016). The religious influence on policies extends beyond religious leaders advocating for climate change. It also includes the significance given to places and animals in religious contexts (Brugnach, Craps, & Dewulf, 2017).

Mitigation Efforts of Christian groups: Instead of concentrating exclusively on an individual's religious identity and views on climate change, some researchers have shifted their focus to the activities of religious scholars and the engagement of religious politics (Newman, Guth, Cole, Doran, & Larson, 2016). One instance of this shift

is evident in COP-27 [7], a convention typically reserved for political discussions on effective climate change strategies. The conference hosted a diverse panel of religious elites and leaders, including the Pope, who jointly advocated for the societal implementation of strategies to combat climate change (see Figure 2.16).

Prominent Churches such as the Church of England and the Methodist Church [8] have committed to vocally advocating for the divestment of fossil fuels. Churches in the Pacific Island regions have been encouraging locals to engage in climate advocacy and regularly provide a platform for locals to voice their growing concerns over climate change (Nunn et al., 2016; Dasgupta & Ramanathan, 2014). Reale highlights in his work (Reale, 2013) that governments in the Pacific island region face budgetary constraints and are often unable to take comprehensive action against climate change. He notes that churches in the region step in to fill these voids and assist in building resilience towards climate change.

2.3.4 Buddhism and Climate Change (brief account)

Javanaud (Javanaud, 2020) interprets Buddha's Fire Sermon in the context of climate change. She suggests that Buddha's metaphor of suffering through greed, hatred, and delusion can serve as a foundation for a Buddhist perspective on climate change. Buddhist teachings often emphasize renunciation and transcendence of the worldly existence, which leads many scholars to believe that Buddhism is ill-equipped to handle activism (Swearer, 2006; Callicott, 1987). However, Mackenzie (Mackenzie, 1999) critically examines this viewpoint and explains that Buddhists do not interpret renunciation as a complete disconnection from worldly affairs, but as a period of reflection. She mentions that this period of reflection can foster a stronger sense of community and activism.

Referring to Buddhist activists like B.R Ambedkar and Tai Xu, Senuke (Senauke, 2013) and Yao (Yao & Gombrich, 2017) discuss the concept of 'Engaged Buddhism.' According to Hanh (Hahn, 2008), 'Engaged Buddhism,' in the context of climate change, urges Buddhists to become more aware of their oneness with nature and asserts that protecting it becomes their dharma. This form of Buddhism has been pivotal in re-

[7] https://www.unep.org/events/conference/faith-based-engagement-cop27
[8] https://www.ft.com/content/56291334-8e98-11e8-b639-7680cedcc421

sponding to deforestation efforts in countries like Sri Lanka and Vietnam (Javanaud, 2020). Darlington shares an account of how Buddhist monks in Thailand, Sri Lanka, and Vietnam have introduced ceremonies in which the robes of revered monks are tied around a tree, thereby bestowing a status of respect upon the tree (Darlington, 2012).

2.3.5 Games For Climate Change

In the previous section, we saw how religion can initiate discussion about climate change and contribute to citizens actively taking part in initiatives to tackle climate change. In this section, we explore how another mobilization force i.e. videogames, can contribute to the battle against climate change. We explore this question with two lenses (a) Serious Games and (b) Indie and AAA games. In the subsequent sections, we discuss scholarship that studies climate change serious games, different themes in climate change serious games, and the efficacy of these games. Later, we study how climate change is being used increasingly as a mechanic in action and AAA games, and finally, the role of gaming studios in tackling climate change.

2.3.6 Serious Games and Climate change

Moser (Moser & Dilling, 2011) mentions climate change is a problem of communicating science. He mentions climate change now is a problem of delivering information and calling citizen action. Gifford terms the need to initiate citizen action as a "Wicked Problem". He mentions that values, ideologies, and lack of trust in agencies act as psychological barriers to initiating large-scale citizen action (Gifford, 2011). Whitmarsh (Whitmarsh, Seyfang, & O'Neill, 2011) phrases the wicked problem of climate change as 'How carbon capable are public?'. Whitmarsh (Whitmarsh et al., 2011) mentions that climate-engaged citizens are connected to climate change in the following three ways (a) Cognitive (awareness), (b) Affective (caring), and (c) Behavioral (engaging and acting). Similarly, Spence (Spence, Poortinga, Butler, & Pidgeon, 2011) points out that the problem of calling for climate change mitigation is wicked because people lack first-hand experience of its consequences.

2.3.6.1 What are Serious Games for Climate Change?

Serious games, a term coined by Abt (Abt, 1987), refer to games that have an explicit educational purpose. Flanagan (Flanagan, 2010) defines serious games as games with carefully thought-out educational goals. Serious games are not meant to be devoid of fun; instead, they utilize entertainment and game mechanics to package and deliver learning experiences. Given climate change's complex and challenging nature, serious games have been recognized as effective tools in addressing this wicked problem. Scholars such as Majuri (Majuri, Koivisto, & Hamari, 2018) and Koivisto and Hamari (Koivisto & Hamari, 2019) have highlighted the effectiveness of serious games and gamification in the context of climate change.

Hugel and Davies (Hügel & Davies, 2020) mention that serious games can engage players in climate change mitigation in several ways. Firstly, they can explain the benefits of participation, helping players understand the positive impacts of taking action against climate change. Secondly, serious games can present the challenges involved in creating effective mitigation strategies, providing players with a realistic understanding of the complexities and trade-offs involved. Lastly, serious games allow players to reflect on their actions and their impact on the climate, encouraging a deeper understanding of the consequences of their choices.

The use of games to communicate actions and educate about climate change is not a new concept. As early as 1983, Robinson and Ausubel developed a board game to educate players about the effects of carbon dioxide on the environment (Robinson & Ausubel, 1983). Robinson identifies three core benefits of educational games for climate change. Firstly, the process of constructing a game encourages discussion and consideration of different stakeholders and their roles in building climate-aware societies. Secondly, playing games allows players to make strategic decisions and understand the behaviors that lead to desired outcomes. Finally, games serve as a source of knowledge and education, imparting information about climate change to players in an engaging and interactive manner. Given that serious games have been used to address climate change, what mechanics have researchers and designers adopted to create serious games that promote climate action?

2.3.6.2 Climate Mechanics in Serious Games

The problem of climate change encompasses various human actions that impact different aspects of the environment. This raises the question of which specific aspect of climate change a game should focus on. In the analysis conducted by Madani et al. (Madani, Pierce, & Mirchi, 2017) on 25 serious games addressing climate change, they observed several common themes, including water management, irrigation, ecosystem ecology, and waste management. Similarly, Barnes (Barnes et al., 2017) used participatory design and grounded theory to analyze games created by student designers around climate change. They found that students often focused on (1) carbon emissions, (2) transportation, and (3) deforestation.

Hugel (Hügel & Davies, 2022) conducted interviews with designers and playtests with games designed for climate change and identified four phases that designers want players to experience throughout a game focused on climate change: (a) planning, (b) consulting, (c) revision, and (d) adoption. In the planning phase, players choose different areas to focus on for mitigating climate change. This is followed by a consulting phase where players interact with various stakeholders associated with climate change. Based on the stakeholders' input, recommendations, and feedback, players revise their plans before implementing them to evaluate the consequences.

Reckien discusses "role-playing for climate" (Reckien & Eisenack, 2013) as a mechanic. "Role Playing for climate" involves players assuming the roles of different stakeholders responsible for making decisions and setting parameters related to climate change. Rumore (Rumore, Schenk, & Susskind, 2016) studied two role-playing climate change games and highlighted their effectiveness in fostering coordination and planning for climate change mitigation and adaptation policies. Johnson (Geels, Rice, & Johnson, 2011) mentioned that role-playing games, as serious games for climate change, provide a "safe innovation" space for players and stakeholders to engage with different alternative approaches and understand their consequences. Reckien also distinguishes between local and global climate change games, wherein the impact of climate change and mitigation strategies is communicated to players using either local or global references. This distinction is evident in various role-playing games that researchers have studied. For instance, Salvini (Salvini, Van Paassen, Ligtenberg, Carrero, & Bregt, 2016) develops

and tests a role-playing game to comprehend the impact of smart agriculture on the local climate in a village in Brazil. On the other hand, Sterman (Sterman et al., 2015) develops and tests a role-playing game specifically designed for climate negotiations between countries at the United Nations.

Reckien (Reckien & Eisenack, 2013) also identified other categories of climate change games, including (a) board games, (b) card games, (c) online games, and (d) simulation games. Eisenack (Eisenack, 2006) introduces a board game called "Keep Cool" to teach sustainable energy practices to students. In a review of board games for climate change, Fjaellingsdal (Fjællingsdal & Klöckner, 2020) identifies the following themes: (1) Board games offer simplified scientific communication about the environment, (2) Board games function as micro-level environmental simulators, and (3) Board games assist in mentally mapping individual eco-impacts.

Callahan (Callahan, Echeverri, Ng, Zhao, & Satterfield, 2019) takes inspiration from Pokemon cards, and creates a card game illustrating the importance of biodiversity for climate change. Post the card game, they noticed players were more willing to donate to climate change causes. They also noticed an increase in knowledge among the players regarding biodiversity and its correlation to climate change. They attribute the increase in knowledge to how players read the cards and analyze them before playing.

According to Wu (Wu & Lee, 2015), there is a growing trend among online climate change games to establish interactions between the physical and real world. These interactions manifest as alternate reality games (ARGs), incorporating social media and employing diverse input modalities to educate players about the consequences of climate change and raise awareness. In an analysis of online games created by students, Barnes (Barnes et al., 2017) broadly classifies student-designed games into two categories: (a) simulation games and (b) interactive narrative games. It was observed that interactive narrative and choice-based games on climate change enable players to explore and adopt climate best practices.

Regarding the use of avatars as a mechanic in climate action games, Fernandez (Fernández Galeote, Legaki, & Hamari, 2022) delves into the subject. Avatars play a vital role in promoting learning in serious games (Oksanen, Van Looy, & De Grove, 2013). In Fernandez's review of 80 videogames, the utilization of climate avatars by

designers was categorized into six categories: (a) Climate Selves, where both players and non-player characters (NPCs) take actions that impact the real world, (b) Climate Citizens, where both players and NPCs assume the roles of fictional characters capable of influencing in-game virtual worlds, (c) Climate Heroes, where both players and NPCs embody avatars with superhero powers, (d) Empowered Individuals, where both players and NPCs engage in actions that harm the climate or virtual world, (e) Authorities, where both players and NPCs act as community leaders, and (f) Faction Leaders, where both players and NPCs navigate tensions among multiple actors in the game.

Overall, these studies and analyses highlight the diverse approaches and mechanics used in serious games addressing climate change, including specific thematic focuses, role-playing elements, various game formats, merging virtual and real-world interactions, and the use of avatars to enhance learning and engagement.

2.3.6.3 Challenges in Designing Climate Change Games

Flood (Flood, Cradock-Henry, Blackett, & Edwards, 2018) highlights that despite the different classifications and mechanics of serious games for climate change, there is a noticeable overlap in objectives among various games and a lack of diversity in mechanics. This limitation could potentially hinder the creation of engaging and innovative experiences.

Cradock (Cradock-Henry, Greenhalgh, Brown, & Sinner, 2017) discusses how elements such as social learning, collaboration, and conflict management within teams typically develop over time. Medema (Medema, Furber, Adamowski, Zhou, & Mayer, 2016) expands on this observation, noting that all of the 43 serious games they reviewed for climate change are either one-off engagements or are likely to lose their novelty after a single gameplay session, hence questioning the ability to improve collaboration to tackle climate change.

Serious games package scientific content and mitigation strategies in a fun and engaging manner via game mechanics and metaphors. However, Reckien (Reckien & Eisenack, 2013) cautions that designers must be careful when communicating scientific concepts through metaphors in videogames. Designers need to strike an effective balance in delivering accurate information without overwhelming the player with complexity,

which might lead to a loss of motivation toward climate action.

2.3.6.4 Evaluating Impact of the Serious Games for Climate Change

In the previous sections, we have seen various mechanics, challenges, and classifications of serious games focusing on climate change. But how can we evaluate the efficacy of these serious games? Among various academic papers, three major evaluation methods used by researchers are identified. The most popular form of evaluation technique is using pre and post-questionnaires or interviews (L. Jones, Ludi, & Beautement, 2013; Eisenack, 2006). Players are given forms or asked questions before and after a serious intervention. Researchers analyze the answers to understand how the game was effective in calling for climate action.

Studying in-game actions is another evaluation method used by researchers. Serious games offer interactive options for players to choose from; researchers capture these interactions to measure player learning and shifts in attitudes toward climate change. Suarez (de Suarez et al., 2012) presents players with multiple climate change scenarios with the same learning variable and monitors the different options and approaches the player chooses. Vincent (Vincent, Dougill, Dixon, Stringer, & Cull, 2017) observes improved resilience and coordination between players over multiple sessions of climate risk-management role-playing games.

Researchers have also used simulation models to provide feedback to players on their choices and interactions. These researchers use climate simulation models and input parameters and choices selected by players in the videogame to create scenarios and dynamically monitor user behaviors and adaptation strategies (Van Pelt et al., 2015).

2.3.7 Gaming Studios and Climate Change

Similar to wars and nuclear apocalypses, climate change has the potential for catastrophic impact. However, unlike war and nuclear scenarios, climate change has not yet become a mainstream backdrop in videogames and movies. This fact limits the academic scholarship studying the impact of using climate change as a game mechanic. While I could not find any academic papers or journals that study the impact of integrat-

ing climate change as a mechanic in AAA games, in this section, I will provide insight into the current practices adopted by gaming studios, as well as various actions and mechanics inspired by climate change. These insights are drawn from content analysis of gaming studio statements, in-game ethnography, and content analysis of gameplay videos.

Protecting our planet from irreversible climate change is a responsibility that falls on everyone's shoulders, but why should we focus particularly on gaming studios? It's because the videogame industry and the studios at its core play a substantial role in contributing to climate change. Fletcher (Fletcher, 2021) highlights that a significant portion of videogaming requires the use of the internet, and introduces the concept of "Internet pollution," where data centers, servers, and storage units contribute to 3.7% of greenhouse gas emissions. He further draws attention to physical devices such as consoles, cartridges, and other electronic equipment that are essential for game development. The need for minerals such as nickel, copper, gold, and zinc in the manufacturing of these devices leads to increased mining activity, which in turn exacerbates pollution. Gordan (Gordon, 2019) points out that each unit of PS4 sold emits 89kg of carbon (including transportation), and generates substantial plastic waste. To put this into perspective, one million PS4 units sold would result in 8.9 billion kilograms of CO2 emissions, which is equivalent to Jamaica's entire emissions for the year 2017.

Given this significant impact on global emissions, there is a pressing need for studios to adopt greener practices. An obvious solution is transitioning to green infrastructure, environmentally-friendly office spaces, and cloud-based services instead of relying on CDs. But beyond these measures, considering the high demand and value of games from these studios, videogame companies have the opportunity to integrate climate-conscious mechanics and narratives, and to promote climate-friendly actions within their videogames, thereby educating their player base.

2.3.7.1 How are Game Studios using climate change in games?

Recognizing that videogames reach one in three people worldwide [9], the United Nations launched the "Playing for the Planet" initiative in September. This initiative

[9] https://www.unep.org/explore-topics/education-environment/what-we-do/playing-planet

emphasizes the potential of major gaming studios to inspire climate action. It aims to motivate game developers to incorporate "green interactions" into their videogames.

Ubisoft recently orchestrated a two-week in-game event that advocated for climate action in their game, "Riders Republic" (Annecy, 2021). "Riders Republic" is an extreme sports game that immerses players in various adventurous activities. Boris Maniora, the game's designer, detailed how they introduced an in-game march where players rallied for climate change. Furthermore, players were given the option to select different avatar skins embellished with stickers and banners promoting climate action. Given that the game is set in national parks, players were encouraged to collect and plant seeds within the game, which would subsequently alter the game maps.

Other games, such as "Asphalt" (*Asphalt*, 2004) and "Assassin's Creed" (*Assassin's Creed*, 2007), have also introduced character or car skins and banners supporting climate action. Games like "Hungry Sharks" (Ubisoft, 2012-present) and "Skull & Bones" (Ubisoft, Expected 2023-2024) have brought attention to climate change issues associated with marine destruction and overfishing. "Hungry Sharks" has launched special levels set in mangroves, reflecting the destruction of these vital ecosystems due to human activity [10]. Likewise, "Skull and Bones" features levels where the player is tasked with protecting against overfishing and the killing of sharks for their fins [11].

In the introductory chapter, we referenced a verse from the game "For Honor: Tempest," where the main conflict between factions revolves around capturing land safe from the impacts of climate change. This use of climate change as a central game mechanic is also present in "Civilization VI" [12]. Like previous games in the "Civilization" series, "Civilization VI" is an intricate game that simulates the progression of human civilization from the Stone Age to the present day and into the future. The unique feature of this edition is how it models global warming based on Carbon Dioxied emissions from various energy sources. These emissions can lead to sea-level rise and more frequent and severe weather events, such as storms and droughts. These environmental changes can have substantial impacts on the player's cities and units, necessitating

[10]https://playing4theplanet.org/participants/2022-Hungry-Shark-Evolution

[11]https://www.videogameschronicle.com/news/riders-republic-and-skull-bones-in-game-events-will-highlight-climate-issues/

[12]https://theconversation.com/civilization-vi-gathering-storm-shows-video-games-can-make-us-think-seriously-about-climate-change-111791

strategic adaptation planning.

2.3.8 A Proposed Juxtaposition on how religion and games can contribute to Climate Action

In this section, I propose a juxtaposition of how religion and games can contribute to the call for climate action.

As discussed in the previous section, religion can provide a moral perspective for addressing climate change. In Section 2, we explore how videogames have incorporated moral concepts through Karma Scales. Looking forward, I envision that future serious and videogames can utilize Climate Karma scales to offer a moral framework for in-game actions related to climate change.

Fernandez (Fernández Galeote et al., 2022) examines the role of avatars in climate change games. Among the various classifications of climate avatars, Fernandez introduces the concept of "Climate Heroes." I see this classification as an intriguing opportunity to incorporate gods and religious figures with special powers as characters in videogames. In Section 2, we observe that holy sites, mountains, and rivers often serve as prominent settings in videogames. However, these locations are subject to significant pollution, as noted in Section 2.3. I envision in-game green initiatives advocating climate action in these sacred places to address this.

In Section 2, we observe that gamers frequently discuss religion within videogames, often utilizing social media platforms. Additionally, we note that climate change games, particularly Alternate Reality Games (ARGs), are beginning to incorporate social media as a game mechanic. Considering this, the incorporation of religious mechanics and narratives in climate change games or other videogames may foster further discussions on online platforms. Combining the elements of religion and climate change within game experiences can spark meaningful conversations and engagement among players, leading to increased awareness and dialogue regarding climate action on various online platforms.

2.3.9 Summary

The first section looked at how religion ends up in games: borrowed mythology, scriptural narrative arcs, sacred geography turned into level design. Researchers have documented this extensively. What they have not done is flip the question: instead of asking what religion already appears in games, ask what religion could contribute to games if you actually studied it directly. That shift, from catalog to method, is where Direction 1 starts.

The same religious content that makes a game feel mythic and immersive can read as offensive or reductive to the communities whose traditions it draws from. Most existing work on this gets player reactions and stops there. The people whose religion is being used rarely appear in the literature at all. Direction 2 is an attempt to fix that, by looking at how religious communities, players, and designers actually talk about these games, on Reddit and elsewhere, and what the disagreements reveal.

The third section asked what happens when you put both forces, religion and games, to work on something that actually matters outside the screen. The climate change literature shows that serious games can shift attitudes, but only inconsistently, and usually through conventional mechanics. The religious studies literature shows that ritual practice can create genuine behavioral change. Nobody has tried building a game where the ritual is the mechanic. Direction 3 does that, and runs it against existing climate change games to see whether it makes a difference.

So the sequence of this disseration is: figure out how to work with religion carefully (Direction 1), understand how the people it belongs to will respond (Direction 2), then put that preparation toward something worth doing (Direction 3). Each direction depends on what came before it.

Chapter 3

Direction 1: Frameworks to build Design Spaces using Religious Inspiration

With trends of game design and development moving towards more agile approaches, it becomes challenging for game designers to constantly produce unique characters, narratives and mechanics. Olesen reports how it is common to hear from videogame designers in agile environments that they find it difficult to generate ideas for narratives and inspiration for character design (Olesen, 2017). Considering established literature in the field of design, inspiration is one of the main factors for generating new ideas within game development (Bunian et al., 2021; Wallace et al., 2020; Mete, 2006; Sbai, Elhoseiny, Bordes, LeCun, & Couprie, 2018). According to Hagen (Hagen, 2009), one of the most popular sources of inspiration is mythology as to help in designing new characters.

Drawing from mythology makes for a frequent occurrence within the gaming industry, but has not had much discussion in academia (de Wildt, Apperley, Clemens, Fordyce, & Mukherjee, 2020a; De Wildt & Aupers, 2019). Successful known titles include gods and characters transplanted from various mythologies (Ninja Theory, 2017; Supermassive Games, 2015; Vigil Games, 2010; Titan Forge Games, 2019; Aurona Technologies & Sony PlayStation2, 2009). Not only does the mere transplantation of gods (in this context: the usage of literal characters from established belief or mythology) create a pragmatical upper cap on the number of characters a designer can draw from, but the adulteration of actual religious figures can arguably bear potential for controversy and

cultural offense as illustrated by (Zeiler, 2014).

There have been numerous controversies over transplanting gods into videogames, such as *Hanuman: The Boy Warrior* (Aurona Technologies & Sony PlayStation2, 2009), where the literal depiction of an important Hindu figure was perceived as nothing but denigration; or *Faith Fighter* (Molleindustria, 2009), where multiple gods from world religions compete in brawl combat and especially Muhammad had to be censored, as Islamic belief prohibits the depiction of gods. These controversies revolve around how certain religious groups find the concept of "controlling gods through a joy-stick" or them "being inflicted damage" as offensive (Alexander, 2009; *Religious groups protest game for its depiction of kali- technology news, Firstpost*, 2012; Usher, 2012). It becomes essential to realize that creating immersive experiences can not come at the cost of cultural sensitivity. This urges the need for a set of regulations or a framework for designers that allows drawing inspiration for characters from mythology without transplanting the worshiped iconography and twisted narrative.

The first direction of my PhD precisely revolves around helping designers understand how religion can contribute to the design of videogames. To provide inspiration for designers and support the creation of new characters resembling mythology I developed two frameworks to help designers develop and evaluate characters inspired from religion. The first framework published at ICEC 2022 (Maram et al., 2022b) uses close reading and discourse analysis as a research method to study religious texts, and religious cinema to identify characters and their agency in-terms of videogames. The second framework published at ACM FDG 2023, introduces a novel concept called "Character Embeddings" and frames the design and development of characters inspired by religion as an embeddings in a design space of religious artifacts. In this chapter I detail out two frameworks each taking unique generative steps and evaluative steps to establish a taxonomy of elements that can inspire characters, narratives and gameplay based on Hinduism.

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3.1 AstraVerse 1.0

The first framework titled 'AstraVerse 1.0' can be broken down into three steps as follows:

- Mythological Derivation: Establishing the taxonomy of mythological references.
- Generative Step: Facilitating the creation of new characters using the taxonomy.
- Evaluative Step: Evaluating generated characters on (a) creative and (b) cultural scales.

3.1.0.1 Mythological Derivation

The goal of the first step is to compile a taxonomy based on the particular mythological background. In order to develop this taxonomy, we first identify various game elements that might benefit from this mythological influence (Sicart, 2008). These primarily boil down – but are not limited – to character visualization, narrative, character abilities, in-game items or collectables, exploration, and combat mechanics. From the chosen mythology, we refer to cultural literature, internet threads and individual experts in mythology to identify popular mythological elements of interest. Finally, we construct nomenclature and visual iconography that can inspire game mechanics as well as characters and other elements.

3.1.0.2 Generative and Evaluative Steps

The generative step aim at verifying if the developed taxonomy allows the creation of characters. Designers – independent from the constructors of the taxonomy – are presented with the taxonomy and are requested to create new characters (participatory design). The evaluative step then verifies if the newly developed characters are deemed as creative and culturally valid. A feasible audience to review these with regards to creativity and novelty might arguably be senior game designers. The cultural validity however should be verified by performing qualitative and quantitative studies using participants that identify with or are familiar with the cultural backdrop associated with the particular mythology.

Figure 3.1: Visual Representation of the first set of Characters and split into components.

Figure 3.2: Visual Representation of the second set of Characters Discussed and split into components.

Figure 3.3: Character Visualization of Participant 1

Figure 3.4: Character Visualization of Participant 2.

Figure 3.5: Character Visualization of Participant 3.

3.2 Case Study 1 : Applying AstraVerse 1.0 framework on Hindu Religion

3.2.1 Mythological Derivation Step:

Hindu mythology discusses and presents a wide range of gods. We refer to works from Bansal (Bansal, 2005) and Hindu epics such as the Mahabharata and Ramayana to identify characters and artifacts. Apart from these, we utilized popular illustrated mythological comics such as *Amar Chitra Katha*, internet forums as *TvTropes* (Multiple, 2026), and popular Hindu Mythology YouTube channels such as *KidsOne* to

aid building the taxonomy. The attributes, narrative and game mechanics these avatars inspire have been separated from their nomenclature and visual iconography, presented in Tables 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 and split into groups according to the classification by Parrinder (Parrinder, 1982).

We also identify elements which help the narrative flow and complete the core game loops. These may entail ways to heal characters, collectables or ways to transport around locations/maps involved in the narrative. Eventually, we derive a collection of mythological objects from Hindu mythology and how they could be used in game loops (c.f. Table 3.7).

Table 3.1: Understanding Attributes and Characteristics of Dashavatara (Part 1 of 2)

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
The Serial Number in the table indicates the Visual representation in Figure 3.1				
1	Matysa	In the zoomorphic version the avatar is a fish with the horn. In the anthropomorphic version the upper half is human and the lower half resembles a fish.	Saves creation from a great flood. (Similar to flood myths across cultures), Recovers ancient scriptures by defeating a horse headed demon.	Underwater speed due to fish fins, Underwater strength, Mythical horn.
2	Kurma	In the zoomorphic version the avatar is a turtle. In the anthropomorphic version the upper half is human and the lower half resembles the shell of a turtle.	Carries the weight of the world on the shell, Acts as a axis in mythology to churn a mythical cosmic ocean.	Underwater agility due to turtle fins, Extreme focus and stability, Extreme strength, Hard protective shell.

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
3	Varaha	The Varaha avatar has a boar head and a human torso as lower half.	Goes to the depth of a cosmic ocean to lift Goddess Earth with tusks. Defeats fierce demons who imprison Goddess Earth.	Agility in both water and land, Extreme speed, Mythical and sharp tusks, Boar face, Four hands.
4	Narasimha	The avatar is visualized with a Lion head and human lower half.	The avatar defeats a smart demon with mythical abilities.	Extreme strength, Lion face, Lion like sharp claws and sharp teeth., Four hands, Carries a mace, Cosmic conch and Rotating sharp disk.
5	Vamana	This avatar is visualized as a dwarf carrying an umbrella and jug of water.	The avatar stops a demon king from performing supreme sacrifices and restore the heavens to the Hindu King of Gods.	Mutable in size(Dwarf to Giant), Mythical powers (Chants, Spells), Carries a protective umbrella, Magic water.

Table 3.2: Understanding Attributes and Characteristics of Dashavatara (Part 2 of 2)

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
6	Parushurama	This avatar is visualized as a powerful Saint.	The avatar is credited to bring order and peace by defeating unjust kings who were ruling land with tyranny and greed.	Fierce warrior, Yields the axe, Skilled in arms, Knowledge on how wield to celestial weapons, Extreme aggression, Skilled in rituals and academic knowledge.

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
7	Rama	This Avatar is visualized as a Prince.	The avatar is credited of defeating a powerful 10 headed demon Ravana. This avatar is the central protagonist of the Hindu Epic "Ramayana".	Skilled archer, Discipline, Kind, Academically strong, Celestial bow, Celestial and divine arrows.
8	Krishna	This avatar is visualized as a Prince.	The avatar defeats his Uncle, The avatar is a pivotal character of the Hindu Epic "Mahabharata".	Skilled warrior, Yields the rotating cosmic flame disc, Yields celestial weapons and shields, Academically strong, Mutable in size, Mythical powers, Great rapport with animals and nature, Multiple arms, Master flute player.
9	Buddha	This avatar is visualized a monk.	The primary purpose of this avatar was to teach morals and principles.	Academically strong, Great orator, Peace loving, Calm
10	Kalki	A person riding a mythical white horse and carrying a long sword.	The avatar is supposed to eliminate human human race and restart cycle of life.	Swift, Skilled swordsmen, Mythical horse, Flaming sword.

Table 3.3: Understanding Attributes and Characteristics of Characters from the Mahabharata and Ramayana (Part 1 of 2)

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
The Serial Number in the table indicates the Visual representation in Figure 3.1				
11	Arjuna	This avatar is visualized as a prince.	The son of the King of gods. He is the best archer in Hindu Mythology. He yields all celestial weapons. There are instances where Arjuna is also portrayed as a eunuch.	Plethora of celestial weapons, Infinite arrow quiver, Cosmic bow, Indestructible chariot.
12	Karna	This avatar is visualized as a prince.	The son of the Sun god. Karna is a great archer second to Arjuna. Karna is considered to be radiant and bright as the sun.	Indestructible golden armor, Radiant earrings reflecting Solar radiation, Cosmic bow, Loyalty, Recipient of many curses.
13	Bheema	This avatar is visualized as a prince.	The son of Wind God. Has the strength of 1000 elephants. Feared among Giants and Asuras.	Extreme strength, Yields of the cosmic mace, Pride in strength, Affection towards loved ones.
14	Duryodhana	This avatar is visualized as a prince.	Prime antagonist in the Mahabharata. Is know for his extreme greed. Is a mighty warrior and ranks among the greatest wrestlers.	Extreme pride and cunning, Iron body in the upper half, Fragile Lower half the body, Extremely experienced wrestler, Death grip.

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
15	Gatotkach	This avatar is visualized as a friendly demon	The son of Bheema (Row 13). Is a mighty warrior with magical powers.	Magical illusions, Mutable size, Multiplied powers at nightfall.

Table 3.4: Understanding Attributes and Characteristics of Characters from the Mahabharata and Ramayana (Part 2 of 2)

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
16	Hanuman	Has anthropomorphic iconography. Avatar is visualized with a Monkey head, human lower half and has a Monkey Tail.	The avatar is the son of the wind god. Student of the Sun god and the principle associate of Rama (Row 7 Table 3.2). Blessed as one of the immortals in Hindu mythology.	Fierce warrior, Yields the mace, Extreme strength, Extreme loyalty, Capable of flight, Skilled in academic knowledge.
17	Ravana	This Avatar is visualized as the king of Sri Lanka with ten heads.	He is the central antagonist of the Hindu Epic "Ramayana". Has his soul in his navel, making him invincible at the rest of his body. Mighty with 10 heads and has knowledge to many celestial weapons.	Skilled warrior and fierce commander, Extreme pride and lust, Great devotee of certain Gods, Access to celestial and cosmic weapons, Academically strong, Posses aerial flight machines.

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
18	Kumbakaran	This avatar is visualized as an extremely large giant.	He is a massive asura who is known to squash enemies to pulp. He is slow and has ferocious appetite. Sleeps for 6 months of the year and awake the other 6 months.	Extreme strength, Slow maneuver, Can be only hit by celestial weapons, High Energy drain.
19	Shiva	Is one of the supreme Gods in Hindu Mythology. Has a serpent around the neck and the moon in the form of a crescent locked in the hair.	Is labelled as the god of destruction. His dark blue color is attributed to carrying a dangerous poison in his throat to save humanity.	Third eye whose opening leads to annihilation, Trident, Hour glass shaped drum which causes cosmic vibration, Serpent neck, Commander of God Soldiers, Lunar Control

Table 3.5: Understanding Attributes and Characteristics of Gods of Various Qualities and Elements (Part 1 of 2)

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
The Serial Number in the table indicates the Visual representation in Figure 3.2				
20	Saraswati	This avatar is visualized as a goddess.	The goddess is treated as the goddess of education.	Music powers (Carries the instrument Veena), Purifying powers, Highest educational knowledge, Resides in a white lotus, Travels in a white swan.

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
21	Lakshmi	This avatar is visualized as a goddess.	The goddess is the spouse of Lord Vishnu (source of Table 3.1) and is has incarnations along with the Dashavatara (Table 3.1).	Giver of wealth, fortune, Power of maya ("illusion"), Giver of agriculture, fertility, health, courage
22	Bhoodevi	This avatar is visualized as a woman.	This goddess is treated as Mother Earth.	Strength (carries the weight of living beings), Earth control powers (rotation, tunnels), Landmass control (earthquakes, avalanches)
23	Durga	There have been many popular representation of this goddess. These range from two arms, to 10 arms carrying various weapons.	This goddess is considered one of the most powerful deity in Hindu mythology.	Has a lion as a vehicle, Carries discs, mace, bows, swords, conch in certain representations, Creates powerful Illusions
24	Surya	This avatar is a radiant human.	This god is treated as the Sun God.	Solar flames, Extreme gravity, Controls day and night, Extreme speed (Rides a chariot with 7 horses)

Table 3.6: Understanding Attributes and Characteristics of Gods of Various Qualities and Elements (Part 2 of 2)

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
25	Vayu	This avatar is visualized the as a human with Wind capabilities	This god is the controller of Air, Wind and gases.	Flying abilities and Extreme speed, Can control winds (Storms, Tornado's).
26	Agni	This avatar is visualized as a human engulfed in flames.	The God Agni is the representation of Fire.	Symbolically represents Fire,Receives damage from rain and aqua avatars, Huge appetite (burns down forests), Guardians of Divine weapons.
27	Varuna	This avatar is visualized the as a human with Aqua capabilities	This god is the king of the oceans and aquatic life.	Extreme underwater abilities. Commander of the Sea animals. Ocean Control (Tsunamis, Cyclones, Gateways).
28	Ganesha	God with a human torso and Elephant head.	This is the god on removing all obstacles and education.	Strength, Devotion and high patience, Magical elephant tusks and elephant trunk, Slow Movement, A jewellery adorned Rat as a transport vehicle.
29	Garuda	He has a human body and face. The mouth is modified to the shape of an eagle. Garuda has a huge wingspan.	Garuda has been discussed in Hindu mythology on multiple occasions. Garuda is the vehicle of of Lord Vishnu for most of his Avatars (Table 3.1).	Aerial ability, Cosmic speeds, Large wingspan, Commands over eagles, Consumes snake as prey, High loyalty.

Sr No.	Game Loop Element	Item Name	Abilities
1	Shields	Karan Kavach, Shiv Kavach, Bramha Kavach	The Karan Kavach is the Armour given to Karna (Row 12 Table 3.4) by the Sun god. The armour is a supreme armour and the one who wears it is invincible at battle. The Shiv Kavach is the armour of the gods. The Bramha Kavach could only be destroyed by the BramhaAstra (Row 6 Table 3.9). Shields can be introduced in game loops as collectables whose effects span over a time period. Shields can also be introduced as inbuilt character abilities with a cooling period once used.
2	Flags	Garuda Flag, Indra Flag, Hanuman Flag, Kaama Flag	Flags act as collectables in a game loop. These collectables can act as short term abilities. The Garuda Flag is a reflection of speed, The Indra flag is a symbol of authority, The Hanuman Flag is powerful flag which resits incoming celestial weapons, Tha Kaama Flag is the flag of love.
3	Healing Herbs and Elixirs	Sanjeevani, Amrit	It is common for protagonists and other character during game play to loose health. Healing herbs such as the Sanjeevni and Amrit have narrative references in Hindu mythology to restore life and health.

Table 3.7: Understanding Mythical Objects and their Role in Game Loops (Part 1 of 4)

Sr No.	Game Loop Element	Item Name	Abilities
4	Transport	Garuda, Surya Vimana, Hansa Vimana, Pushpaka Vimana, Tripurajit Vimana	The term Vimana is analogus to flight. Hindu mythology had references to Vehicles which broke the time space barrier. The Surya vimana is a golden Chariot with 7 White horses (each corresponding to one day of the week). The Hansa Vimana is a White chariot guided by swans. The Pushpaka Vimana is a chariot of Ravana (Row 17 Table 3.4). The Tripurajit Vimana is cosmic Chariot used by Shiva (Row 19 Table 3.4). Garuda is a Eagle with a huge wingspan capable of flying through the cosmos.
5	Elemental Weapons	BhumaAstra (Earth), AgniAstra (Fire), VayuAstra (Wind), VarunaAstra (Water)	The BhumaAstra is a weapon capable of shattering the earth and digging tunnels. The AgniAstra is a fire emitting weapon. The VayuAstra is told to travel at great speeds. The VarunaAstra is capable of unleashing large water bodies on armies, fires.

Table 3.8: Understanding Mythical Objects and their Role in Game Loops (Part 2 of 4)

Sr No.	Game Loop Element	Item Name	Abilities
6	Cosmic Weapons 1	Bramhastra, Trishul, Sudarshana Chakra, Vajra	The Bramhastra is an extremely powerful weapon capable of destroying armies and cities. The Trishul is the weapon of Shiva (Row 19 Table 3.4). Visually similar to the trident. Sudarshana Chakra is a disc which travels at cosmic speeds to behead enemies and return to the owner once done. The Vajra is analogus to the mighty thunderbolt.
7	Cosmic Weapons 2	PashpataAstra, NarayanaAstra, BrahmashirshaAstra, RudraAstra	The PashupataAstra is one of the irresistible weapons, which requires high skill to use. The NarayanaAstra is a weapon which showers weapons from the sky upon enemies. The shower can only be stopped once the enemy bows to the power of the weapon and disarms themselves. The BrahmashirshaAstra is an advanced version of the BramhaAstra and is said to cause four times more damage. The RudraAstra translates to the Furious Weapons, it is the only weapon which can counter a BramhaAstra.

Table 3.9: Understanding Mythical Objects and their Role in Game Loops (Part 3 of 4)

Sr No.	Game Loop Element	Item Name	Abilities
8	Cosmic Weapons 3	NagaPasha, GarudaAstra, Sammohanastra, Prajnastra	The NagaPasha is a weapon dedicated to the Snake Gods. The weapon releases serpents to attack the enemies. This can be countered by the GarudaAstra, which summons Garuda (Row 4 Table 3.8) the eagle, which sweeps the serpents. The SammohanaAstra intoxicates enemies, while the PrajnaAstra recovers them from the intoxication.

Table 3.10: Understanding Mythical Objects and their Role in Game Loops (Part 3 of 4, continued)

Sr No.	Game Loop Element	Item Name	Abilities
9	Cosmic Bows	Gandeeva, Sharanga, Vijaya, Pinaka	Not all bows can handle Cosmic Weapons. These are a few bows have been used by various characters in Hindu mythology. The typical Characteristic of these bows include high string tension, Multiple strings, made from celestial wood from alternate dimensions.
10	Cosmic Swords	Nandaka, Chandrahas	The Nandaka is the sword of the Dahsavatars. The Chandrahas translates to "crescent" in Hindu mythology there has been references where the crescent of the Moon acts as a sword for the Gods.

Table 3.11: Understanding Mythical Objects and their Role in Game Loops (Part 4 of 4)

Taken together, these tables constitute the full taxonomy produced by the Mythological Derivation step: a structured inventory of characters, their narrative roles, visual attributes, and usable game mechanics, alongside a catalogue of mythical objects mapped to common game loop functions. The taxonomy separates the underlying design potential of each element from its original religious iconography, giving designers something they can draw on without reproducing the worshiped figures directly. The immediate question, then, is whether this taxonomy is actually usable. Can designers unfamiliar with Hindu mythology pick it up and produce original characters that feel both novel and culturally coherent? The Generative step puts that to the test.

3.2.2 Generative Step:

For the participatory design workshop, we recruited three amateur game designers from a game design program (Masters degree) at the University of California, Santa Cruz. None of the participants identified as Hindus, and only one of them claimed to be partially aware of Hindu mythology. The following procedure was used in the workshop:

- Take informed consent and introduce them to the context of the workshop i.e to generate game narratives, design, sketch, or narrate visualized game characters using a taxonomy.
- The researcher educates the participant on the developed taxonomy.
- With the introduced knowledge and ideas, the participant is requested to design and visualize game characters.

The participants were tasked with crafting characters using the provided elements, presented in tabular form and were also asked to form character narratives based on the myth and description of the character provided to them. An artist was also available to collaborate in character design with the game designers. This process resulted in the creation of three distinct characters, as illustrated in Figures 3.3, 3.4, and 3.5. As demonstrated in Figure 3.4, one game designer incorporated the Veena, a mythical instrument of Goddess Saraswati, along with other mythical instruments like the Flute and Damaruk, which are syntagms associated with Shiva.

Outcomes from the Generative Step: This section comprises the outcomes (transcribed from narration) of the Participatory Design from participants P1, P2 and P3 in terms of narrative creations and possible visual representations of these, derived as concept art during the workshop.

3.2.2.1 P1: "A Cosmic Time Portal"

- **Narrative** : *"A hiker slips down the mountain and falls into a celestial portal connecting the ancient times. He falls down to the armoury of celestial weapons. He is thrown back to the current day with the weapons stuck to him forever. The portal also throws ancient Asuars and powerful demons back into the modern day setting"*

- **Visualization** : *"In my game I would like to build a massive female villain. I might have a three headed villain like Ravan (Row 17 Table 3.4) and have a extreme size like Kumbakaran (Row 18 Table 3.4). I will also arm her with Nature Powers like Krishna (Row 8 Table 3.2). Each head controlling different aspects of nature".* A visual representation is presented Figure 3.3.

3.2.2.2 P2: "Mystique Musician"

- **Narrative** : *"The narrative is linked to African tribes and their freedom struggle against colonial empires. A young girl has music has her genre of attacks. She is a black musician who evolves as levels in the game progress. She yields all mythical instruments mentioned in the taxonomy (Row 20 Table 3.11, Row 8 Table 3.2 and Row 19 Table 3.4)."*
- **Visualization** : *"I am thinking of giving the protagonist multiple arms like Narasimha (Row 4 Table 3.1) and Varaha (Row 3 Table 3.1). The character will unlock more arms and more weapons as the levels progress".* A visualization of this character is shown in Figure 3.4

3.2.2.3 P3: "War of the Elements"

- **Narrative** *"It is important that people are bought aware of climate changes. In my game I want to make use of Natural elements in Hindu Mythology such a Lunar control, Sun energy and Wind energy to show players how the lack of either of them leads to trouble. I want characters in my game to control nature"*
- **Visualization** *"Like Shiva (Row 19 Table 3.4) has a moon in his forehead. The crescent of the moon can act as a sword facing terrestrial enemies. While fighting aqua characters the moon would glow to be a dull disc to cause low tide. A negotiating character would be a character with earth capabilities (Row 22 Table 3.6) or solar capabilities since they would have a greater gravitational pull."* A Visual Representation is presented in Figure 3.5.

3.2.3 Evaluation of AstraVerse 1.0

The final step in applying the framework included understanding weather the created characters were perceived to be novel, but yet be culturally sensitive. To evaluate the novelty of these characters, we invited two senior game designers to evaluate the creative and novelty element of the creations. For measuring creativity and novelty, we asked the senior game developers to judge items (on a scale of 5) based on Brookhart's rubric (Brookhart, 2013). On top of this, the interviewees were asked to comment on the particular narratives qualitatively. Overall, quantiative measures of the percieved novely for each of the characters shown in Figure 3.3, 3.4 and 3.5 are presented in Table 3.12. Table 3.12 contains the quantitative assessment of senior game designers towards the produced characters. Furthermore, we asked them to elaborate on their scores. Judge 1, who scored Participant 2 the highest (in terms of cumulative points compared to other participants), shared - "*The combination of mythical influence on historical freedom wars is fascinating, ranging from colonial invasions, musical warfare and finally introducing mythical physical characteristics. The other idea (Participant 1) had mythical power from both ends, while here it is more the mythical powers of the hero taking on huge armies in different conditions.* "

	Judge 1			Judge 2		
	P1	P2	P3	P1	P2	P3
Variety of ideas and contexts	3	5	3	3	3	4
Variety of sources	4	4	3	4	3	3
Combining ideas	4	5	4	4	3	4
Communicating something new	3	5	4	3	3	3

Table 3.12: Quantitative Evaluation of Designed Characters and Narratives by Experienced Game Designers

Judge 2 had appreciative feedback on Participant 3's work - *"I really like the idea of a mutable moon sword causing tides and that being the primary way it fights. That feels really cool. The character also being made of bushes and trunk as hair is also an interesting combination.* "

To measure the cultural sensitivity of these characters, we took a survey based

approach to understand how the newly developed characters fared in acceptance compared to existing gods used in games with religious elements. Students with a Hindu background were presented Figure 3.3, 3.4, 3.5 as well as depictions[1] of a Hindu goddess that raised controversial discussions in the multiplayer online battle arena game *SMITE* (Titan Forge Games, 2019). Participants were asked to comment on the representation in SMITE as well as on the images produced by our taxonomy qualitatively, which was later classified by structuring content analysis.

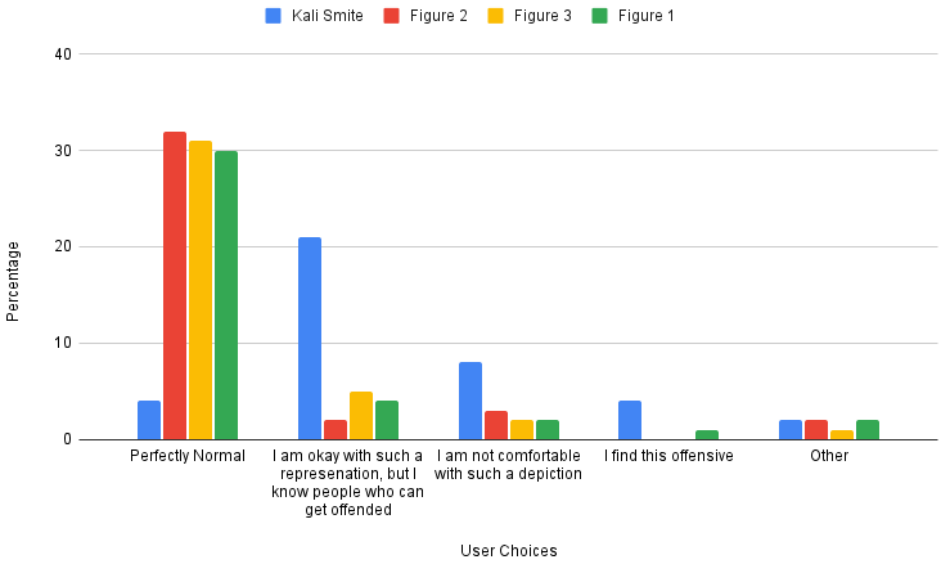

Figure 3.6: Quantitative results reflecting cultural acceptance of characters from SMITE and generated characters as part of the study shown in Figure 3.4,3.5,3.3

In total, (n_b=39) students were recruited through a call for participation from online Indian Communities at UCSC for the cultural appropriateness evaluation. From the recruited student participants, 92.9% identified as Hindus (3.6% Atheists and 3.6% Jains). All of the participants claimed to be aware of Hindu mythology and the most of them also knew other mythologies, most popularly Greek (69%).

Participants were shown a representation of Goddess Kali from the game *SMITE*. The Hindu-affiliated participants had mixed opinions on the representation,

[1]A reference to the image depicting the representation of Kali from the game SMITE can be found at https://images.news18.com/ibnlive/uploads/2012/07/kalismite.jpg

with 10% of them being "*offended*" by the portrayal. Another 10% of the participants claimed the representation is "*Perfectly normal*". Around 20% of them were not offended but claimed "*they were not comfortable*" with such a visualization. The majority of 53% claimed "*they might be okay with such a representation, but know people who would be offended*". Also, participants qualitatively reinforced that (P9): "*Kali presented like this, people here in the west might find it amusing. If you are planning to launch in India, be ready for controversies and only criticism.* "

After presenting *SMITE's* representation of Goodess Kali, we asked participants to comment on characters from Figure 3.3,3.4,3.5. For Figure 3.3, 76% of the students felt the characters were *"Perfectly Normal"* and 10% of the students shared "*they might be okay with such a representation, but people who would be offended*". A 5% reported *"they are not comfortable"* and 3% of the participants felt the representation was *offensive*. With reference to this, (P19) interpreted the result that "*Three heads makes me think of Ravana but he had ten [heads]. Also Reminds me of Lord Brahma with his multiple heads but it doesn't strike as an instant connection.*"

For Figure 3.4, 82% of the participants felt the characters were "*Perfectly Normal*" and only 5% shared "*they might be okay with such a representation, but know people who would be offended*". No participant responded to be "*offended*" and only 7% of the participants shared "*they were not comfortable*". In reference to Figure 3.4, (P2) declared: "*I find this art more artistic rather than something offensive. Even if it's explicitly implying that the art has taken some elements from Hindu mythology, I still find it creative and something joyful, a person who is enjoying music. I can't see how this art is gonna be offensive to people.*"

For Figure 3.5, 79% of the participants felt the characters were "*Perfectly Normal*" and 12% of them shared "*they might be okay with such a representation, but people who would be offended*". 5% reported *"they were not comfortable"*. No participant responded to be *offended*. (P6) added that "*healing herbs reminds me of Sanjeevani from Ramayana. There are many mythological aspects here, like the hair represents vegetation and the solar shield representing the Surya Vamsha.*"

Figure 3.6 reveals an arguably positive trend in cultural acceptance of characters when built using the provided framework. To investigate this effect, we calculated

statistical significance utilizing Wilcoxon rank sum tests on the ordinally ranked response categories between the *SMITE* example and each of the characters produced within our workshop (Wilcoxon, 1992). For measuring the impact of these comparisons, we additionally computed effect sizes r after Rosenthal (R. Rosenthal, Cooper, Hedges, et al., 1994). As hypothesized, the *SMITE* portrayal of Kali produced significantly higher indications of offensiveness than the characters of Figure 3.4 ($p < 0.05, r$=0.79), Figure 3.5 ($p < 0.05, r$=0.83) and Figure 3.3 ($p < 0.05, r$=0.74); all showing large effect sizes.

Even if the perceived creativity and novelty of characters are always subjective and dependent on the target population that would play such a game, senior game designers approved the potential of the taxonomy to construct innovative characters by means of inspiration and combination. *SMITE's* version of Kali raised considerably more rejections than endorsement. This highly contrasts the feedback that characters produced by our taxonomy received, with most of the responses judging all three of them as perfectly normal, none or only single mentions of offense and only minor doubts of the appropriateness for peers within the Hindu community. Statistical significance's with large effect sizes throughout all comparisons further strengthen the potential of the framework.

3.2.4 Drawbacks of AstraVerse 1.0

Despite the novelty of the designer-generated characters, as assessed by experienced game designers, and the perceived cultural sensitivity, as evaluated by practicing Hindu stakeholders, AstraVerse 1.0 has significant shortcomings. First, AstraVerse 1.0 introduces a classification of gods from Hindu mythology and breaks these gods down into detailed elements. This approach limits game designers to merely creating new characters without offering the chance to explore weapon spaces, fashion, and other elements that are crucial to developing unique characters. Second, the evaluation framework for novelty depends on expert designers. This method introduces the evaluators inherent biases and fails to accurately assess how the newly created characters differ from existing gods. Lastly, the framework's sensitivity evaluation does not consider the perspectives of religious scholars, even though these scholars and priests are often

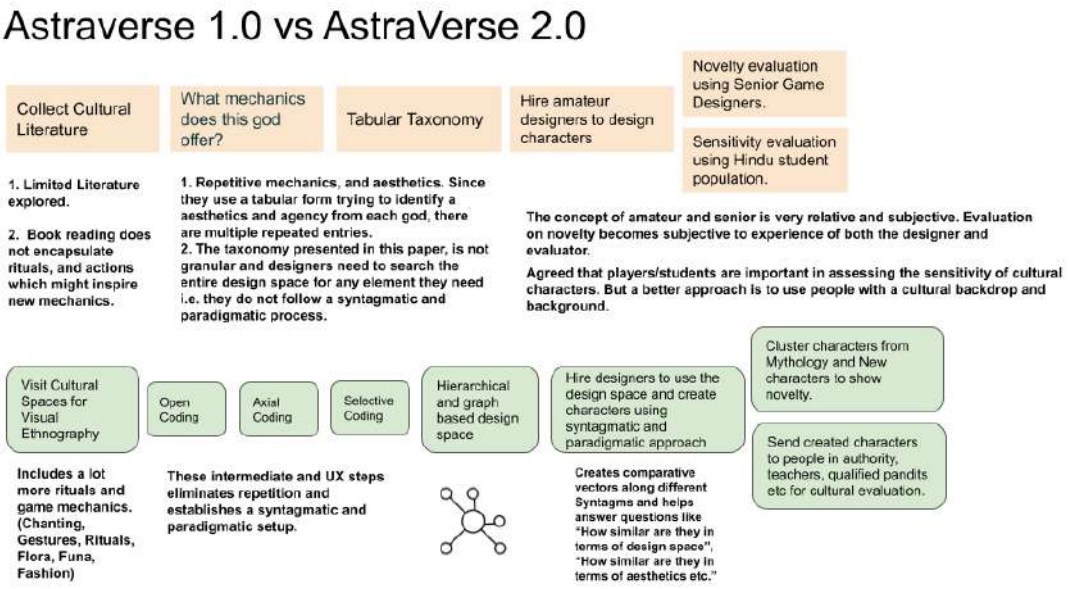

Figure 3.7: Difference in AstraVerse 1.0 and Astraverse 2.0

authoritative figures regarding religious elements.

3.3 AstraVerse 2.0

3.3.1 Differences between AstraVerse 1.0 and AstraVerse 2.0

To address the limitations of AstraVerse 1.0, we developed an enhanced framework, AstraVerse 2.0. Figure 3.7 illustrates the distinctions between AstraVerse 2.0 and its predecessor in three main aspects. Initially, AstraVerse 1.0 depended on researchers analyzing religious narratives and literature to identify deities and their offerings. However, this approach failed to capture the full spectrum of what a religion encompasses, as literature alone is insufficient. In contrast, AstraVerse 2.0 employs visual ethnography at places of worship, enabling the collection of a broader array of artifacts, deities, and religious elements for use in videogames. Secondly, while AstraVerse 1.0 decomposed each deity into various granular elements, it lacked a categorization or hierarchical taxonomy, which is often the preferred format for game designers when creating new aesthetics or characters. To address this, AstraVerse 2.0 adopts a grounded theory ap-

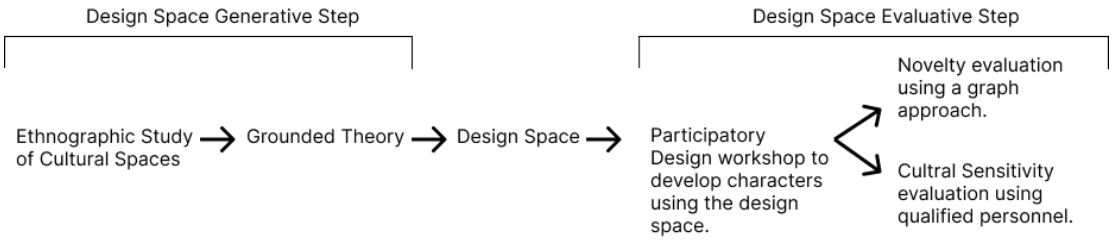

Figure 3.8: Methodology adopted to generate and evaluate the design space undertaken

proach, developing a taxonomy with four selective codes, each containing multiple axial codes. This assists designers in navigating the taxonomy to create characters. Lastly, the original evaluation of character novelty by expert designers in AstraVerse 1.0 was subject to bias. AstraVerse 2.0 introduces a novel quantitative evaluation framework based on hierarchical taxonomy, enabling a more objective interpretation of character novelty. Additionally, unlike its predecessor, AstraVerse 2.0 involves consultation with religious scholars and pandits to assess character sensitivity, ensuring respect for religious nuances.

3.3.2 Methodology

In AstraVerse 2.0, we execute the generative steps and the evaluative steps as shown in Figure 3.8. The first generative step is the visual ethnographic process to collect data points. The second generative step is a grounded theory exercise in which researchers perform open, axial and selective coding of the data collected from the previous step. The coding allows us to establish a design space inspired from a particular cultural space in the form of syntagms and paradigms. The fourth step in the pipeline is to conduct a participatory design workshop with game designers to verify whether the proposed design space supports character creation. Once the characters are created, as a last step, we evaluate the novelty and cultural sensitivity of the characters created. In Section 3.4 we detail all our steps by applying the methodology shown in Figure 3.8.

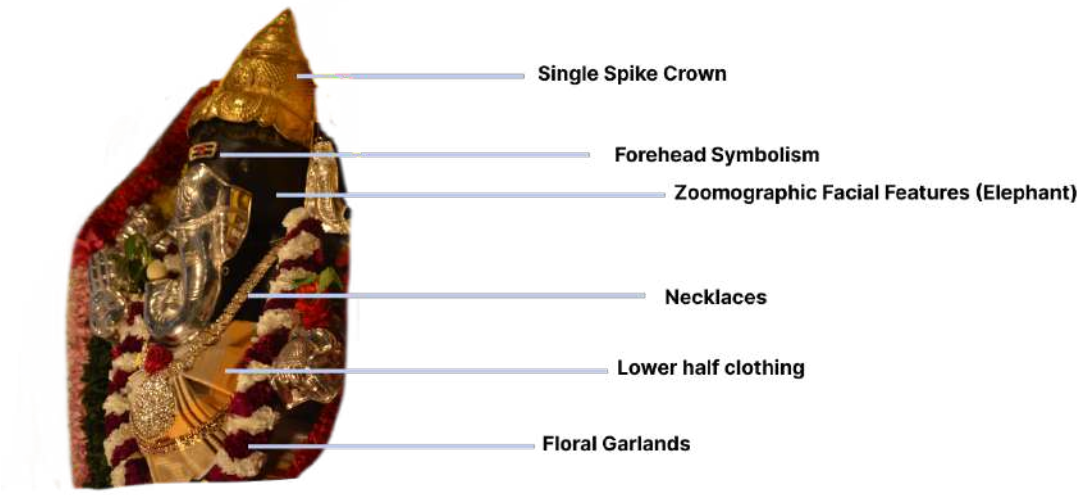

Figure 3.9: Illustration of Open Coding on a captured data point.

3.4 Case Study 2: Applying AstraVerse 2.0 framework on Hindu Religion

3.4.1 Ethnography Study: A Visit to Hindu Temples

As part of the first step of the proposed pipeline shown in Figure 3.8, the researchers visited four temples located in Sunnyvale, California, USA. Temples were open to people of all religions, sex, and identities. Photography and videography were allowed in all temples, allowing researchers to capture important events and incidents. One of the authors adopted the position of *researcher-as-participant* and visited temples to participate in activities, and rituals, and capture important events in the form of videos and photographs.

3.4.2 Data

We collected a total of 429 images. The data consisted of images of idols in temples, and videos of rituals, and processions. Of the 429 images, 248 images were images of idols, 63 images consisted of ongoing rituals, and 45 images were miscellaneous objects.

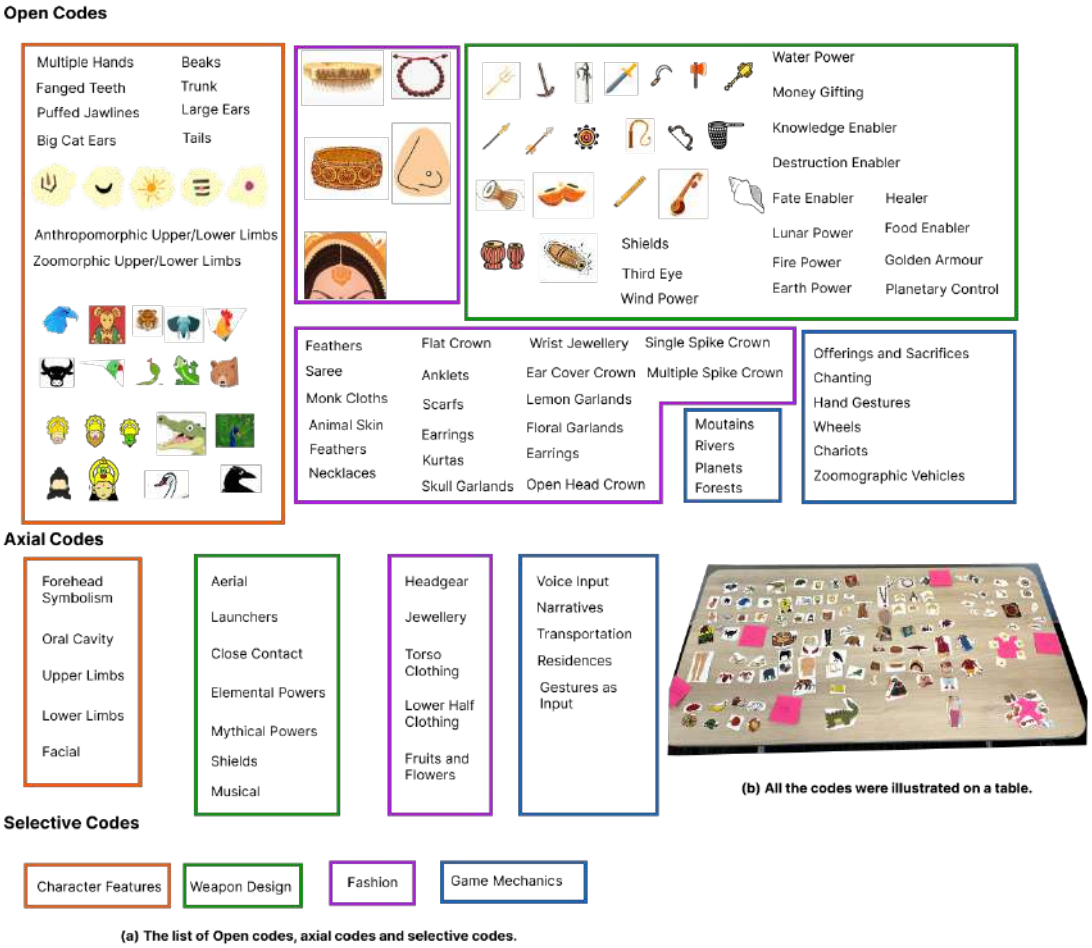

Figure 3.10: Open Codes, Axial Codes and Selective Codes from Constructionist Grounded Theory.

3.4.3 Grounded Theory

The second step in the proposed pipeline (Figure 3.8) was to use the grounded theory method (GTM) on the captured data points. For Astraverse 2.0, we adopt a constructivist grounded theory flavor (Charmaz, 2006). In this approach to GTM, the researcher is crucial to developing meaning and context within the domain being inspected (Charmaz, 2000). An illustration of open coding on a data point is shown in Figure 3.9. With the open codes generated, we performed axial coding to establish a set of emerging concepts and categories. We followed with a chain of discussions among

researchers to execute selective coding and identify four key categories for our design space. A summary of the open codes generated and the subsequent generated axial and selective codes is shown in Figure 3.10. We explain the generated design space in detail in Section 3.4.4.

3.4.4 Syntagmatic and Paradigmatic Design Space

The generated design space has 141 open codes, categorized into 22 axial codes, and finally converging into four selective codes. Selective codes and axial codes provide a convenient (Pace, 2008) way for creating Character Creation Interfaces. This allows designers to search for specific elements they are looking for while designing their characters. The four selective codes include (1) Character Features (Section 3.4.4.1) (2) Weapon design (Section 3.4.4.2) (3) Fashion (Section 3.4.4.3) and (4) Game mechanics (Section 3.4.4.4).

3.4.4.1 Character Features

The character feature selective code includes elements that contribute to the physical characteristics of the character. This includes five axial codes (1) Facial features (2) Upper limbs (3) Lower limbs (4) Oral Cavities and (5) Forehead symbolism. Facial features are different types of faces that a character can take. Apart from regular human faces, the proposed design space allows the creation of characters with zoomorphic faces. Certain facial features presented to participants are illustrated in Figure 3.10. Similarly, the upper and lower limbs include various zoomorphic and anthropomorphic features, for example, Wings, animal legs, claws, tails, and others. The axial code oral cavity includes different styles in which the lips and jaws of a character can be presented. These included fanged teeth, puffed jaws, and regular lips, among others. Finally, the forehead symbols are a set of symbols (usually etched to the face) that can be used to show character personality and loyalty towards groups.

3.4.4.2 Weapon Space

Weapons provide agency to characters in terms of their abilities. Our visual ethnography and grounded theory open up a range of weapons that designers can equip

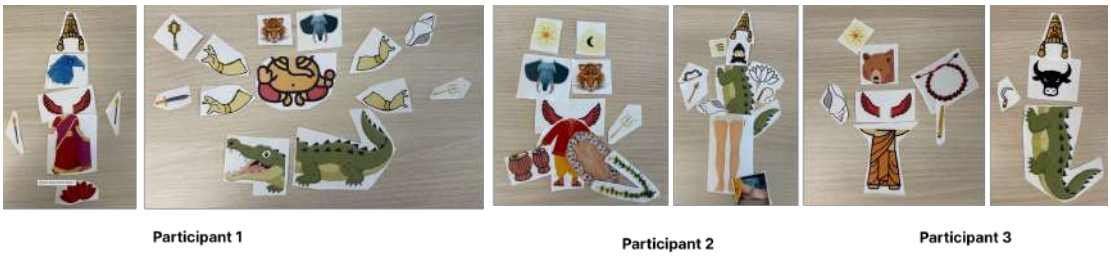

Figure 3.11: Raw Characters Created by Participants.

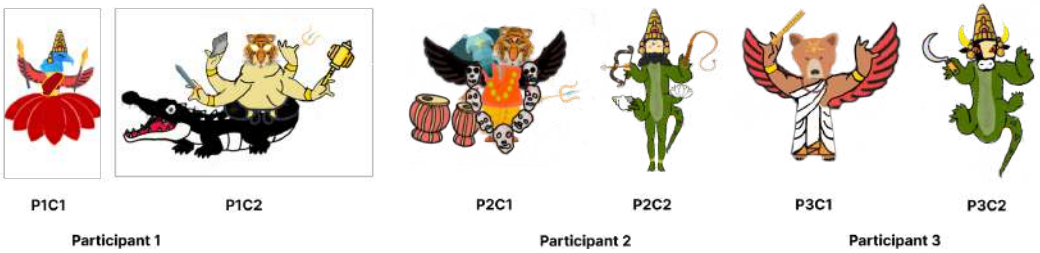

Figure 3.12: Characters Created by Participants and artist working together.

their characters with. We axially code the weapon space into 4 categories (1) Ranged Weapons (2) Close contact weapons (3) Elemental powers (4) Mythical powers (5) Shields and (6) Musical weapons. Aerial weapons have a range (arrows, spears). Close-contact weapons include mace, tridents, and others; these can be used to help design characters involved in close combat. Our study also uncovers a wide range of musical instruments that can be used as a weapon space. In Figure 3.10 we show how we present certain weapons to designers.

3.4.4.3 Fashion

Clothing, jewelry and other elements of fashion play an important role in the expression of the qualities and abilities of a character. As a result of the visual ethnography and open coding we identified 26 fashion artifacts. When axially coded these include (1) Headgear (2) Jewelry (3) Torso clothing (4) Clothing for lower limbs and (5) Floral fashion elements (garlands, flowers in hair, fruit garlands). Clothing elements cover a range of textiles for different situations, parts of the body and terrains across all genders. Jewelry and Floral fashion elements offer decorative options for

characters designed by designers.

3.4.4.4 Game Mechanics

In this selective code we identified various game mechanics which can be used in videogames. Axial codes include (1) Voice as a game mechanic (2) Narrative (3) Transportation (4) Residences and houses (5) Gestures. Certain deities mounted animals and used them as transportation systems to support movement across terrains. Certain deities were placed in houses or landscapes covering various terrains and habitats. This opens up different backdrops for games. Majority of the open codes and axial codes in this section of the design space do not translate to character creation but are input modalities for videogames. We omit those that are not useful for character creation in the subsequent evaluative study.

3.5 Evaluation of AstraVerse 2.0

Goal: In the mixed-method evaluation step, we: (1) Conduct a participatory design workshop to verify if the design space supports the creation of new characters. (2) Propose a quantitative evaluation method to discuss the novelty of the characters across various paradigms and syntagms. (3) Conduct qualitative user interviews with scholarly personnel to assess the cultural sensitivity of the characters.

3.5.1 Participatory Design Workshop

Through an open call, we invited game designers from UCSC's Game Design and Development graduate program. Three designers volunteered to participate and create characters using the design space. The following protocol was used for the participatory design workshop.

- Participants were welcomed and asked to sign a consent form and complete their demographic details.
- Participants were presented with the design space (Section 3.4.4) laid out on a table as shown in Figure 3.10(b).

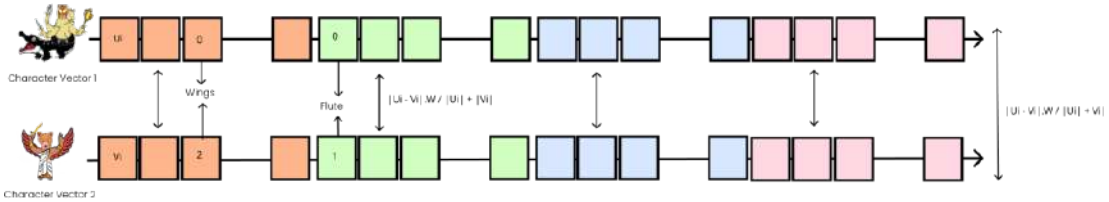

Figure 3.13: Visual illustration of Character Embeddings. Each set of colored cells corresponds to open codes from a particular selective code. This illustration also depicts how the distance between two character embeddings across selective codes is calculated.

- Participants were asked to construct two characters that they believed could save a fictional planet from a violent alien invasion. The characters created are shown in Figure 3.11
- The participant and an artist worked together to add the desired modifications in terms of color and other aesthetics. The final characters are shown in Figure 3.12.
- Once the participant was satisfied with the character they created, they were thanked and free to leave the premises.

3.5.2 Novelty Evaluation Framework

3.5.2.1 Creating Character Embeddings

In this section, we introduce how treating the design space as a syntagmatic and paradigmatic process allows us to present characters as vector embeddings.

We treat each character(C) as a vector embedding. Each entry in the vector is a syntagm. Designers build characters by choosing a particular syntagm(u) and arranging the syntagms as they envision it on their characters. Designers can also pick the same syntagm multiple times. For example, participants might have chosen more than a single pair of arms for their character. Each element in the vector corresponds to the frequency of a particular open code that has been selected. This is illustrated in Figure 3.13.

3.5.2.2 Character Distances

Each character consists of four embeddings, one for each selective code. All four selective code embeddings together represent the character in the entire design space. This is illustrated in Figure 3.13. Generating a vector embedding for each character allows us to treat the character as a point in the design space, compute distances between characters, and study how they vary across various paradigms established in the design space.

To measure the distances between the characters across the selective codes and the overall distance between them, we use the Canberra distance metric shown in Figure 3.13 for our discussion. Our choice to use the Canberra distance lies in its ability to measure similarity and dissimilarity between groups for ordered categorical data (Jurman, Riccadonna, Visintainer, & Furlanello, 2009). Other metrics tested were Euclidean(Dokmanic, Parhizkar, Ranieri, & Vetterli, 2015) and Manhattan (Sammut & Webb, 2017) distances, and all align with the trends discussed in the results.

To illustrate that the design space enables the creation of novel characters, without the need of transplanting original gods from Hindu mythology, we compare the characters generated by participants with the characters in videogames transplanted from Hindu mythology. The characters we choose are Kali, Ganesh, Rama, and Shiva from SMITE (Titan Forge Games, 2019), Karna, Arjun, and Lakshmi from Fantasica (Silicon Studio, 2012), Krishna from Shin Megami Tensei IV: Final Krishna (Atlus, 2016), Hanuman from Hanuman the Boy warrior (Aurona Technologies & Sony PlayStation2, 2009), Nagas from Unrest (Pyrodactyl Games, 2014). We also include a basic male character and a basic female character in the group of characters. These characters were overlaid on the design space to generate vector embeddings. We choose the character with the least number of elements as the origin. We compare characters against various selective codes and the entire design space as discussed in the next section.

3.5.3 Sensitivity Evaluation

Previous instances of characters being copied from mythology have received backlash (Usher, 2012; Alexander, 2009; *Religious groups protest game for its depiction of kali- technology news, Firstpost*, 2012; Maram et al., 2022b). Maram *et al.* also

mention how characters designed with culture, and mythology as inspiration can benefit from evaluation by scholarly experts to prevent backlash. As part of the proposed pipeline shown in Figure 3.8, the final step is to evaluate the characters through qualified personnel. To do this, we recruited three evaluators. Two of the evaluators (Evaluators 1 and 3) were priests in Hindu temples (age 52 and 48). The other evaluator (Evaluator 2) has a diploma in Hindu scriptures (Age 24). All the evaluators could speak, read and write English. During the interviews, the evaluators switched between English, Telugu, and Hindi. All languages were native to the researcher and raised no issues with transcription.

To benchmark against existing characters in games, the evaluators along with participant-generated characters were also presented with the Hindu characters Kali[2] from SMITE, Krishna from Shin Megami Tensei IV: Final Krishna (Atlus, 2016), Hanuman from Hanuman the Boy Warrior (Aurona Technologies & Sony PlayStation2, 2009).

The protocol followed in the sensitivity evaluation step was as follows:

- The evaluator and the researchers connected through online video/voice calls. The evaluators were briefed about the goal of the project.
- The evaluator was informed that a series of characters would be shown and a set of questions would be asked.
- The evaluator was presented one character at a time (unless they requested to see all the characters before commenting) randomly from the pool of characters in Figure 3.12, Kali from SMITE (Titan Forge Games, 2019), Krishna from Shin Megami Tensei IV: Final Krishna (Atlus, 2016), Hanuman from Hanuman the Boy Warrior (Aurona Technologies & Sony PlayStation2, 2009). For the character/s presented they were requested to answer the following:
  - Based on your first look at the character/s, share your thoughts.
  - Do you find this offensive? If so, what about this character makes it inappropriate or offensive? If not, what about this character makes it appropriate?

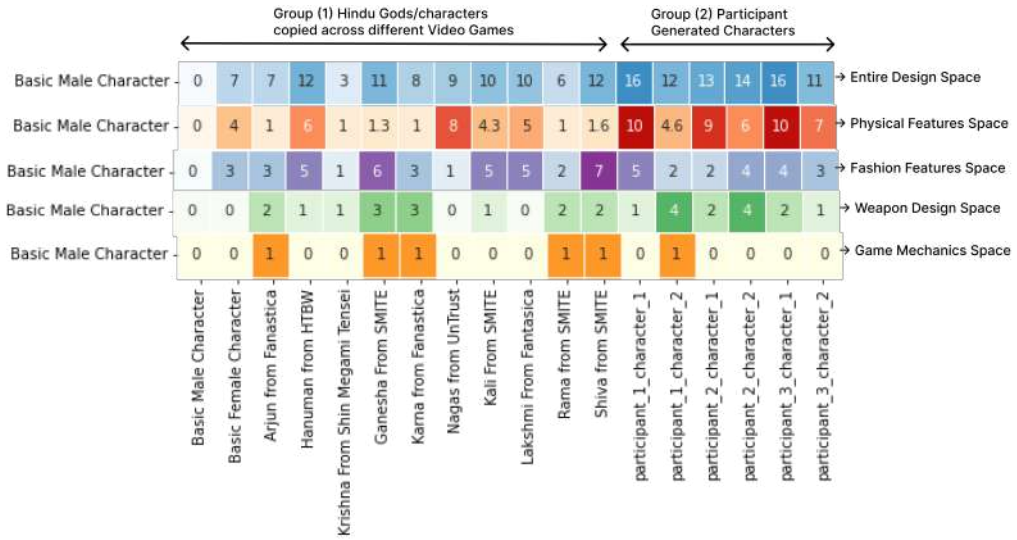

Figure 3.14: The distances of embodied gods in different games and participant-generated characters from the origin character throughout the design space and different selective codes.

3.5.4 Novelty Evaluation Results

To evaluate the novelty of characters, we establish the following:

- **Origin**: The basic male character as the origin, since it is constructed by the least number of elements from the design space.
- We define two character groups, indicated in Figure 3.14:
  - **Group 1**- Characters copied from Hindu mythology and used in various videogames.
  - **Group 2**- Characters designed by the participants.
- **Distance Computing**- Compute distances between the origin character and all the characters against the entire design space and the selective codes. These distances are shown in Figure 3.14. To visualize trends, we present a radar chart in Figure 3.15.

The dark blue line in Figure 3.15 corresponds to the distance between the origin and the character throughout the design space (all selective codes). The other lines correspond to the distance between the origin and the character being inspected

[2]an image of Kali from SMITE is shown here: https://www.engadget.com/2012-06-27-religious-group-calls-for-removal-of-hindu-deities-from-hi-rezs.html

across a particular selective code. We report the following statistical interpretations and researcher's interpretation of the trends.

3.5.4.1 Character Physical Features Space

- **Statistical Interpretation**- Using Welch's t-test for unequal variances on Group 1 ($M = 2.8$, $SD = 2.4$) and Group 2 ($M = 7.8$, $SD = 1.9$) for distance measured across the selective code of physical characteristics (shown in Figure 3.14-Physical Features) we report $p < 0.05$ and Cohen's $d = 1.8$. The large effect size $d > 0.8$ indicates that participant-generated characters significantly differ from the origin compared to copied gods from Hindu mythology when measured across the physical features space.
- **Qualitative Interpretation**-Participant-generated characters have a combination of zoomorphic features and anthropomorphic features. In contrast, original characters (gods) are anthropomorphic in majority. This results in greater visual distinction and variety in participant-generated characters.

3.5.4.2 Weapon Features Space

- **Statistical Interpretation**- Using Welch's t-test for unequal variances on Group 1 ($M = 1.24$, $SD = 1.08$) and Group 2 ($M = 2.6$, $SD = 1.2$) for distance measured across the selective code of weapon (shown in Figure 3.14-Weapon Space) we report $p < 0.05$ and Cohen's $d = 1.1$. The large effect size $d > 0.8$ indicates that participant-generated characters have a diverse weapon choices compared to copied gods from Hindu mythology when measured across the weapon space.
- **Qualitative Interpretation**-Participant-generated characters have a combination of multiple weapons compared to existing characters copied from mythologies, who generally use a single primary weapon. The zoomorphic nature of participant-generated characters leads to characters having multiple arms, allowing participant-generated characters to carry more weapons.

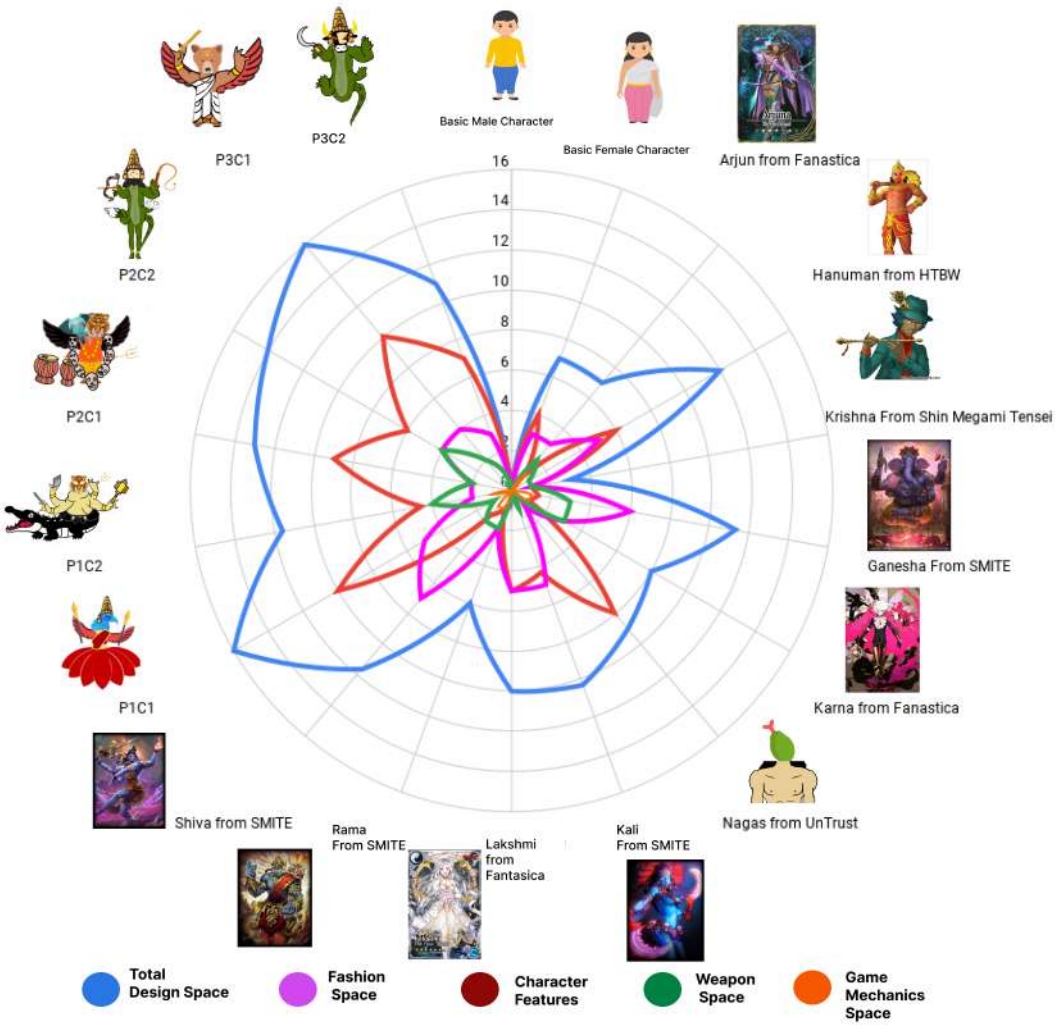

Figure 3.15: Radar Chart showing the distance between characters and a baseline character across different Selective Codes.

3.5.4.3 Fashion Features Space

- **Statistical Interpretation**- Using Welch's t-test for unequal variances on Group 1 ($M = 3.4$, $SD = 2.0$) and Group 2 ($M = 3.0$, $SD = 0.8$) for distance measured across the selective code of fashion (shown in Figure 3.14-Fashion Features) we report $p > 0.05$. This indicates that participant-generated characters and original gods have fewer distinctions when measured across the fashion-selective code.
- **Qualitative Interpretation**- Group 1 consists of gods which come from a royal backdrop or identify as female. These gods are adorned with jewelry and clothing. This results in original gods in games covering a wider range of fashion artifacts. We also notice that characters in both groups restrict themselves to using crowns, anklets, and garments, but do not use or combine other elements from the fashion space.

3.5.4.4 Game Mechanics Features Space

- **Statistical Interpretation**- Using Welch's t-test for unequal variances on Group 1 ($M = 0.4$, $SD = 0.49$) and Group 2 ($M = 0.2$, $SD = 0.49$) for the distance measured across the selective code of Game Mechanics (shown in Figure 3.14-Game Mechanics) we report $p > 0.05$. This indicates that participant-generated characters and original gods have fewer distinctions when measured across the game mechanics-selective code.

  The game mechanic selective code is less visual aesthetic driven but input modality and game loop driven, hence the low the lower means for both participant generated characters and Hindu gods in videogames. Also evident in Figure 3.14 most characters do not have any element of this selective code resulting in $p > 0.05$
- **Qualitative Interpretation**- Original gods are anthropomorphic and mount animals (zoomorphic) for transportation or use chariots for fast transportation. On the flip side, participant-generated characters are zoomorphic in nature and do not use any modes of transportation.

3.5.4.5 Total Design Space

- **Statistical Interpretation**- Using Welch's t-test for unequal variances on Group 1 ($M = 7.9$, $SD = 3.4$) and Group 2 ($M = 13.12$, $SD = 1.7$) for distance measured across the entire design space (as shown in Figure 7-Entire Design space) we report $p < 0.05$ and Cohen's $d = 1.57$. The large effect size $d > 0.8$ indicates that participant-generated characters are significantly distant from the origin compared to copied gods when measured across the entire design space.

The above interpretations indicate how participant-generated characters are visually novel and offer more combat agency compared to gods copied by designers in videogames. Even when measure against the entire design space have a larger mean distance from the origin character and the large effect side $d > 0.8$ indicate how both groups have minimal overlap supporting how the design space allows the creation novel and creative characters.

We indicate how the design space provides a large set of fashion features that can be used for character design by designers in the future. We also believe that the proposed quantitative framework to represent characters allows designers to reflect on their design choices and artifact selection to create engaging and relatable characters. The presented quantitative evaluation also allows us to compare how gods copied from different mythologies by designers deviate from the actual cultural representation of the gods. In order to scope this research paper, we do not discuss this comparison.

3.5.5 Sensitivity Evaluation Results

To illustrate and compare cultural acceptability of participant-generated characters and original gods copied from Hindu mythology in videogames, we present condensed results of the qualitative evaluation based on the protocol shared in Section 3.5.3.

"These gods are an identity for lots of us, Devi (Kali) is my primary deity and it is upsetting to see her reduced to such an representation." is what Evaluator 1 (Age 52, Temple Priest) shared while commenting on Kali from SMITE. This comment throws insight into how the evaluator relates to the character and is upset with the portrayal. Evaluator 3 (Age 48, Temple Priest) also shares comments on similar lines

"We often refer Kali as Maa (mother) now this presentation is not what I would prefer. Same with Krishna, in Hindu mythology, he is seen as the upholder of Dharma (justice), but here you are conveniently fighting him up." The ability to relate to the character and having the character being presented or performing actions that are not relatable or even offensive is a point of concern that was shared by the evaluators.

However, when presented with characters generated by participants, evaluator 2 was able to identify elements borrowed from Hindu mythology and create an association with modern media artifacts and continues to share *"I understand why you would be concerned if game characters can offend people, but think these are not my gods or any gods that anyone would identify or worship."* This reinforces how despite being relatable in terms of design elements, how the generated characters do not resemble or mimic the original gods, which was the primary concern shared in the previous paragraph. The fact in which the participant-generated characters deviate from the original Hindu gods in terms of visual aesthetics is iterated again by evaluator 1 *"I cannot blatantly rule any of the ones you showed out like the previous ones, since it is not a deity which I know."*

How characters through their actions in videogames deviate from original narratives, tales, and beliefs was a concern shared by evaluators. Evaluator 3 shares how the core principles of Hinduism are distorted by videogames that copy characters *"Hindus believe in laying their fate and destiny in the hands of gods. Now forget controlling these gods, you are also having them get hit."* Evaluator 1 mentions *"Krishna is almighty and invincible, and in this game, he is shown as a bad guy, and you fight against him. Imagine what the next generation of kids will think and learn."*

Evaluators maintained consistency on how they would not be concerned with the generated participant and what they do in the games. This is attributed to how they have no cultural experiences, tales, or beliefs associated with these characters even though elements are relatable. Evaluator 3 mentions *"These creatures are a combination of things borrowed. Items they hold might have cultural value, but as creatures, I am not worried about what they do, or what happens to the character."*. Evaluator 1 supports this by simply quoting *"The reason I might be okay with it is, it does not touch the source gods."*. Evaluator 2 reinforces this argument and mentions *"I do not see myself worshiping them, because there is no mythological story or god that exists with which I*

can relate or resonate."

The qualitative discussion mentioned above with the expert evaluators indicates how the participant-generated characters through the design space are culturally acceptable.

3.5.6 Summary

In the research direction outlined above, we explored my contributions to creating frameworks and design taxonomies that enable designers to swiftly construct religiously inspired characters and evaluate them. However, the incorporation of religion into games encompasses many dimensions, with various stakeholders, including designers, religious figures, and players, interpreting the presence of religion differently. It is crucial to understand the perspectives of this diverse group of stakeholders before studios, developers, and researchers embark on creating games with religious foundations. Therefore, in the following section, we adopt a systematic approach to investigate how communities discuss religious elements in games.

3.5.7 Implementation Notes

On involving cultural stakeholders. AstraVerse 2.0 includes a sensitivity review with religious scholars and pandits. This is a necessary step, but it should not be the only point at which cultural voices enter the process. Anyone using this framework to design a videogame with specific cultural or religious content should involve community members, scholars, and cultural experts from the beginning, not just at the end. A research team conducting fieldwork at a few temples cannot fully represent how a tradition is practiced across different communities and regions. Getting that input early tends to produce better design decisions and avoids problems that are much harder to fix later.

On applying AstraVerse to monotheistic religions and other artifact types. AstraVerse, as currently implemented, is a character design framework. The taxonomy built from Hindu temples is organized around character features, weapons, fashion, and game mechanics, all of which fit a tradition with a large, visually distinct pantheon.

That framing does not translate directly to monotheistic religions. Islam, Christianity, and Judaism each have traditions that limit or prohibit visual representations of the divine. Trying to apply a character design taxonomy to these contexts would not be appropriate.

The methodology itself, though, is not tied to character design. Visual ethnography and grounded theory can be applied to other types of cultural artifact. For Islamic contexts, this could mean building a design space around mosque architecture, geometric ornamentation, calligraphy, or the soundscape of the call to prayer. For other traditions, it might be music, ritual objects, ceremonial dress, or festival practices. Researchers and designers using this framework should adapt the taxonomy categories to whatever the tradition and context actually call for. Character design is one application of the method, not the only one.

Chapter 4

Direction 2: Community Attitudes towards Religion in Videogames

In the preceding sections, we developed essential frameworks and introduced distinct methodologies for creating design taxonomies based on religion. Although these taxonomies may support the integration of religion in videogames, the use of religious elements is highly subjective, and opinions on this matter can vary significantly among different stakeholders. Therefore, it is crucial to understand the perspectives of various religious communities on the incorporation of religious elements in videogames. Additionally, it is important to examine how modern interactive media, such as videogames—which have risen to prominence in the last century—are perceived through the lens of religions whose doctrines were established thousands of years ago. My second research direction precisely explores this topic as illustrated in Figure 1.1. In this chapter, I discuss perceptions on videogames by religious communities on Reddit. I present a compilation of topics and their inherent meanings, based on discussions about religion and videogames. For readers unfamiliar with various terminology associated with reddit, certain religious terminology and, consider going through the below definitions:

- **Subreddit:** Reddit is a platform where people come together online and form communities. Each community can name themselves as desired, and each of these communities is referred to as subreddits.
- **Text Embeddings or Embeddings:** Text Embeddings, also known as word em-

beddings, refer to the mathematical representation of words as vectors in a multi-dimensional space. In this form, words with similar meanings tend to be located close to each other, allowing algorithms to discern semantic similarities based on distance and positioning in the vector space. These embeddings enable efficient computational processing of language and serve as the input to many natural language processing (NLP) models.

- **Clusters:** In the context of data science, clustering refers to partitioning the input data into subsets, such that data in the same subset (or cluster) have some notion of similarity—be it in terms of distance, density, or distribution. Clustering is an essential technique in exploratory data analysis, as it helps to understand the natural grouping or structure within a dataset.
- **Haram:** An activity termed Haram translates to the particular activity being forbidden. For further information, please refer to an online Arabic dictionary [1].
- **Halal:** Halal is the opposite of Haram, meaning an activity is permissible. For further information, please refer to an online Arabic dictionary [2].
- **Shirk:** Shirk in Islam refers to how you are prohibited from believing in multiple faiths. Accurate definitions and rulings of this term can be found in the rulings of scholars [3].
- **Rama, Ganesha, Kali, Durga, Vamana, Narasimha, Saraswati:** These are important Hindu deities worshiped widely.

4.1 Understanding Community perceptions of Religion in Videogames

Traditionally, religious doctrines have established clear demarcations, providing distinct narratives and guiding principles regarding deities' nature, lore, and role. However, the medium of videogames introduces an interdisciplinary melding of religious elements, where deities, rituals, and sacred narratives from diverse religions coexist,

[1] https://arabiconline.eu/what-does-haraam-mean/

[2] https://arabiconline.eu/what-does-haraam-mean/

[3] https://www.dawateislami.net/magazine/en/islamic-beliefs-and-information/what-is-shirk

interact, and challenge conventional understandings, inviting new forms of religious discourse. This paradigm shift warrants a rigorous exploration of two key questions: “How do players perceive religion in videogames?” and ”How do religious individuals view the portrayal of their religion in videogames?” — Addressing these questions requires insights from both videogame players and religious communities. The broad religious representation in videogames necessitates understanding each religion’s perspectives and potential contributions to the game development process. To this end, this paper conducts topic modeling across Reddit’s most influential related subcommunities, revealing how various religions and videogame communities engage with the portrayal of religion in videogames and how various aspects of religion can influence game design.

Radde-Antweiler *et al.* have identified an abundance of religious elements embedded within videogames, observing that these virtual realms are awash with symbols and motifs of faith. They aptly term these virtual worlds as ”religioscapes” (Radde-Antweiler, Waltmathe, & Zeiler, 2014a). As players navigate through these religioscapes, they routinely engage with these religious characters, narratives, rituals, and artifacts during their play sessions. While these sessions might often be solitary experiences, countless players converge online to dissect interactions, exchange viewpoints, and cultivate vibrant communities. In a parallel vein, religious groups maintain a robust online presence, actively sharing their beliefs and reflections (H. A. Campbell et al., 2016). Reddit stands out as a digital crossroads where both these communities frequently interact. Recognizing the platform’s significance to our subjects of interest, we have selected Reddit to curate our corpora and perform topic modeling.

The convergence of two major communities on a platform where many users engage under pseudonymous identities has cultivated a space for candid dialogues, allowing individuals to openly express their admiration or critique of religious portrayals in videogames. To comprehensively grasp the multifaceted dialogue arising from the amalgamation of religion and videogames, we base our research questions on the approach of Mohr and Bogdanov (Mohr & Bogdanov, 2013) for analyzing topic modeling outcomes. This approach includes: (a) identifying the topics, (b) interpreting these topics, and (c) understanding the role of these outcomes within the broader scope of the research project. In alignment with the first two questions, particularly in the context

of religion and digital gaming, we have formulated the following research questions:

- **RQ1:** What are topics discussed by religious communities and player communities around the intersection of religion in videogames?
- **RQ2:** How do we interpret topics across communities? What are the similarities and differences?

Finally, in Section 4.6, we address the final question posed by Mohr and Bogdanov, namely the role of the outcomes in the larger research project. There, we discuss the implications of our current work and its position in relation to the existing body of literature. The subsequent sections of this paper delve into relevant previous works and contributions, our research methodology, data sources, and thematic explorations.

Acknowledgment: I would like to thank my co-authors: Dr. Johannes Pfau, Mansi Kasar and Dr. Magy Seif El-Nasr for their valuable advice on the accepted publications at ACM CHI PLAY 2024.

4.2 Methodology

Topic modeling has become an increasingly popular method for analyzing large text datasets where human coding is cumbersome (Aranda, Sele, Etchanchu, Guyt, & Vaara, 2021). DiMaggio (DiMaggio, 2015) highlights that topic modeling enables the postponement of interpretation until after the discovery of contextual similarities between various documents within a text corpus. This feature of topic modeling is beneficial in our study, considering the multifaceted nature of religious discourse and the challenges associated with establishing a comprehensive codebook apriori that encompasses all aspects of religion and videogames.

Paakkonen (Pääkkönen & Ylikoski, 2021) discusses two lenses through which researchers can approach topic modeling: (a) topic realism and (b) topic instrumentalism. In our study, given that the conversations occur among genuine Reddit users who express their authentic opinions under pseudonymous usernames, we have adopted a topic realist perspective. This paper is built on the assumption that the topics identified by our topic modeling pipeline reflect the actual, inherent themes and discussions about religion and videogames as they organically manifest in the Reddit corpus.

However, as Paakkonen (Pääkkönen & Ylikoski, 2021) also notes, both these lenses, are incomplete without the interpretive input of researchers. Consequently, following the identification of topics, our researchers engage in a Human-in-the-loop methodology, where researchers were involved in assigning labels to topics, categorizing them, and elucidating overarching themes and relationships between the topics. The authors, experienced in data-driven approaches in game research and HCI research, recognize the potential for algorithmic biases in data-driven analysis. Therefore, our positionality lies in emphasizing the importance of human researchers interpreting the findings.

As illustrated in Figure 4.1, we use a three-step methodology to understand themes and topics of discussion regarding religion and videogames in religious and videogame subreddits.

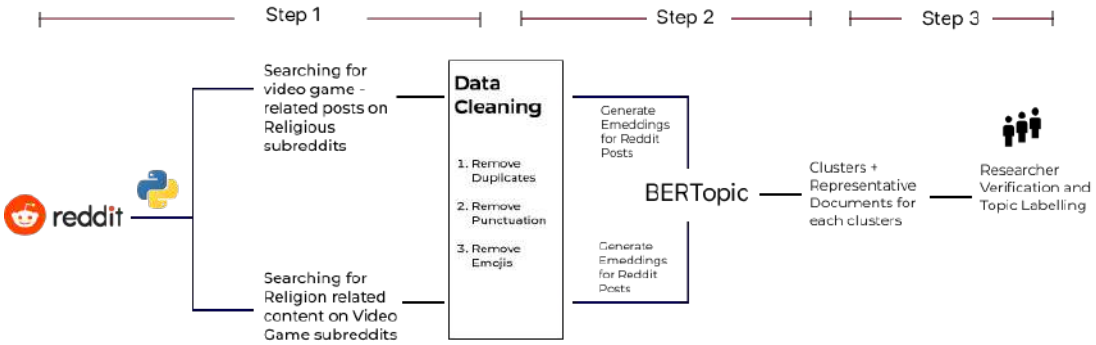

Figure 4.1: Methodology adapted to understand Reddit discourse regarding Religion and Videogames.

4.3 Step 1: Data Retrieval and Cleaning

4.3.1 Data Retrieval:

We utilized Python's PRAW library to scrape relevant data from several subreddits. For religious communities, we targeted the most active subreddits of Christianity (*r/Christianity*), Islam (*r/islam*), and Hinduism (*r/hinduism*), retrieving posts and comments containing the term "videogames". Similarly, for gaming communities, we concentrated on popular game subreddits with over 10,000 followers (e.g., *r/poke-*

mon), extracting discussions mentioning religious terms such as "Islam", "Christian", and "Hindu". Our scraping was restricted to initial comments, avoiding recursive retrieval of child comments, given they often address only the parent comment in single-words, creating explosive branches with minimal contexts and also a practice evident in previous Reddit based reserach (Gamage, Ghasiya, Bonagiri, Whiting, & Sasahara, 2022).

4.3.2 Data Cleaning:

We applied the following steps to clean our corpora:

- *Removing Noise from Subreddits because of Pseudo-Anonymous Usernames:* Across the religious subreddits and videogames subreddits, we found users with usernames such as *ChristianBaby, ChristianBaleFans, DeMuslim, theHinduGuy* among the others, the PRAW retrieval API retrieved posts with such usernames relatable to religion. We eliminated posts that where such usernames were tagged.
- *Removing Moderated/Deleted posts:* We perform data cleaning by removing duplicates and empty rows. Reddit groups are monitored by moderators who have the ability to remove posts against community guidelines, which are indicated by the keyword "removed" and are dropped from our dataset. Similarly, user-deleted content is marked with the keyword "deleted," which were also excluded from our dataset.
- *Limiting number of Videogame Subreddits:* We noticed not all videogame subreddits contain exclusive discussion with respect to videogames and religion. The number of posts and comments dropped significantly after the first 5 videogames. Hence, we choose to analyze the top 5 videogames per religion.
- *Removing single word content:* A lot of comments had a single word such as "Ok", "Fine" among the others. All such posts with a single word were dropped from the dataset.

The number of posts and comments extracted are presented in Table 4.1 and Figure 4.2 below. Overall, post data cleaning, we analyze 1028 posts and 4119 comments from religious subreddits; 4557 posts and 12236 comments from videogame subreddits.

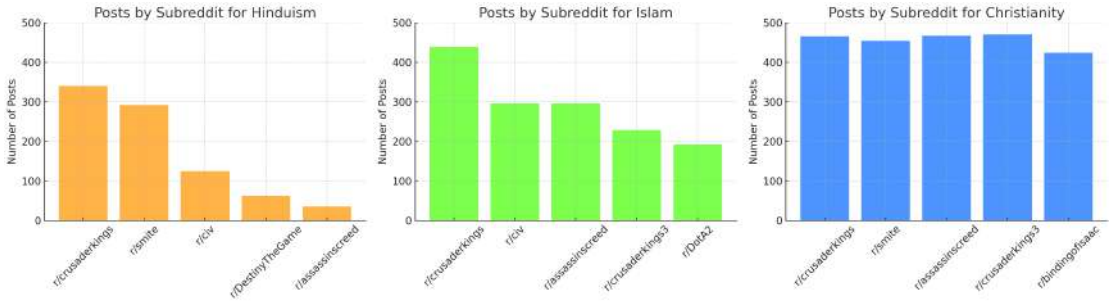

Figure 4.2: Top 5 Videogames per religion with regards to number of posts (after Data Processing)

4.3.3 Dataset Overview

In Figure 4.2, we explore the distribution of posts in videogame subreddits.

Subreddit	**Number of Posts**	**Number of Comments**	**Posts with highest upvotes**
r/Christianity	428	1799	*"We're creating an game which is adventorus where you can explore ancient Jerusalem, solve quests and discover events from the Bible. What stories would you like to experience in this way?"* (401 Upvotes)
r/hinduism	202	1080	*"Hare Rama, I am an game developer from India trying to make a game on our culture, its called "Chakra", here's a clip of a battle with the demong Asura senapati, would love to know your thoughts and all feedbacks are appreciated."* (697 Upvotes)
r/islam	398	1240	*"The New Spiderman Game got Muslim women's behaviour patterns perfect!"* (1000 Upvotes)

Table 4.1: Distribution of Posts across the Religious Subreddits (after Data Processing)

4.4 Step 2: Execution of Topic Modeling

4.4.1 Topic Modeling Approach Selection:

Traditionally, researchers have used LDA (Latent Dirichlet Allocation), BTM (Biterm Modeling), and NMF (Negative Matrix Factorization) for topic modeling. However, three problems are associated with using methods like LDA and NMF. Groot *et al.* highlights how (de Groot, Aliannejadi, & Haas, 2022) LDA and NMF use a bag-of-words approach and rely purely on the frequency of words and fails to capture relationships, word-play, essence, and the context in corpora. As a result, these models suffer in

generalizability and struggle to distinguish topics if similar words are used to describe different topics. Secondly, LDA and NMF are supervised algorithms, i.e., the researcher has to determine the approximate number of topics they expect in the corpora. Finally, LDA and NMF do not consider outliers and force all the items into at least one cluster. To counter these problems, we deploy a more recent approach to topic modeling named BERTopic (Grootendorst, 2022).

BERTopic[4] has been used by various authors to study corpora on different issues. As pointed out by various researchers (Hutama & Suhartono, 2022; Jeon, Yoon, & Sohn, 2023; Uncovska, Freitag, Meister, & Fehring, 2023; Grootendorst, 2022), BERTopic addresses the issues faced by LDA and NMF by (1) Allowing the researcher to use context-aware embeddings to encode the context of the sentence and create better topic clusters, (2) BERTopic automatically accounts for outliers and removes them from the analysis and (3) BERTopic automatically selects the optimal number of topics and removes the onus from the researcher to pre-determine the number of clusters.

4.4.2 Process:

In this paper, we use the recommended open-source sentence embeddings (all-MiniLM-L6-v2) (Grootendorst, 2022) available on HuggingFace[5] to embed posts and comments. As shown in Figure 4.3, BERTopic uses these embeddings to generate topic clusters and outputs a set of 10 representative documents for each topic (details of the algorithm are discussed further in the original BERTopic paper by Grootendorst (Grootendorst, 2022)). We pass data from each subreddit into BERTopic which outputs topics and data points best representing each topic. For readers interested, the total number of topics identified by BERTopic is illustrated in Figure 4.5 (Section 4.5.1) (only the videogame subreddits with the highest number of topics for each religion have been shown).

[4] `https://maartengr.github.io/BERTopic/api/bertopic.html`
[5] `https://huggingface.co/sentence-transformers/all-MiniLM-L6-v2`

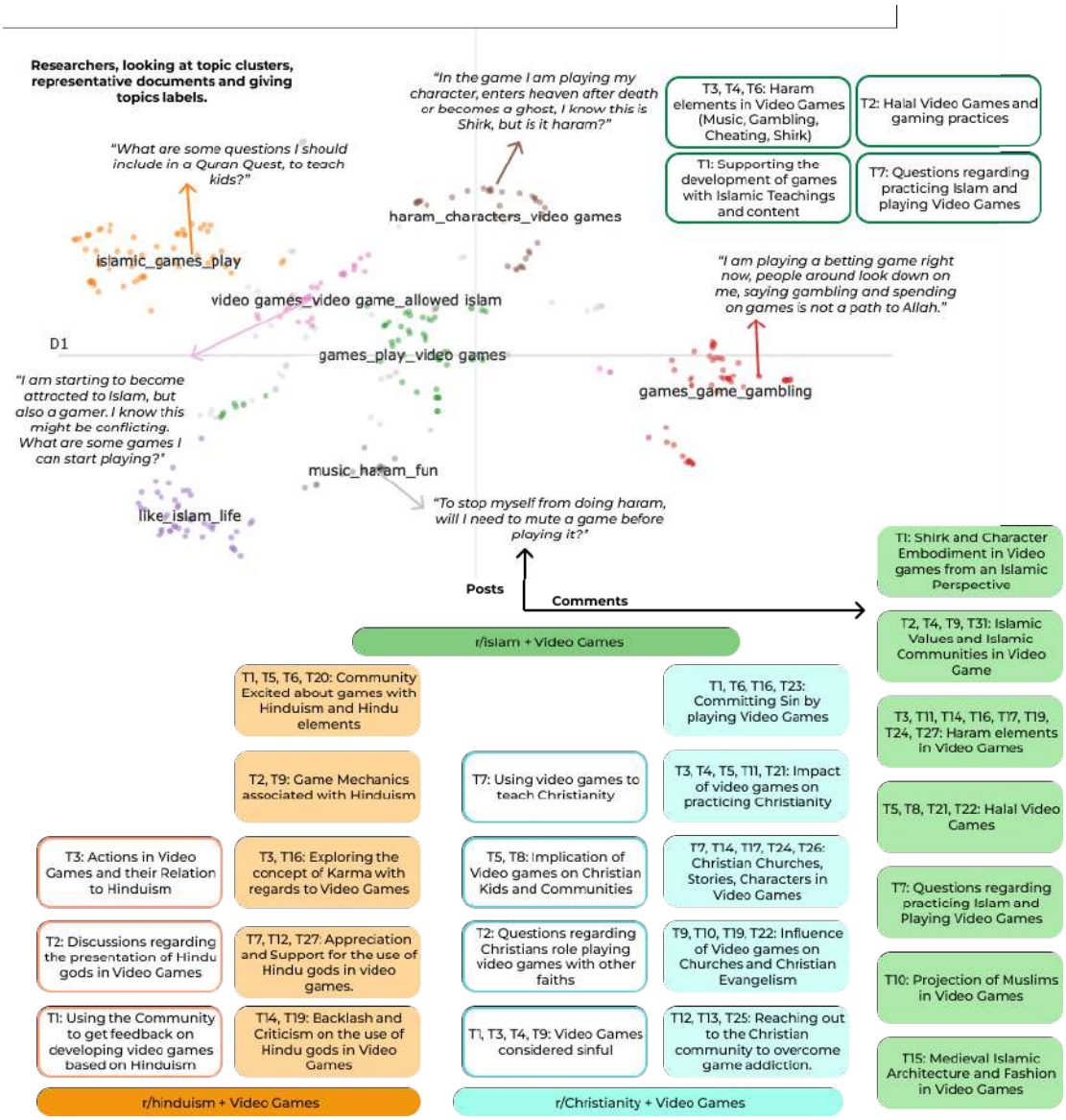

Figure 4.3: Different Topics Identified from the Religious Subreddits Discussing Videogames. Showing output of BERTopic for Islamic subreddit and how researchers assign topics to the cluster. Outlined boxes indicate topics from posts, while colored boxes indicate topics identified from comments.

4.5 Step 3: Researcher Verification and Topic Labeling

Two scholars independently undertook the task of topic labeling. This was achieved by referencing the representative documents provided by BERTopic for each topic cluster. Following this individual analysis, all the researchers convened to deliberate upon the topic labels, reconcile discrepancies, and organize the topics into overarching themes. Researchers when convened, used their religious experience to identify how topics related to each other, religious verses to support the topics, and identify relations between the topics across religions.

In our dataset, we encountered inherent noise, leading to the identification of several topics that were unrelated to the intersection of religion and videogames. These topics, while not outliers, were not relevant to our research focus and thus were discarded. To guide our selection, we established specific inclusion criteria for topics: (a) Topics must be directly related to games (whether digital or board) and intersect with religious discourse, and (b) Topics should be inherently religious and connected to player communities. For example, within the *r/islam* subreddit, we found numerous references to how barbie toys are prohibited in Islam. Although this topic is steeped in religious context, it failed to meet our inclusion criteria of videogames. To provide a comprehensive overview, we include a detailed list of the topic labels that were discarded in Section 4.5.1 below

In Figure 4.3, we show topic clusters for posts and comments from each religious subreddit and illustrate BERTopic clusters for the Islamic subreddit. Similarly, in Figure 4.4, we outline a list of topic labels given to various topic clusters for the videogame subreddit with the most number of topic clusters per religion. A detailed list of the topic labels for other games is provided in Section 4.5.2.

After eliminating extraneous clusters and achieving consensus on topic labeling, we pursued a structured approach to systematically discern sub-themes. The researchers met multiple times to categorize analogous topic labels both within and across various religions and grouped them into overarching themes. An exhaustive enumeration of these sub-themes and overarching themes can be found in Figures 4.10, 4.11, and 4.12.

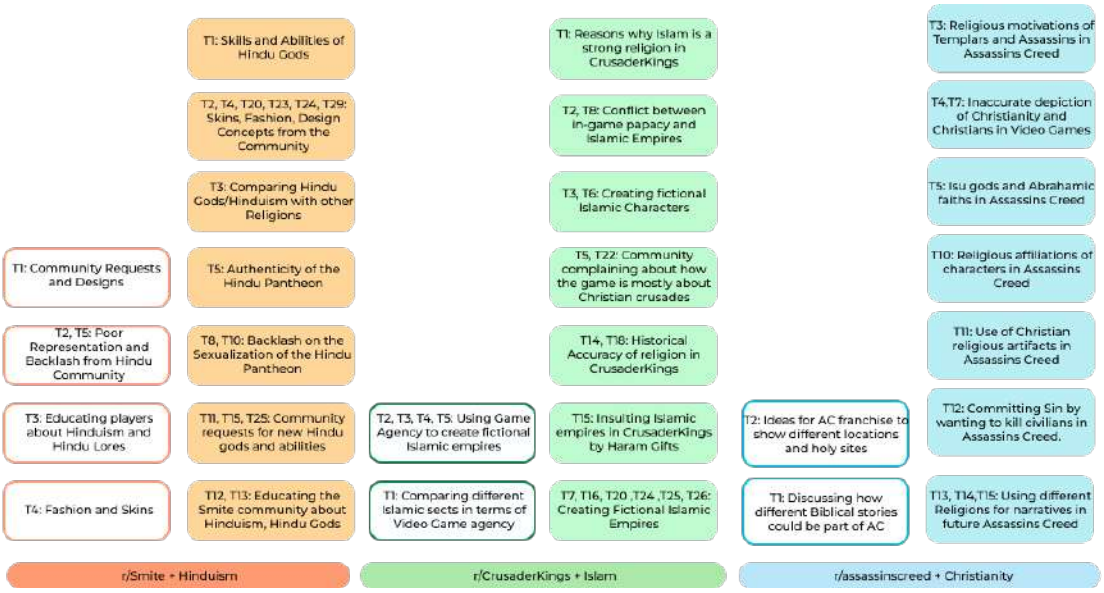

Figure 4.4: Different Topics Identified from the Videogame Subreddits Discussing Religion. Outlined boxes indicate topics from posts, while colored boxes indicate topics identified from comments.

4.5.1 Discarded Topics

Tables 4.2, 4.3, 4.4 list the topics discarded from the religious subreddits, while Tables 4.5–4.6, 4.7–4.10, 4.11 list topics discarded from the videogame subreddits.

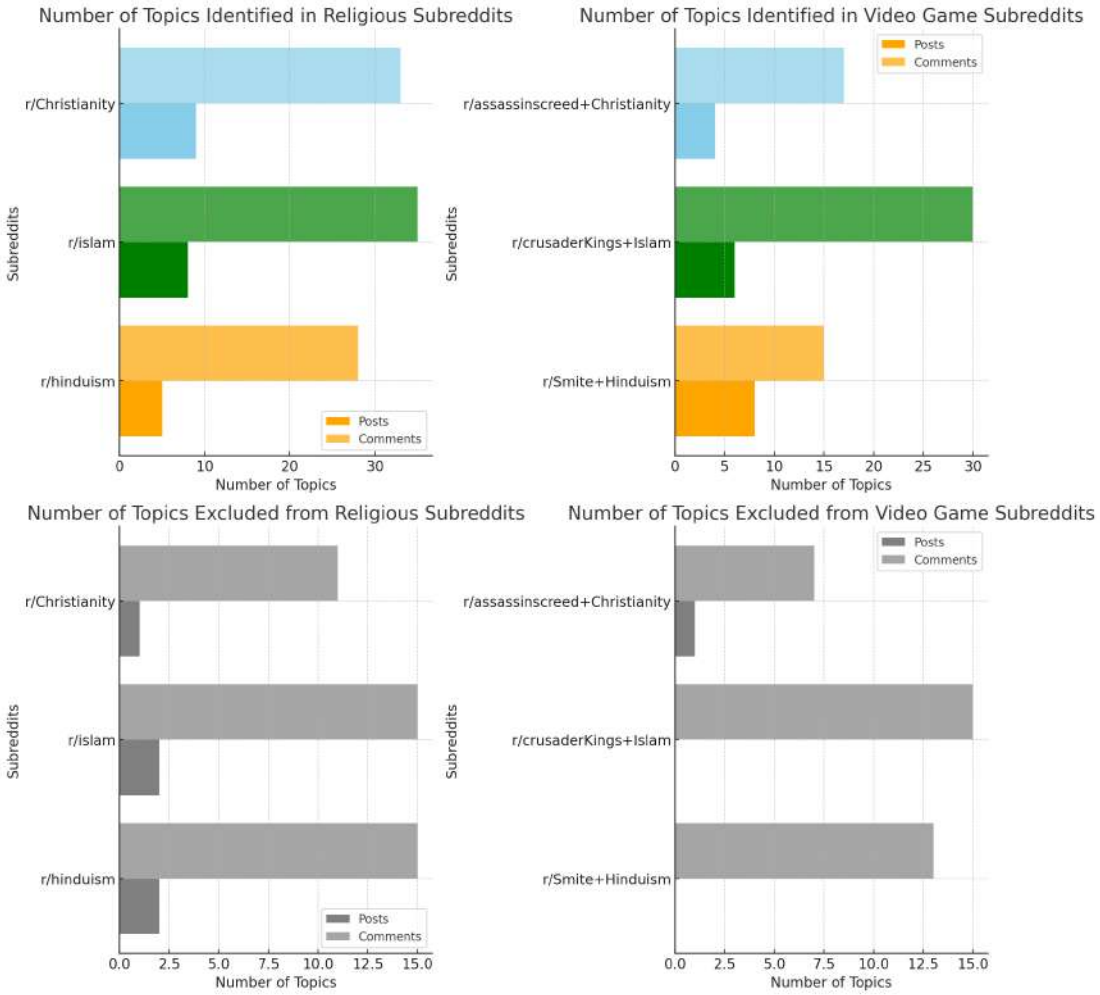

Figure 4.5: Top Row: Number of topics from Posts and Comments identified by BERTopic; Bottom Row: Number of topics excluded by researchers

Subreddit + Query	Posts/Comments	Excluded Topic Label
r/hinduism + Videogames	Post	Understanding the Hindu Caste System
		Dice Game in the Mahabharata
	Comment	Maya, Moksha are games of god
		Shiva controls Nature of Souls and Karma
		Depiction of Shakuni, and other characters in Mahabharat
		Stories behind Vishnu Avatars
		Youtube Links to prayers
		Understanding Puranas, and ancient texts
		Introduction to Hinduism
		Debates around the existence of God
		Understanding Hinduism and Hindu Gods
		Challenges in Meditation and Yoga
		Understanding attachment and detachment
		Importance of Gurus, and Rishis
		Youtube links to Religious sermons
		Commentry on the Gita (Hindu Holy book)
		Hindu rituals

Table 4.2: Topics discarded by researchers after topic modeling on the r/hinduism subreddit when queried for videogames.

Subreddit + Query	Post/Comment	Excluded Topic Label
r/islam + Videogames	Post	Rules during Ramadan
		Struggles with Islam and Social Media
	Comment	Discussions regarding Pet Ownership in Islam
		Understanding Islamic Values
		Permissibility of watching Anime
		Parents role in teaching Islam
		Islamic perspectives in watching TV
		Preferences of PS5 over Xbox
		Nostalgia discussing PS1 era games
		Reading Manga is Haram
		Islam position on cinema
		Challenges faced by young Muslims
		Understanding Haram
		Benefits of studying the Quran
		Right ways to practice Islam
		Views of different Islamic scholars
		Youtube videos of Islamic Scholars and Islamic Sermons

Table 4.3: Topics discarded by researchers after topic modeling on the r/islam subreddit when queried for videogames.

Subreddit + Query	Post/Comment	Excluded Topic Label
r/Christianity + Videogames	Post Comment	Influence of Christianity on US politics Should Christian Prayers be allowed in schools Personal Stories of faith and miracles by Jesus Favorite videogames of people The impact of mobile phones on Christianity Game setups, and preferences of players Nintendo vs PS4 vs Xbox Gender Representation in Videogames Influence of Media Cinema on Christianity Discussions regarding various RPGs Games bringing up Nostalgia Prasies to Jesus

Table 4.4: Topics discarded by researchers after topic modeling on the r/Christianity subreddit when queried for videogames.

Subreddit + Query	Post/Comment	Excluded Topic Label
r/smite + Hinduism	Post	
	Comment	Message Systems in Smite
		Discussing Hi-Rez employees on Reddit
		Various Smite Leaderboards
		Smite championship and tournaments
		Smite server performance
		Bots spamming Smite discord server
		Unprofessional responses by Hi-Rez employees
		Christmas celebrations
		Irish accents being used in games
		Xbox glitches
		Patches and Bugs in Smite
		Closest server to India
		Casting Gandhi in the game
r/crusaderkings + Hinduism	Post	Dragons in the Game
	Comment	Graphics in CrusaderKings
		Comparing CK2 and CK3
		Appreciation for CK3 developers
		Real life politics in various countries

Table 4.5: Topics discarded by researchers after topic modeling on various videogame subreddits when queried for Hinduism (Part 1 of 2).

Subreddit + Query	Post/Comment	Excluded Topic Label
r/civ + Hinduism	Post	
	Comment	Warfare in Poland
		Role of Gandhi in CIV
		Advantages starting out as India in CIV
r/DestinyTheGame + Hinduism	Post	Explanation of Characters in the Game
		Connection between Rasputin and darkness
	Comment	Speculation of ending the Destiny the game series
		Theories in Destiny
		Developers of Destiny
r/leagueoflegends + Hinduism	Post	Comparing RPGs like Smite/DoTA/LoL
		Game Client issue with
	Comment	Youtube links of Gameplay
		Issues with slow servers

Table 4.6: Topics discarded by researchers after topic modeling on various videogame subreddits when queried for Hinduism (Part 2 of 2).

Subreddit + Query	Post/Comment	Excluded Topic Label
r/crusaderkings + Islam	Post	
	Comment	Cussing in Game
		Cool missions in Crusader Kings
		Peasant revolts in Crusader Kings
		French Empire in Crusader Kings
		Indian Empires in Crusader Kings
		AI powers and capabilities in Crusader Kings
		Issues with vassel succession in Crusader Kings

Table 4.7: Topics discarded by researchers after topic modeling on various videogame subreddits when queried for Islam (Part 1 of 4).

Subreddit + Query	Post/Comment	Excluded Topic Label
r/crusaderkings + Islam		Viking Conquests and English Empires
		Trade routes in Crusader Kings
		Comparing CK2 and CK3
		The importance of having History in CK
		Glitches in Crusader Kings
		Strategies for hostility in CK
		People discussing playtimes

Table 4.8: Topics discarded by researchers after topic modeling on various videogame subreddits when queried for Islam (Part 2 of 4).

Subreddit + Query	Post/Comment	Excluded Topic Label
r/civ + Islam	Post	Gold Production in various cities
		Different modular units in Civ
	Comment	Issues with graphics and DLC in Civ
		Female leaders in Civ
		French revolution in Civ
		Different levels of expertise in the Civ

Table 4.9: Topics discarded by researchers after topic modeling on various videogame subreddits when queried for Islam (Part 3 of 4).

Subreddit + Query	Post/Comment	Excluded Topic Label
r/crusaderkings3 + Islam	Post	Planning for a Discord event
		Strategies for Portugal achieving dominance
	Comment	AI dominance in Crusader Kings 3
		Strategies for playing CK2 and CK3
		Combat reworks in new CK3
		People sharing CK3 gameplay and experiences
		Strategies for creating new kingdoms in CK3
r/assassinscreed + Islam	Post	
	Comment	Spanish Backdrop in AC
		East India company and British Empire in AC
		Comparing AC1 and AC2
		Poor DLC, graphics, and narration in AC
		Disappointment with game size and lack of history
		Stealth Mechanics in AC
		American Civil War in AC
r/dota2 + Islam	Post	
	Comment	Russian Players in Dota2
		Requesting support for items to buy in Dota2
		Travelling and living in Singapore as a gamer
		Valves mishandling of events in China
		FPS drops in Dota2

Table 4.10: Topics discarded by researchers after topic modeling on various videogame subreddits when queried for Islam (Part 4 of 4).

Subreddit + Query	Post/Comment	Excluded Topic Label
r/crusaderkings + Christianity	Post	Keyboard shortcuts in Crusader Kings
	Comment	Players sharing gameplay screenshots
		Language and movements of characters
		Comparing features and DLC
		Knight mechanics in Crusader Kings
r/smite + Christianity	Post	
	Comment	
r/assassinscreed + Christianity	Post	Differences in AC1 and AC2
	Comment	DLC and Graphics in AC1
		Poor Narration and Script in AC series
		Reasons why AC is best seller game
		British Empire in AC
		Upcoming Ubisoft games
		Comparing AC1 and AC2
r/crusaderkings3 + Christianity	Post	
	Comment	
r/bindingofisaac+ Christianity	Post	
	Comment	

Table 4.11: Topics discarded by researchers after topic modeling on various videogame subreddits when queried for Christianity.

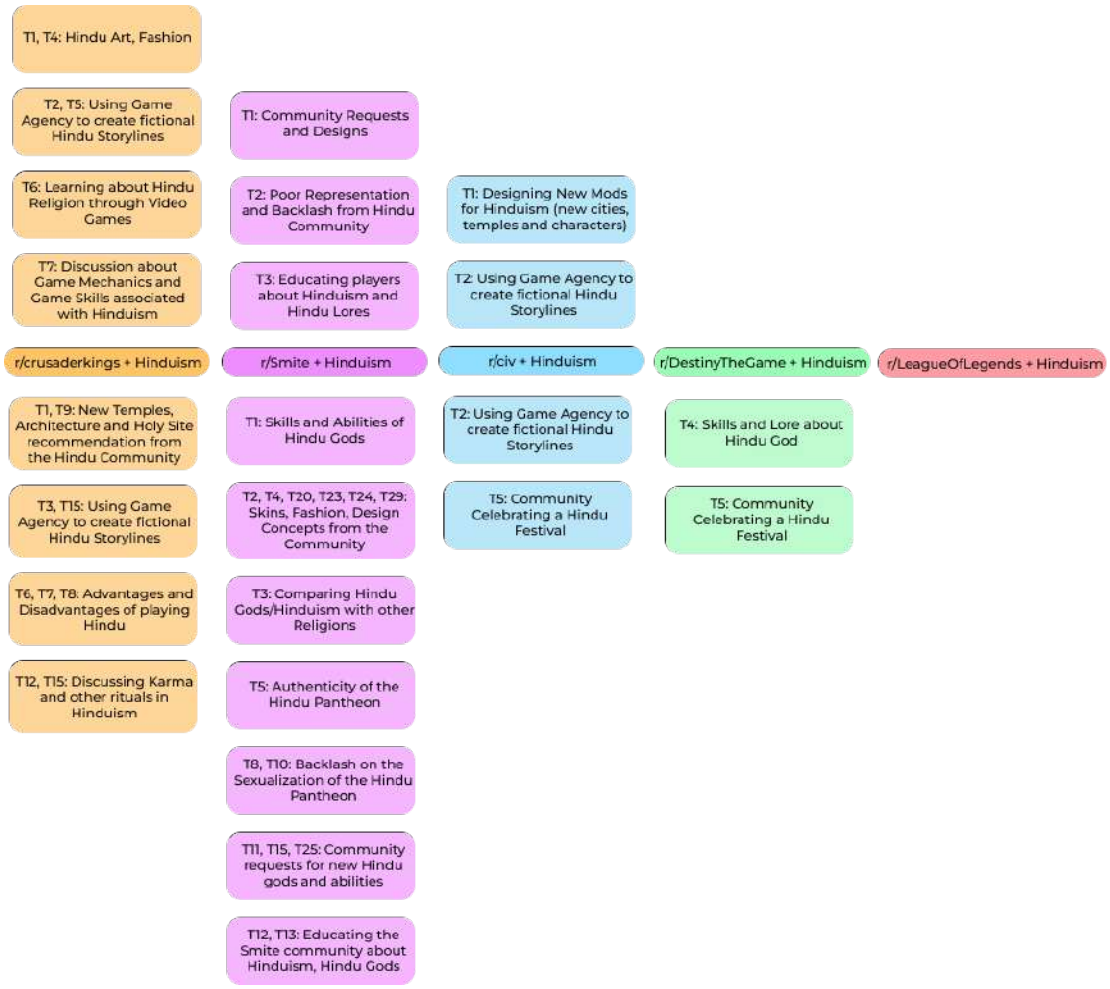

Figure 4.6: Topic Labels from the Videogame Subreddits when queried for Hinduism

4.5.2 Topic Labels for Videogame Subreddits

Topic labels for videogame Subreddits categorized by specific religions are presented below. Figure 4.6 displays the topic labels for videogames associated with Hinduism, ranked by post count. Figure 4.7 showcases those related to Islam, while Figure 4.8 pertains to Christianity. In each of these figures, topic labels positioned above the subreddit name represent posts, and those below denote comments.

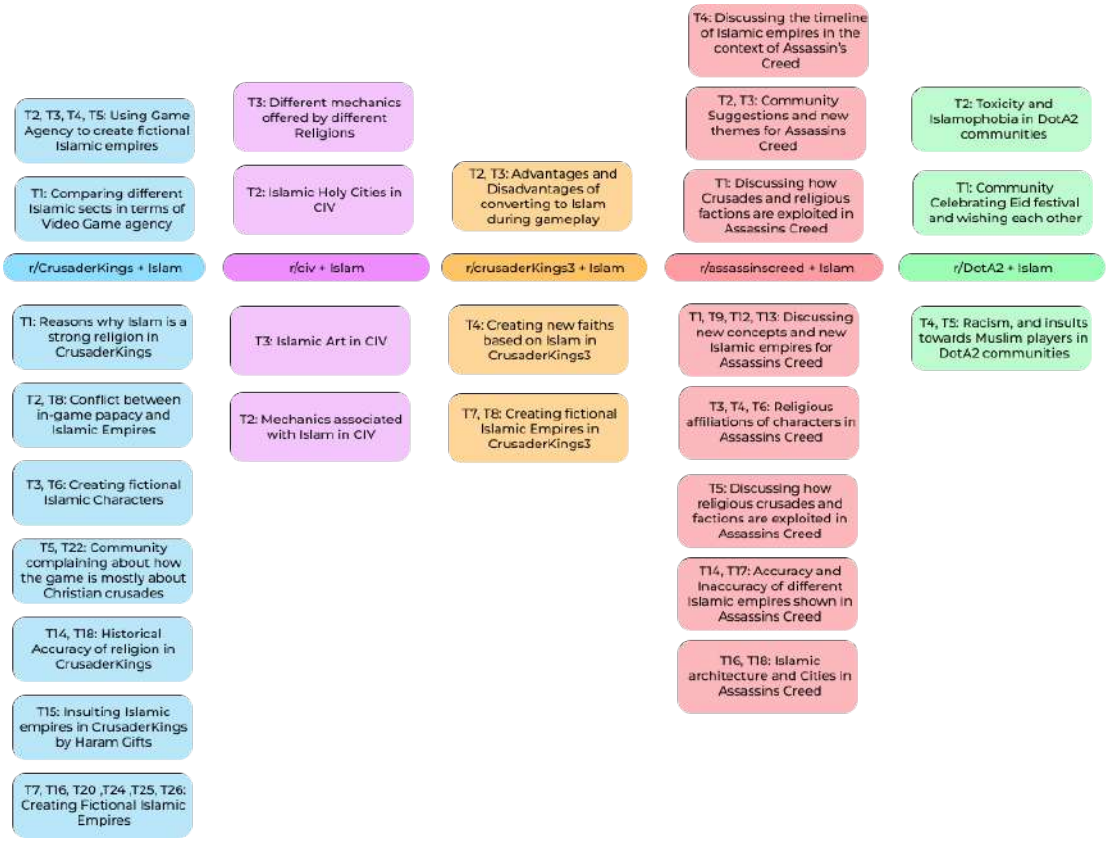

Figure 4.7: Topic Labels from the Videogame Subreddits when queried for Islam

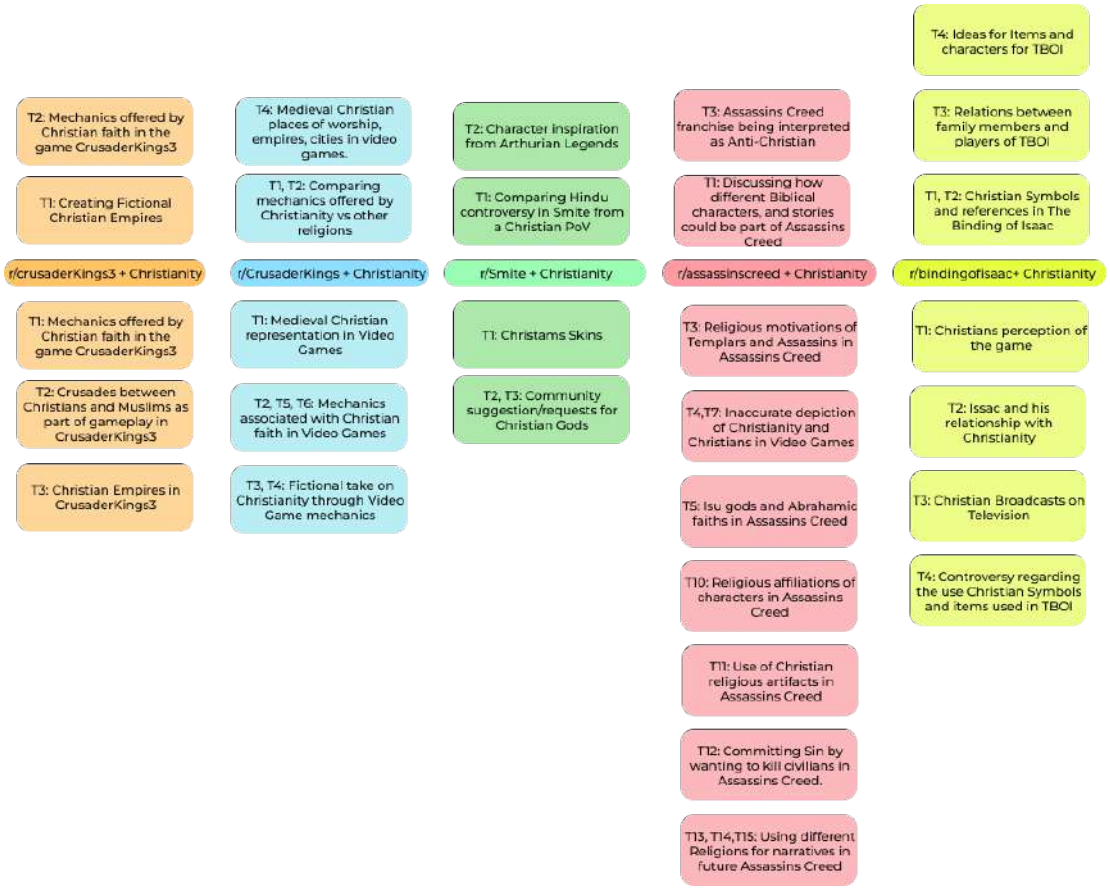

Figure 4.8: Topic Labels from the Videogame Subreddits when queried for Christianity

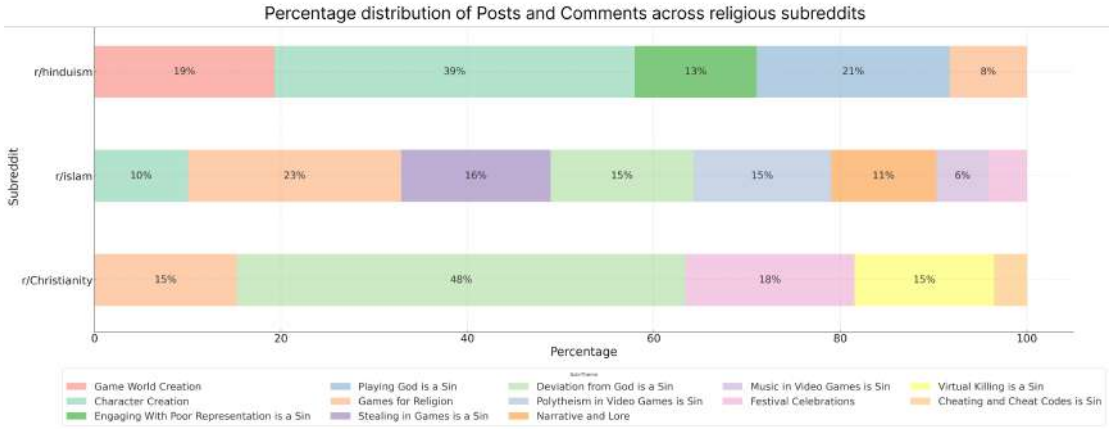

Figure 4.9: Comparing the distribution of subthemes among religious subreddits when queried for videogames

4.6 Results and Discussions

In this section, we communicate empirical findings towards our proposed research questions and provide our insights. To point to specific topics and enable easier referencing while reading, we use the following notation to represent a particular topic:

$$R^{T}_{S.Q}$$

Where:

- R denotes the religion and can take the values H (Hinduism), I (Islam), or C (Christianity).
- T signifies the topic number identified.
- S represents the source of the data, either P for posts or C for comments.
- Q is an optional qualifier that specifies the particular subreddit if the data is not from the primary subreddit of the religion in question. For instance, *.Smite* indicates data from the Smite subreddit.

As an example, $H^{3}_{P.Smite}$ refers to Topic 3 identified from the posts from the Smite subreddit when queried for Hinduism, whereas H^{3}_{C} pertains to comments from Topic 3 identified from the primary Hinduism subreddit (*r/hinduism*) when queried for videogames.

4.6.1 RQ1: What are topics discussed by religious communities and player communities around the intersection of religion in videogames?

Our analysis highlights that conversations within player and game communities about religion and digital play encompass 22 sub-themes. We have organized these into three primary themes: The first set, comprising ten sub-themes, relates to how certain elements in videogames are analogous to religious blasphemy, as depicted in Figure 4.10. The second group, encompassing eight sub-themes, focuses on the design elements in videogames inspired by religious concepts, shown in Figure 4.11. The last cluster, consisting of four sub-themes, revolves around the interplay between religion and games in the context of community building and the utilization of games in religious education, illustrated in Figure 4.12.

4.6.1.1 Blasphemous Elements of Videogames

The topic *"Poor Representation"* is often seen within discussions pertaining to Hinduism. Hindu temples and idols often feature abundant decoration, adhering to specific rituals and scriptures. However, users have noted that games featuring worshiped gods tend to misrepresent these deities, sparking controversy in Reddit communities and in the news[6]. Multiple topic clusters in religious subreddits (H_P^2, $H_C^{14,19}$) and videogame subreddits ($H_{P.Smite}^{2,5}$, $H_{C.Smite}^{8,10}$) have expressed disappointment over the poor or inaccurate representations both from a narrative and aesthetic perspective deities as highlighted in Figure 4.10.

The transfer of deities from religious lore to videogames, while visually controversial, has also been deemed blasphemous due to the act of role-playing as a god. The topic *"Playing with God is a Sin"*, shown in Figure 4.10, encapsulates discussions where users felt that controlling deities and subjecting them to mortality undermined their sacredness. For instance, Ganesha in Hindu mythology is considered a god of peaceful demeanor. However, in the game *Smite* (Titan Forge Games, 2019), Ganesha can engage in combat and be killed by gods from other or the same pantheons (e.g., H_P^2, $H_{C.Smite}^3$). This juxtaposition reignites the "ludology vs. narratology" debate (Frasca,

[6] `https://www.thehindu.com/news/national/ukraine-minister-apologises-for-goddess-kali-tweet-says-we-respect-unique-indian-culture/article66803301.ece`

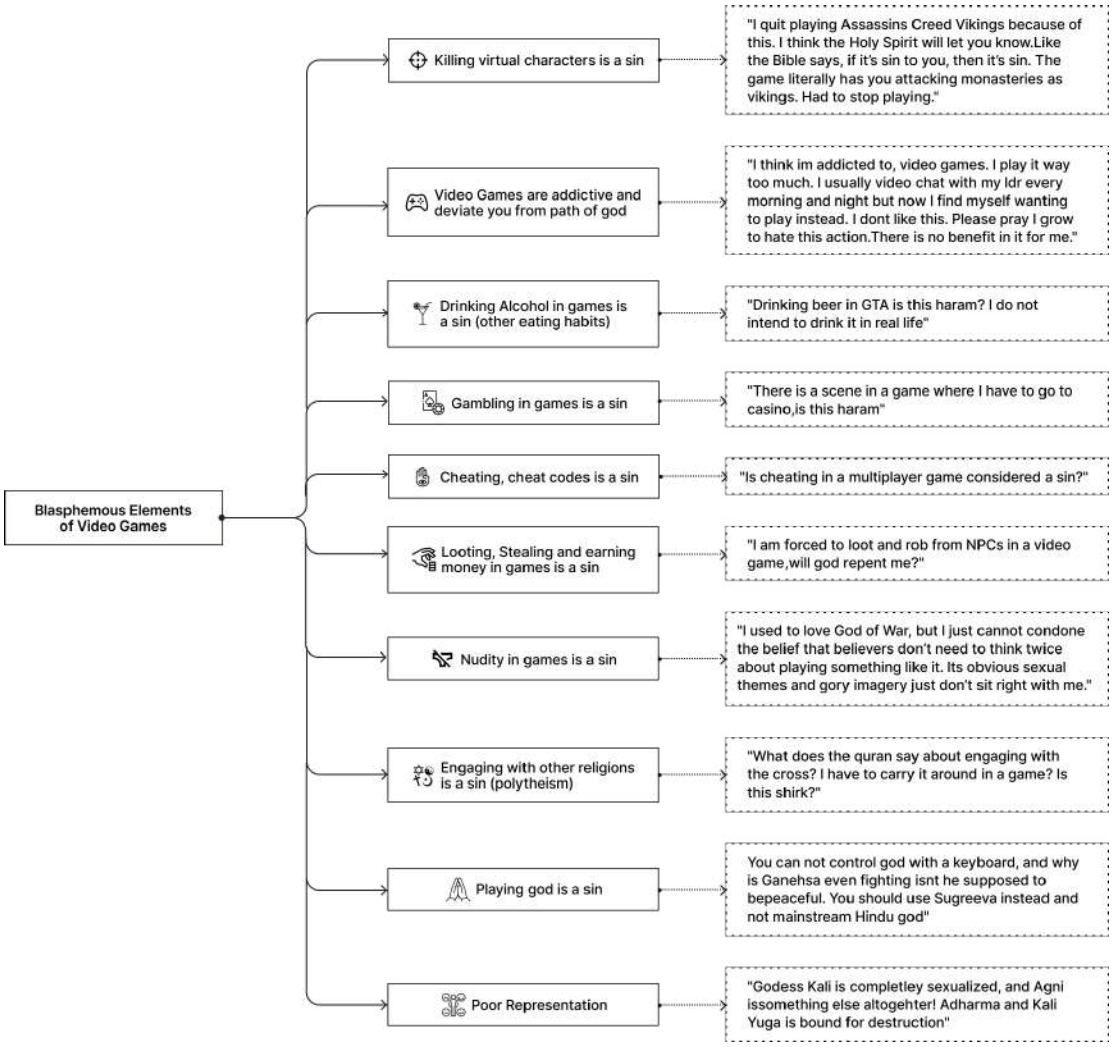

Figure 4.10: Sub-Themes and Supporting paraphrased quotes for Theme 1: Videogames are Blasphemous/Sin/Haram

2003) prevalent in game studies. Ludology prioritizes game mechanics, whereas narratology emphasizes storytelling. In this context, the portrayal of deities in a vulnerable state contradicts their traditionally supreme status, challenging the ludic framework where players control them. This raises questions about the possibility of divine defeat and the appropriateness of allowing players to manipulate deities, thus challenging traditional narratives and disrupting the conventional understanding of divine omnipotence in religions like Hinduism.

Building on the topic *'Playing with God is a Sin'*, discussions pertaining to Islam emphasize how engaging with idols or 'immersing' in role-play of gods from other religions can be treated as'Haram' i.e. the Islamic version of sin. This stems from the Islamic ruling of 'Shirk' which prohibits followers of Islam from engaging in polytheism, or idolatry worship. Games research which often discusses immersion and relating with the character, in this case players relating themselves with religious characters from other religions was seen haram ($I_C^{1,3,24}$). Similarly, visiting Churches in games, engaging with spirits, believing in re-birth, re-spawning or engaging with relics of other religions was also treated Haram as these were forms of Shirk.

Users from both religious and player communities reference the Islamic verse, *"O You Who Believe! Indeed, wine, gambling, idols, and divining arrows (a way of gambling) are evil and of Satan's act; therefore, leave them aside in order that you may prosper"*, to discuss how certain in-game mechanics can be considered haram. This verse ties to the topics in Figure 4.10 which include how *'Drinking Alcohol in games is a Sin'* (I_P^3), *'Gambling in games is a sin'* (I_C^{27}), where players often need to take part in virtual drinking of alcohol, or play games which involve betting and gambling. Similarly, users often refer to the concept of modesty and nudity in Islam, discussing how players' explicit interaction with nudity in games blasphemous against Islamic teachings. This leads to the topics that *"Nudity in games is a sin"* (I_P^4). Despite these haram acts being executed virtually, the argument was that players were engaging in it willingly – explicitly. Such discussions illuminate the complex interplay between religious beliefs and the virtual experiences offered by videogames.

The discussed ways of engaging in haram activities in videogames are unified by the notion that these games and their in-game activities can divert players from the

path of God and worship. Moreover, religious communities extend this discussion to the general concept of videogames being addictive and potentially leading players away from the path of devotion and worship resulting in the topic *"Videogames are addictive and deviate you from the path of god"*. Topic clusters ($I_C^{11,14,16}$, I_P^7) discuss how a core aspect of Islam is the commitment to service and engaging in prayer to Allah. Users express concerns that videogames, by their very nature, might prevent individuals from fulfilling their religious duties and hinder their involvement in meaningful societal and spiritual activities. This perspective echoes Islamic teachings, such as the *Hadith* that emphasizes moderation in all things and warns against excessive indulgence in activities that distract from religious obligations as highlighted in Figure 4.10.

Certain ways in which games can be deemed blasphemous were common across the Christian and Islamic subreddits. We identified topic clusters (C_P^1, C_C^6,$I_{C.Assassin'sCreed}^{12}$) that delve into the debate over whether the killing and shooting of virtual characters constitute a sin, leading to the topic *"Killing Virtual Characters is a Sin"* as depicted in Figure 4.10. Mirroring the conversations in Islamic subreddits with regards to *Hadith*, Christian-focused discussions (C_C^{16}, C_P^9, C_P^1) critique videogames as sinful for promoting time wastage, deviating individuals from religious obligations, fostering addiction, and detracting from the essence of life. Similarly, akin to the designation of cheating as haram in Islamic discourse, Christian subreddits engage in discussions (C_P^4, C_C^{23},I_P^6) on how cheating in multiplayer games, piracy, and hacking are considered sinful activities since they spoil the fun of other players, or do not respect the effort and hardwork put in by people.

This section touches upon the view of how different communities might perceive videogames as offensive or sinful. In the next section, we discuss how videogames embed various religious elements, how players leverage those religious elements, and how players, developers, and religious followers leverage the Reddit community to discuss the use of religion for developing videogames.

4.6.1.2 Religion as a Design Space for Videogames

Religion offers a rich source of characters, assets and narratives that enhance gameplay, as demonstrated by popular titles such as Assassin's Creed (Ubisoft Montreal,

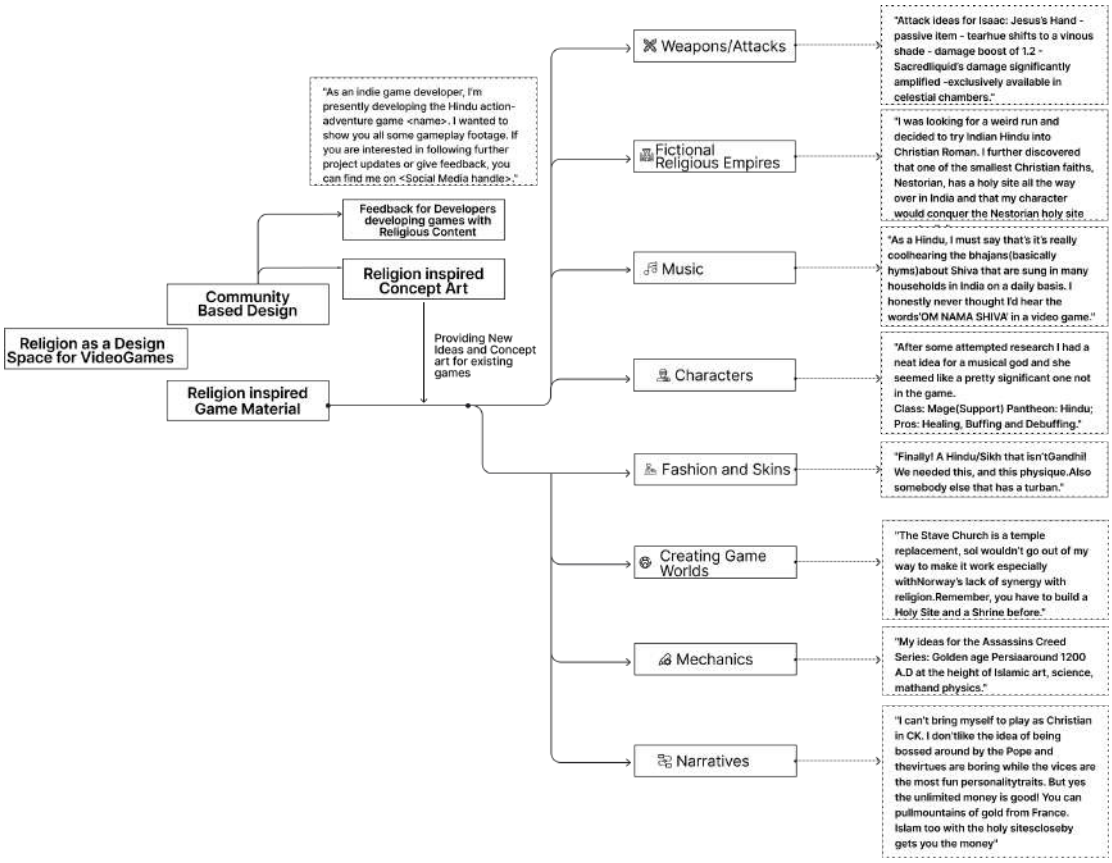

Figure 4.11: Sub-Themes and Supporting paraphrased quotes for Theme 2: Religion acts as a Design Space for Videogames

2007), Razi (Nodding Heads Games, 2020b), and others. This section explores how individuals perceive this design space, generate new ideas, and discuss the incorporation of religious elements in game design. Our analysis divides the discussion on religion and design on Reddit into two main categories: (a) Community Engagement on Design and Religion, and (b) Religious Inspired Game Material, as illustrated in Figure 4.11.

In the broader theme of *Community Discussions on Design and Religion*, we notice how Reddit serves as a platform enabling developers and designers to seek validation, recommendations, and feedback for their religiously themed games (H^1_P, C^7_P, I^1_P). Figure 4.11 highlights instances of indie developers engaging with religious subreddits to showcase games under development with Hindu themes, seeking input and ideas from the Hindu community. These showcases are often met with appreciation, criticism or the community recommending changes in the game being built.

Furthermore, certain topic clusters in videogame subreddits ($H^1_{P.Smite}$, $H^{11,15,25}_{C.Smite}$, $I^{2,3}_{P.Assassin'sCreed}$, $I^{1,9,12,13}_{C.Assassin'sCreed}$, $C^4_{P.BindingofIsaac}$) revolve around the generation of new ideas and modifications for new gods, religious relics, and narratives in the respective games. These discussions culminate into the topic of *"Religion Inspired Concept Art"* as shown in Figure 4.11. The community frequently employs the term "Concept Art" to refer to designer's or user created illustrations of proposed ideas of religious elements to enhance the game.

The engagement of community members in the development of concept art paves the way for our second major topic - *"Religion-Inspired Game Material"*. In this context, community members engage in discussions about the incorporation of religious elements in games. They share their views, offer suggestions to studios regarding desired features in future game versions, and analyze the unique contributions of various religious elements within games (but not necessarily design or create these elements). For example, clusters within religious ($H^{1,5,6}_C$) and videogame communities ($H^{11,15,25}_{C.Smite}$) have shown users interested in the addition of more religious characters in the game Smite (Titan Forge Games, 2019), and have encouraged the designers of Assassin's Creed to include narratives and characters from the Islamic Golden Age. This interest is depicted in Figure 4.11 under the categories of *"Narratives"* ($H^{5,12,13}_{C.Smite}$, $I^{14,18}_{C.CrusaderKings}$, $C^1_{P.AssassinsCreed}$, $H^5_{P.Smite}$) and *"Characters"* ($H^1_{P.Smite}$, $C^1_{P.Smite}$, $C^2_{C.Smite}$). During

the discussion around the inclusion of new characters, we also noticed conversations around *"Weapons and Attacks"* inspired by religious lore, as shown in Figure 4.11. These discussions cover weapon systems that include godly attacks based on associated narratives (e.g., water, fire) or special swords and other weaponry from religious stories.

Another theme closely related to Characters is how religion inspires *"New Skins and Fashion Elements"* for these characters. Disguise, clothing, and skins play a crucial role in storytelling and enhancing player engagement. Discussions across subreddits reveal users talking about new character skins often derived from cultural practices and religious festivals ($H^{1,4}_{P.CrusaderKings}$, $H^{2,4,20}_{C.Smite}$, $C^{1}_{C.Smite}$). Religious festivals such as Diwali, Ramadan, and Christmas have prompted the introduction of new character skins in games like Crusader Kings (*Crusader Kings*, 2004) and Smite (Titan Forge Games, 2019), as illustrated in Figure 4.11.

Designing immersive game worlds is another essential aspect of game development, where the game environment plays a pivotal role in storytelling and offering players a transcendent experience. The community has made multiple references ($C^{7,14,17}_{C.AssassinsCreed}$, $I^{1,9,2,13}_{C.AssassinsCreed}$) to religious buildings, holy sites, and even proposed new locations for game settings, as discussed under the topic *"Creating Game Worlds"* in Figure 4.11. For example, members in the Assassin's Creed community share an exquisite list of mosques that might add value to the game, or how games like Civilization (Firaxis Games and Aspyr, 2010) can include temples in Hindu empires to increase engagement.

Additionally, music within these game worlds enhances immersion, with discussions around the inclusion of Islamic Adhan and Namaz in Assassin's Creed (Ubisoft Montreal, 2007) and Hindu and Christian hymns in the background scores of games like Smite (Titan Forge Games, 2019) and Crusader Kings (Paradox Development Studio, 2020), as shown in Figure 4.11.

Beyond the realms crafted by game studios, titles like Crusader Kings (*Crusader Kings*, 2004) and Civilization V (Firaxis Games and Aspyr, 2010) grant players the ability to construct their own empires, deeply influenced by religious dynamics. This empowerment enables players to select their preferred religions, leading to the establishment of imaginative religious empires. Discussions ($H^{3,15}_{C.CrusaderKings}$, $H^{2}_{C.civ}$, $I^{2,3,4,5}_{P.civ}$,

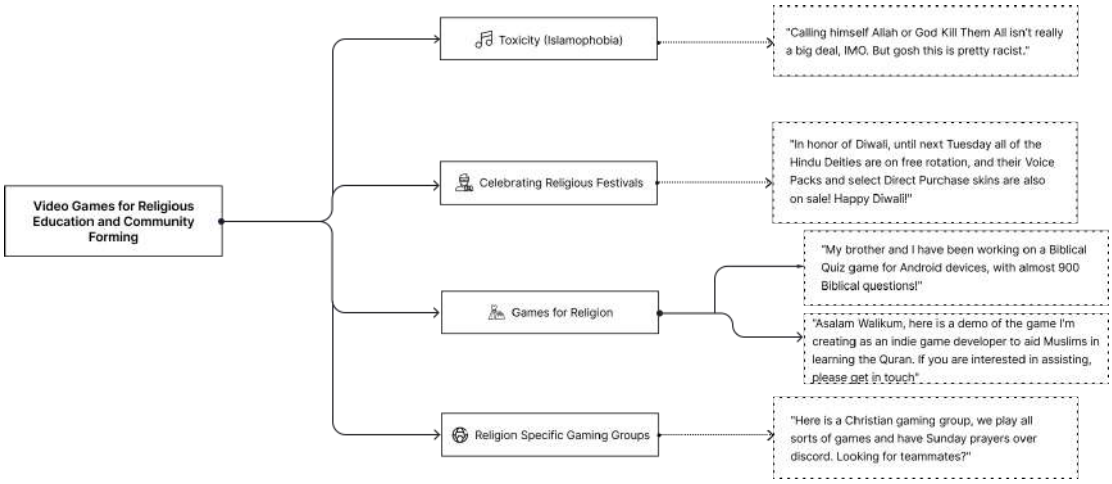

Figure 4.12: Sub-Themes and Supporting paraphrased quotes for Theme 3: Videogames for Religious Education and Community Forming

$I^{3,6}_{C.civ}$, $I^{4}_{C.CrusaderKings3}$, $C^{1}_{P.CrusaderKings3}$) highlight how players have been creating experimental and fictional religious states, such as a 'Hindu Roman Empire' or a 'Muslim Greece'. These creations represent a playful reinterpretation of historical empires, as emphasized in the topic *"Creating Fictional Empires"* in Figure 4.11.

In the above paragraphs, we have essentially discussed how Reddit communities come together to create engaging discussions to foster game design in various aspects. These conversations are interesting to understand as they inform designers what players are looking for, and also with users sharing ideas provide a pool of inspiration, feedback, and constructive criticism for developing better games. In the subsequent sections, we explore how religion and videogame communities have discourse on religious inclusion, help community members strike a balance between gaming and religion, and finally even engage in religion-specific game community building.

4.6.1.3 Videogames for Religious Education and Community Forming

In Section 4.6.1.1, we saw users widely discuss how videogames affect the way one practices religion (in a negative way). But today, games are a new form of media and learning, and vast members of the community discuss how videogames can help practice their religion or how videogames can be played along with practicing religion.

In this section, we discuss how the religious community and videogame community come together to discuss the use of videogames for religious community formation, suggest games that are religiously inclusive, and build games for religious education.

Research has demonstrated that games serve as an effective learning tool. Developers and religious scholars alike have recognized the potential of videogames to educate young individuals about religion. Discussions ($H_C^{5,6}$, $I_C^{2,4}$, $C_C^{7,14,9,19,22}$) on religious subreddits reveal users posting and engaging in conversations about games designed to teach religious content, support evangelism, and even integrate videogames into places of worship. It has been observed that developers frequently consult with religious communities to ascertain which aspects of religion should be emphasized in the design of religious education games. Given the community's vested interest in promoting a specific religion, calls for collaboration in the development of religious videogames are common. Individuals well-versed in religious matters often suggest compelling themes for religious games, or quiz questions for developers to include, as illustrated by the theme *"Games for Religion"* in Figure 4.12.

Games developed with religious content address blasphemous elements, as discussed in Section 4.6.1.1. To address these concerns, members of religious communities (I_C^2, $I_C^{5,8,21,22}$, $C_C^{12,13,25}$) have sought assistance from their communities to identify games compatible with their faith and offer guidance on overcoming videogame addiction. For example, discussions have centered on enabling Muslims to engage with halal games that avoid haram content or Christian communities suggesting players play bible-friendly games, with no violence.

Gaming communities, comprising players from diverse religious backgrounds and affiliations, unite to celebrate religious festivals such as Ramadan ($I_{C.DotA2}^1$) and Diwali ($H_{C.Civ}^5$, $H_{C.Destiny}^5$). These occasions are marked by posts extending holiday greetings to fellow gamers, as shown in Figure 4.12. The acknowledgment of festivals within these communities not only recognizes players of different faiths but also serves an educational purpose, as many posts explain the reasons behind these celebrations and the associated lore. Moreover, it's noteworthy that gaming communities, which include employees from various studios, leverage these festivals for marketing purposes and to generate interest in new items designed specifically for these occasions, as depicted in

Figure 4.12.

Users in religious communities often share the same religious background and look for other gamers who share their beliefs, to form teams, and create a community of gamers within their religion. We noticed posts and responses to these posts (I_C^9,C_C^{12}) where religious games share Discord servers, and aim to create gaming spaces for specific religions. While what happens within these communities is a research study on its own, briefly exploring the community guidelines of these discord servers indicated, members of the server share insights about various games, discuss religion, and aim to create player teams within their religious circles or those familiar with their religious practices.

In this section, we addressed the question: What do different communities discuss regarding the intersection of religion and videogames? We elaborated on all 22 topics, supplementing them with supporting quotes gathered from various subreddits in Figures 4.10, 4.11, 4.12. Often, we included religious rulings analogous to these topics. However, despite these topics, it is important to understand how the religious community and player community differ in terms of how and what topics they discuss. In the subsequent section, we provide a reflexive analysis into how various topics differ across various communities and the relationships between topics.

4.6.2 RQ2: How do we interpret topics across communities? What are the similarities and differences?

While the identification of topics from the Reddit discourse in itself could stand as a contribution to the gaming community, we find it crucial for designers and researchers to grasp the relationships among these topics and recognize the prominence of certain topics within specific communities. Therefore, in Section 4.6.2.1, we illuminate the connections between different topics. Furthermore, in Section 4.6.2.2, we examine the frequency of occurrences and explore the reasons behind variations in topic distribution across different communities.

4.6.2.1 Relationships between Topics:

In the context of using religion as a design space, there was evident excitement and interest among users from both player and religious communities in seeing

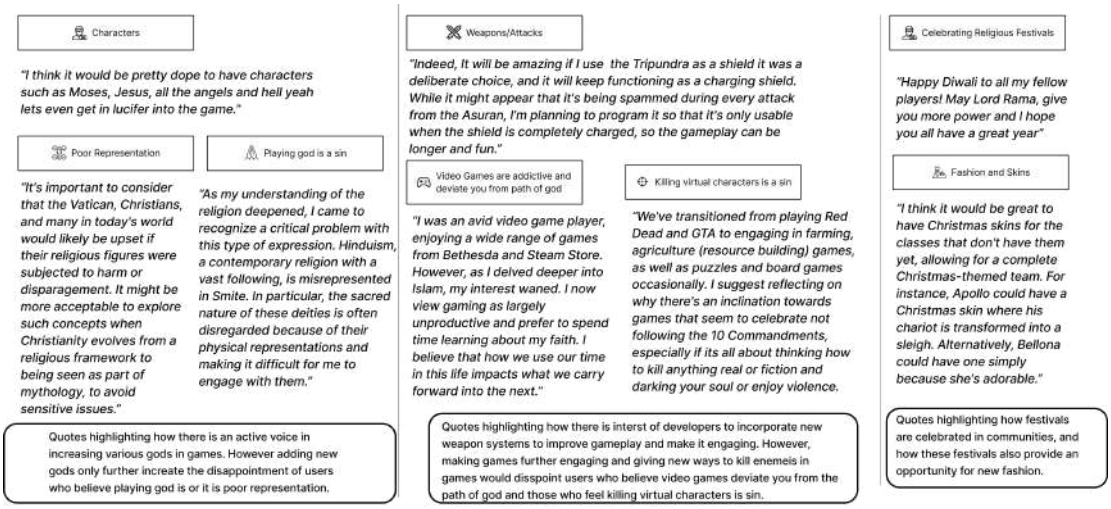

Figure 4.13: Quotes from Users highlighting relationships between topics

characters and narratives drawn from religious lore. However, as shown in Figure 4.13, this enthusiasm was often met with dissatisfaction in the religious subreddits. While the idea of introducing religious characters is intriguing, designers and researchers must carefully navigate the depiction of worshipped gods being harmed or killed, considering the potential reactions and responses from players who adhere to the respective religions. Simultaneously, the introduction of new gods and religious characters from various religions, although exciting, could create dissatisfaction among certain sections of the Muslim community, where polytheism and engagement with gods from other religions are viewed as sinful.

Similarly, within game subreddits, users shared concept art for various fashion elements from different religions to be included in videogames. However, as shown in Figure 4.13, there's a risk of misrepresenting gods, goddesses, and places of worship when designers incorporate their own elements into these religious entities, potentially causing offense. In the realm of fashion and skins, player communities actively discuss various styles and skins associated with religious festivals. Figure 4.13 reveals that games like Smite (Titan Forge Games, 2019), Assassin's Creed (Ubisoft Montreal, 2007), and Civilization (Firaxis Games and Aspyr, 2010) often launch special fashion elements to commemorate festivals such as Diwali, Halloween, and Ramadan, often

offering discounts on these items during the festive periods. This approach draws a parallel between how videogames and religious groups celebrate festivals, with games seizing these occasions to introduce new fashion elements and game aesthetics.

Discussions on using religion as a design space in games highlight the potential for new narratives, lore, and weapon systems. For instance, there have been conversations about the possibility of gods from different religions interacting within a game and the creation of fictional religious empires through game agency. However, Figure 4.13 reveals mixed feelings among users regarding how games often alter the narrative lore associated with gods, leading to perceptions of poor representation and inaccurate depictions. While the introduction of religious characters can bring a variety of new weapon systems and game mechanics, those who view elements in games as blasphemous argue against the use of any weapon system or killing mechanic, seeing virtual character killing as a sin.

Moreover, the incorporation of mechanics, weapons, fashion, and characters, though potentially making games more engaging and increasing playtime, also raises concerns about gaming addiction. This is seen as sinful by some users, as it distracts from religious duties and devotion. There's also a similar conflict in how some users enjoy sharing religious-themed music to enhance the gaming experience, while others view listening to music as sinful and advocate for muting games to avoid what they consider to be sinful. These contrasting viewpoints illustrate the complex relationship between religious beliefs and gaming experiences, where the integration of religious elements can be both enriching and contentious.

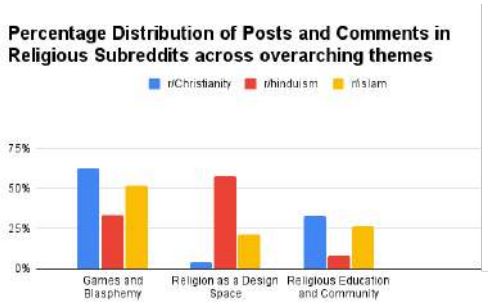

Figure 4.14: Distribution of overarching themes in religious subreddits

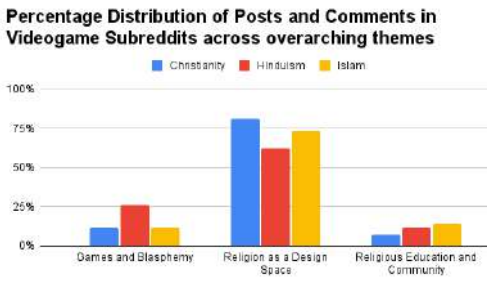

Figure 4.15: Distribution of overarching themes across game subreddits

4.6.2.2 Differences and Similarities:

Figure 4.14 demonstrates that discussions on blasphemy are more prevalent in *r/islam* (52%) and *r/Christianity* (63%) compared to *r/hinduism* (34%). Topics such as drinking alcohol and polytheism are uniquely blasphemous in Islamic discourse as Islamic verses have direct rulings against them which users interpret in the context of videogames. Topics like nudity, killing virtual characters, addiction, looting, and cheating are viewed as blasphemous in both Islamic and Christian contexts, where users often mention how videogames deviate players from the Ten Commandments.

Conversely, the Hindu community uniquely views playing god and poor representation of god as sinful, reflecting the monotheistic ethos of Christianity and Islam. For instance, games like Shin Megami Tensei (Atlus, 2016) or Smite (Titan Forge Games, 2019) do not let you play Allah/Mohammed/Jesus - whereas for Hindus, they actually get to see their worshiped gods in actions. Islam's specific prohibition of idolatry and imagery worship further distinguishes these perspectives. These differences on what constitutes as blasphemy underscore how religious communities interpret and engage with videogames, influenced by their distinct religious doctrines and teachings.

Discussions about utilizing religion as a design space for games are prominent in *r/hinduism* (58%), compared to *r/islam* (21%) and *r/Christianity* (4%), a trend discernible in Figure 4.14 and Figure 4.9. In *r/hinduism*, the majority of this discussion revolves around the incorporation of Hindu deities and themes into videogames. Meanwhile, the Islamic subreddit shows a significant interest in exploring Islamic narratives and lore for videogame content. In contrast, the Christian subreddit exhibits minimal engagement in both character creation and the incorporation of Christian elements into videogames. This variance highlights the diverse ways in which different religious communities perceive and engage with the integration of their religious themes in the gaming world and also the agency of each religion. A further detailed dissection of sub-themes per religion is presented in Figure 4.9 (Section 4.5.2).

Within the broader theme of games for education and community building, Christian subreddits exhibit a higher level of detailed discussions (33%) compared to *r/hinduism* (8%) and *r/islam* (27%), as shown in Figure 4.14. These discussions frequently involve developers engaging with religious communities to brainstorm ideas for

religious-themed games and celebrating festivals. The larger engagement in Christian and Islamic communities also translates to more discussions about forming religious player groups and teams, as well as organizing celebrations for religious festivals. In comparison, such conversations are less prevalent in Hindu communities. This disparity may reflect the varying degrees of community organization, and the adoption of videogames as a religious educational platform. It's crucial to recognize that within the Islamic and Christian religious subreddits, despite a substantial percentage of discussions labeling games as blasphemous, there is still a comparatively higher percentage of conversations about using games as a medium to impart religious education, especially when compared to the Hindu subreddit.

In Figure 4.15, we illustrate the distribution of posts and comments across various player communities in relation to each religion. A notable observation is that game subreddits show a higher proportion of discussions labeled as blasphemous when discussing Hinduism (26%), compared to Islam (12%) and Christianity (12%). This trend is contrary to what we observed in religious subreddits. We suggest this is due to games like Smite, which directly reference and utilize Hindu gods, or Crusader Kings, featuring Hindu empires with inherent god affiliations, leading players to more frequently discuss sin in videogames within this context. In contrast, discussions in videogame subreddits about blasphemy in relation to Islam and Christianity often revolve around how in-game mechanics such as virtual killing, looting, and the use of religious elements like mosques and churches might be perceived negatively in games like Assassin's Creed (Ubisoft Montreal, 2007) or in the Civilization series (Firaxis Games and Aspyr, 2010).

Multiple games, such as Assassin's Creed (Ubisoft Montreal, 2007), often center around the Crusades or have narrative origins in the Middle East, leading to numerous discussions about how game studios can explore new areas, different historical periods, and various empires. In contrast to religious subreddits, where the *r/hinduism* subreddit showed a higher percentage of posts on using religion as a design space for games, within player communities, this trend reverses. Discussions in player communities are more focused on how historical aspects of Islam (74%) and Christianity (81%) can enrich games with a range of mechanics, narratives, weapons, and world-building elements. Specifically, there are discussions about integrating various Islamic and Chris-

tian ages, mosques, locations, and stories into games like Assassin's Creed and Crusader Kings. Within these posts, users often share actual images of various places of worship, discussing why these locations would make interesting inclusions in videogames. This highlights a clear distinction between the religions: discussions on Hinduism often revolve around the introduction of new characters, whereas in Christianity and Islam, they center around architecture and various empires.

Contrary to religious subreddits (as depicted in Figure 4.14), videogame subreddits exhibit significantly fewer discussions about the role of games in community building and religious education. While religious communities often do not experience toxicity within their own religions, player communities, comprising users from multiple religions, inevitably encounter such topics. However, the diverse composition of gaming communities also leads to posts and comments that acknowledge important festivals and discuss the lore associated with them, especially when this lore relates to a specific religious character or place of worship depicted in the game. This duality highlights the unique dynamics in player communities, where discussions range from addressing toxicity to celebrating religious diversity through in-game content.

4.7 Implications

In this paper, drawing inspiration from Mohr (Mohr & Bogdanov, 2013), we have structured our research questions around two key areas: (a) identifying the topics present in our text corpus, and (b) exploring the relationships between these topics and our interpretations of them. To further extend our analysis, we consider a third aspect highlighted by Mohr (Mohr & Bogdanov, 2013): understanding how our work fits as a component within a larger research project. In this context, we position our results with regard to theoretical lenses of religion and what distinguishes us from previous work in religion and digital play.

4.7.1 Implications to Game Research

Our first overarching theme, examining how the presence of religion or certain game mechanics can be perceived as blasphemous, represents a unique contribution to the field of religion and digital play. De Wildt et al. (De Wildt & Aupers, 2017)

briefly touch on how players 'reject' the notion of religion in videogames. This point is further supported by Maram (Maram, Pfau, Dodechani, & Seif El-Nasr, 2023) and Zeiler (Zeiler, 2014), who note the controversy surrounding the game Smite in India due to the depiction of Goddess Kali. While these works highlight the concept of offense, they leave several fundamental questions unanswered, such as: (a) What aspects of games with religious elements do people find offensive? (b) How do individual religions perceive offense through games? (c) Are there differences in opinions between players and religious communities regarding the presence of religion in videogames?

Our work systematically addresses these questions. First, through the topics discussed in Section 4.6.1.1, we identify 10 ways in which various communities might find games offensive. We introduce, for the first time, detailed discussions on how Islamic communities might perceive games as sinful, correlating these views with religious quotes and scriptures. Second, through Figures 4.14, 4.15 and the discussions in Section 4.6.2.2, we highlight differences in areas of perception of sin between religious communities and player communities. For instance, we demonstrate that the Hindu religious subreddit has a lower share of discussions about sin compared to player community discussions, and the reverse is true for discussions pertaining to Islam and Christianity in player subreddits. Finally, across Section 4.6, we illustrate how certain topics show a higher frequency in specific religions, such as the consumption of alcohol being a major issue in discussions related to Islam and almost negligible issue in Hindu subreddits.

Addressing the question "How are religious elements being used in videogames?" is crucial, as it opens up opportunities for designers to create games with engaging mechanics and intriguing characters. Previous researchers have explored how religion has influenced the development of karma systems (Knoll, 2018a), gameworlds (El Nasr et al., 2008), and characters (Mukherjee, 2009). However, in Section 4.6.1.2 of our paper, we expand this understanding by identifying eight distinct ways religious elements can influence gameplay. While some topics like characters, gameworlds, and mechanics may align with findings from previous research (Maram et al., 2022b; El Nasr et al., 2008; Mukherjee, 2009), our work provides new insights. We delve into themes such as fashion, music, and weapons, and explore how players engage with religion by creating fictional religious empires, offering a broader perspective on the integration of religious

elements in videogames. By a comparative analysis we also bring out specific areas of interest for each religion, for instance, we notice Hinduism related discussions primarily talk about borrowing characters while Islamic subreddits talk about the Islamic golden age and various Islamic narrative that can be used in videogames. Finally, we showcase how game communities and religious communities create conversations about design through indie developers and players suggesting new features. Our work, apart from unpacking the role of religion in game design, highlights design discussions and agency pertaining each religion.

Scholars like De Wildt (de Wildt & Aupers, 2023), Seif El-Nasr (El Nasr et al., 2008), Aupers (Aupers, Schaap, & De Wildt, 2017), and Schaap (Schaap & Aupers, 2017a) utilize interviews with designers and players to understand the rationale behind and perceptions of religious inclusions, often focusing on games like *World of Warcraft* (Blizzard Entertainment, 2004) which isn't primarily linked to active religions. In contrast, scholars like Masso (Masso & Abrams, 2014), Sisler (Šisler, 2008, 2017), Maram (Maram, Pfau, Dodechani, & Seif El-Nasr, 2023; Maram et al., 2022b), and Zeiler (Zeiler, 2014) narrowed their research to specific religions such as Judaism, Islam, and Hinduism, using methodologies like virtual ethnography and interviews with both designers and players within these religious traditions. Others, including Heidbrink (Heidbrink, Knoll, & Wysocki, 2015), Knoll (Knoll, 2018b), and Campbell (H. A. Campbell et al., 2016), adopted a more immersive player-centered approach, documenting in-game mechanics and religious artifacts based on firsthand experiences. In contrast to the aforementioned research, our work adopts a distinct approach by utilizing topic modeling. This method enables us to simultaneously examine multiple games and religions, offering a comprehensive view. This approach also facilitates the connection of various topics, allowing us to report interpretations and provide insights into the dominant discussions across different communities and how topics across the groups relate to each other. Finally, previous studies are predominantly centered around the interpretations of researchers (F. G. Bosman, 2015, 2016c; H. A. Campbell et al., 2016), players (Maram, Pfau, Dodechani, & Seif El-Nasr, 2023; De Wildt & Aupers, 2019; Aupers et al., 2017), and designers (El Nasr et al., 2008; de Wildt & Aupers, 2023; Maram, Pfau, Dodechani, & Seif El-Nasr, 2023), we provide a valuable contribution

by incorporating the perspectives of the religious community and recognizing them as pivotal stakeholders, adding a different perspective.

4.7.2 Theoretical Lenses

Durkheim, while introducing the concept of 'sacred vs profane' (Durkheim, 2016), states - *"Sacred things are those which the interdictions protect and isolate; profane things, those to which these interdictions are applied and which must remain at a distance from the first"*. Other theologians, such as Eliade (Eliade, 1959) and Asad (Asad, 1993), also recognize this dichotomy. From this viewpoint, videogames fall into the profane category, whereas God resides in the sacred. Our topics provide evidence of this dichotomy in the context of videogames, by elaborating on why themes like playing god or including god in games may be perceived as blasphemous. The depiction of polytheistic deities and religious rituals in videogames also blurs this boundary for monotheistic religions, potentially leading to perceptions of blasphemy among adherents. Furthermore, Mahmood (Mahmood, 2005) notes, *"Practices of piety (devotion) are not just about belief but are, culturally and historically specific practices of self-making"*, emphasizing that religious practice transcends mere sequential steps and involves culturally and historically contextualized practices that contribute to individual development at all times. This becomes particularly significant in videogames that include elements like nudity, gambling, and cheating, which directly challenge the norms of modesty and propriety upheld in many religious traditions.

Campbell (J. Campbell, 2008), in their book *The Hero with a Thousand Faces*, state *"Myth is the secret opening through which the inexhaustible energies of the cosmos pour into human cultural manifestation"*. This concept is frequently adopted by game theorists to underscore the significance of 'Myth' in relation to the 'Hero,' both of which are essential components in videogames. Our research highlights discussions among users on how religion can serve as a creative space for designing new 'heroes' and narratives embedded with religious 'myth.' Similarly, authors like Krzywinska (Krzywinska, 2006) and Bateman (Bateman, 2011) explore how game worlds can evoke a sense of myth and engagement, an idea supported by our findings. Our topics point to discussions about the use and request of various churches, mosques, and holy sites in

games, emphasizing how these elements can enhance the gaming experience. Tekinbas describes games as *"systems in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome."* In line with this definition, we observe that discussions among Reddit users often revolve around religious narratives that involve conflict. We also notice conversations about various religiously inspired game mechanics. These mechanics, as reflected in the positive reception by gaming subreddits, add depth to the 'artificial conflict' in games, imbuing them with layers of religious and cultural familiarity.

Scholars like Smith (C. Smith, 2003) and Putnam (Putnam & Campbell, 2012) have noted that communities are often united by shared experiences and a mutual understanding. This concept is particularly evident in the intersection of videogames and religion. We observe through our topics, that religion-specific gaming groups not only facilitate shared gaming experiences but also act as venues for shared religious experiences. This phenomenon leads to a novel form of community building within the digital world. Historically, religious festivals were largely esoteric, primarily understood and celebrated by those practicing the religion (Hanegraaff, 2017). However, the incorporation of religious elements in videogames has changed this dynamic. Nowadays, with the blending of religions in videogames, people from various religious backgrounds and communities are gaining awareness of different festivals and the stories behind them. This integration helps break down the barriers of esoteric knowledge. In these gaming environments, rituals such as dressing in festival attire are reflected through in-game costumes. Additionally, game maps decorated with motifs from various religious festivals allow players to participate in and celebrate these occasions within the gaming community. This not only enhances the gaming experience but also serves as a form of cultural education, enabling players to gain awareness.

4.7.3 Summary

The above chapter irons out how two critical communities i.e. the players and the religious stakeholders perceive the projection of religion in videogames and how videogames become an important conversation in religious communities. The chapter highlights multiple facets that designers find challenging, players find interesting and

devotees find conflicting. The chapter aims to open up conversation between designers, and stakeholders to co-create videogames instead of facing community backlash after the release of certain videogames. Further, by applying theoretical lenses, such as Durkheim's dichotomy of the sacred versus the profane and Campbell's concept of myth, the chapter demonstrates that religious elements in games do more than provide aesthetic flavor. They can inadvertently cause cultural friction, but they also possess a profound capacity to foster shared experiences, break down esoteric knowledge barriers, and build novel digital communities.

While Chapter 4 establishes that religious narratives and elements deeply resonate with players and can serve as powerful tools for cultural education and community building, it primarily focuses on the passive reception and community discourse surrounding existing commercial games. Building upon this understanding of religion's potent influence in digital spaces, Chapter 5 shifts from observational analysis to active application. Recognizing that religious myths, such as ancient scriptural narratives of catastrophic floods, carry inherent moral weight and emphasize humanity's responsibility to nature, the next chapter explores how these sacred frameworks can be intentionally harnessed in game design. Transitioning into "Direction 3: Player Experience with Religion and Digital Play," the focus moves to Shloka, a serious game designed to leverage these deeply ingrained religious rituals and environmental philosophies to actively engage players and drive reflection on the modern crisis of climate change.

Chapter 5

Direction 3: Player Experience with Religion and Digital Play

Verse 1

The waters rose and covered the mountains to a depth of more than fifteen cubits [...] Every living thing on the face of the earth was wiped out; people and animals and the creatures that move along the ground and the birds were wiped from the earth.
- Genesis 7:19-23 (Whitcomb & Morris, 1961)

Verse 2

The fish warned Manu of a coming flood and told him to build a ship. When the flood rose, the fish came, and Manu tied the craft to its horn. [...] Manu, alone of all creatures, survived.
- Matsya Puranam (An ancient Hindu text) (Vasu et al., 1916)

Narratives of great floods and natural disasters are found across most religious texts as illustrated in Verse 1 and Verse 2. Such verses underscore humanity's longstanding recognition of nature's formidable power and the balance between human existence and the environment. These stories from the Bible and Hindu scriptures not only highlight catastrophic events but also serve as tales for moral responsibility, stewardship, and the consequences of human actions on the natural world. In the contemporary era, the parallels between these timeless narratives and the escalating reality of climate change are striking.

Figure 5.1: Various deities, and characters associated with climate identified from the Ethnographic study and their representation and role in the game Shloka.

Religion has historically been a catalyst for social change, mobilizing communities through shared beliefs, values, and collective action (Tucker & Grim, 2001). Religious teachings across cultures have long emphasized the sacredness of nature and humanity's responsibility to protect the environment. Many faith traditions advocate for environmental stewardship as a moral imperative. For example, Christianity promotes the concept of "creation care," highlighting the duty to preserve God's creation (Horrell, 2015). In Islam, the Qur'an refers to humans as stewards (*khalifah*) of the Earth, entrusted to maintain its balance and resources (Nasr, 1968). Hinduism venerates the natural world, considering rivers, mountains, and forests as divine manifestations, and encourages living in harmony with all beings (Chapple, 2003). These religious perspectives not only foster a deep spiritual connection with nature but also provide ethical frameworks that inspire proactive engagement in environmental conservation.

Digital games, particularly serious games, have become powerful tools for communicating complex social and environmental issues, including climate change (Bogost, 2010; Flanagan & Nissenbaum, 2009). By simulating the consequences of players'

choices, serious games provide an avenue to reflect on an individuals relation with climate, making them an effective medium for climate education. There is strong evidence in serious game literature showing that elements like metaphors (Lelardeux, Alvarez, Montaut, Galaup, & Lagarrigue, 2013), narrative familiarity (Gagné, Bell, Yarbrough, & Weidemann, 1985), and immersive storytelling (M.-T. Cheng, Lin, She, & Kuo, 2017) are effective in communicating messages. Religious traditions offer rich sources of immersive narratives, metaphors, and culturally familiar frameworks that could enhance player engagement and learning. However, the potential to leverage religion in serious games—particularly in relation to climate change education—has yet to be fully realized. This disconnect limits the potential of games to foster a deeper, more holistic understanding of climate responsibility through the lens of religion.

Previous researchers from a theological lens have examined how religious scriptures interpret climate and how rituals and festivals hinge on environmental conditions (Lal, 2015; Motswapong, 2022; Jain, 2019; Haluza-DeLay, 2014a), yet these insights have seldom been deployed in interactive media that encourages users to reflect on their relation with climate. Meanwhile, existing religious artifacts in interaction design—such as worship or meditation aids—focus only on personal devotion rather than environmental concerns (Markum, Wolf, Hoefer, & Maas, 2023; S. Wolf, Steinmüller, Mörike, Luthe, & Hurtienne, 2023; Gonsher, Michelson, & Halperin, 2024).

Additionally, many serious games that do address climate change struggle to maintain engagement because they rarely tap into players' cultural or spiritual backgrounds (Castronova & Knowles, 2015; Fjællingsdal & Klöckner, 2020; Bogost, 2016). As a result, the connections between players' lived traditions, their sense of moral responsibility, and the global challenge of climate change remain underexplored. As the focus of serious games shifts towards more localized approaches to climate change solutions, there is growing recognition that effective engagement with environmental issues requires an understanding of local contexts and cultural perspectives. Religion, with its deep roots in local traditions, offers a powerful framework for bridging this gap in serious games.

In this chapter, we introduce *Shloka*, a serious game that integrates Hindu rituals and narratives related to environmental stewardship into its core gameplay. By

embedding religious themes directly into gameplay, we aim to harness both faith and the interactive affordances of serious games, thereby fostering deeper reflection on how individuals of the Hindu faith relate to climate change. Although our work focuses only on the Hindu community, it responds to the growing recognition that 'one-size-fits-all' climate interventions often struggle to address the distinct cultural, social, or geographical factors that shape people's climate perceptions (Reckien & Eisenack, 2013; Salvini et al., 2016; Bontchev, Antonova, Terzieva, & Dankov, 2021). As part of our game development process, we co-designed with stakeholders, and visited religious spaces to bring nuance elements of the Hindu community into the designed serious game.

Scholars working towards climate change from both a religious lens and serious game lens agree reflection on individuals relation with climate is an important precursor to meaningful, sustained behavior change (W. Jenkins, Berry, & Kreider, 2018; Morrison, Duncan, & Parton, 2015; de Witt, 2016; Flood et al., 2018; Eisenack, 2013). In the game Shloka, we hypothesize that when players pause to reflect on how faith-based teachings relate to environmental decisions, it can inspire deeper motivation and help communicate the issue of climate change. For serious games to effectively promote pro-environmental reflection, communication and decision making, they must not only inform players but also sustain their interest and emotional involvement.

To examine these issues, we conducted a research-through-design (RtD) process in creating *Shloka* and carried out a mixed-methods study comparing it to climate-focused serious games lacking religious elements. Based on the above, our study focues on two questions:

- **RQ1:** How does the integration of religious rituals and narratives in a serious game enhance players' *reflection* and *interest* in climate change?

  - *Rationale:* Reflection and interest serve as vital precursors to intentional climate choices (W. Jenkins et al., 2018; Morrison et al., 2015; de Witt, 2016; Flood et al., 2018; Eisenack, 2013). By examining how faith-based storytelling and ritual elements encourage thoughtful engagement, we can discern whether these design strategies lead to more profound insight and emotional investment in environmental issues.

- **RQ2:** How does the integration of religious rituals and narratives in a serious game influence *engagement* and *player experience*?

  – *Rationale:* Engagement and a positive user experience are critical to any serious game's efficacy. If religious frameworks within the game resonate with players' cultural or spiritual identities, they might feel more immersed and motivated to continue exploring pro-environmental themes.

On that pre-text, we make the following contributions:

- **Designing Interactive Systems based on Religious Narratives, and Rituals:** We present the design and development of *Shloka*, a novel serious game that integrates Hindu religious narratives to address climate change. To the best of our knowledge, this is one of the first serious games that aims to teach scientific concepts using religious metaphors.
- **A Replicable Research-through-Design Methodology:** We detail our process of collaborating with cultural stakeholders, conducting ethnographic fieldwork, and engaging in iterative design and playtesting to create *Shloka*. This approach can serve as a framework for future endeavors that seek to develop religion-based or culturally relevant climate games in other contexts.
- **Enhanced Player Engagement and Reflection through Religious Elements:** We provide evidence on the effectiveness of religion in enhancing player engagement and promoting reflection in the context of climate change. We highlight how rituals and narratives associated with religion might foster greater engagement with climate change compared to other popularly used serious game mechanics for climate change.

Acknowledgment: I would like to thank my co-authors: Dr. Johannes Pfau, Yash Malegaonkar, Niveditha Dudyala and Dr. Magy Seif El-Nasr for their support in helping me conduct studies and their valuable advice on the accepted publications at ACM DIS 2025 and ACM CHI PLAY 2024.

5.1 Methodology

We take a research through design approach in developing and evaluating our game Shloka. As illustrated in Figures 5.2, 5.6, and 5.15. Me (the dissertation writer) and the second author of this study, are practicing Hindus. I embarked on visits to two prominent Hindu temples: the Tirumala Tirupati Balaji Temple in Andhra Pradesh, India, and the Sabarimala Ayappa Temple in Pamba, Kerala. These temples, renowned for their high visitor numbers, are situated on hills and typically require devotees to walk to reach them. Notably, the Tirumala Temple offers car services for reaching the temple top, a facility absent at the Sabarimala Temple. To conduct a thorough visual ethnography, I chose to hike the mountains, mirroring the journey of devout followers. Each hike lasted approximately two hours, enabling the capture of various rituals and the interaction between religious stakeholders and the climate.

Following the data collection, the researchers independently reviewed the data points, annotating and labeling the images. They each dedicated a week to examining all the images before convening to finalize a list of themes, which were identified collaboratively. All the themes discussed in the paper, were identified by both researchers independently, leading to no further iteration analysis. It is important to note that although only one researcher physically visited the temples, both are deeply familiar with Hindu rituals, narratives, and religious doctrine due to their upbringing and had awareness of various rituals, gods and elements present in the images and videos collected.

Our methodology adopts the following steps:

- **Game Ideation Step:** This step involved generating insights through an ethnographic study at Holy Hindu temples (Figure 5.2). We aimed to understand various rituals, metaphors, narratives, and the efforts by the Hindu community towards climate action (Section 5.2). The outcomes include a design space of metaphors connecting Hinduism to climate change and a set of rituals that can be used as part of gameplay.

- **Game Design Step:** In this step, we iteratively developed game prototypes and gathered feedback on cultural sensitivity (Figure 5.6). The outcome includes the

game Shloka.

- **Game Evaluation Step:** Our final step involved an evaluative phase, where we conducted playtests comparing our game with other existing climate change games (Figure 5.15). In the subsequent sections, we explain each of the above steps, and finally discuss the results of our evaluative step.

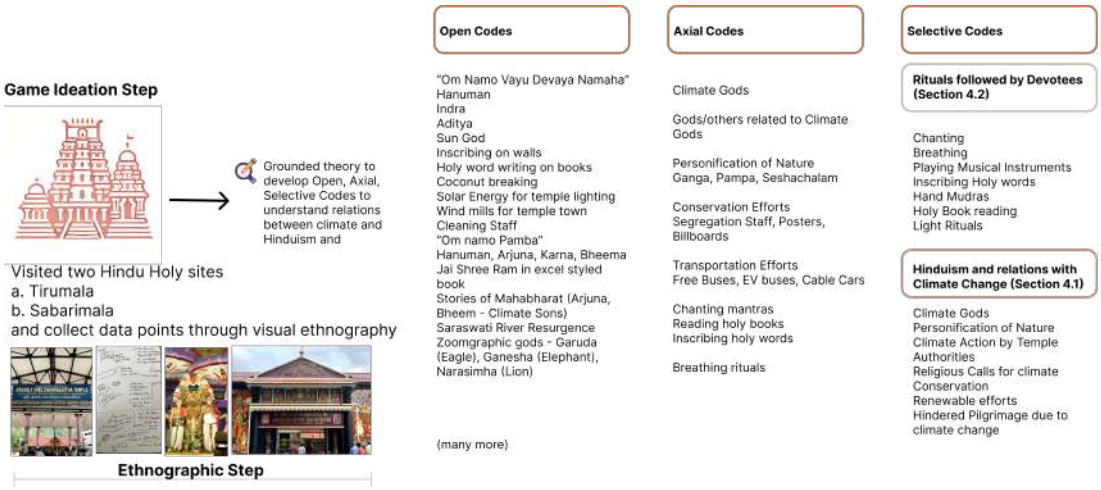

Figure 5.2: As part of the ideation step, we conducted an ethnographic study at two temples, from collected data points, we identify game mechanics and narrative to support the design of our game.

5.2 Game Ideation Step: Ethnographic Studies of Cultural Spaces

To explore the intersection of Hinduism and climate elements within religious spaces, we drew on methodologies employed by researchers conducting ethnographic studies in cultural settings. Specifically, we referenced Maram's work (Maram, Pfau, Dodechani, & Seif El-Nasr, 2023), which combined visual ethnography with a constructivist grounded theory approach to analyze data and develop new videogame characters in the context of religion. Building on this approach, we conducted a visual ethnographic study at two prominent Hindu temples in India: Tirumala and Sabarimala, to investigate the connections between Hindu rituals and climate-related themes.

The first author, a practicing Hindu, actively participated in local practices, rituals, and customs. We collected 412 photographs and 43 videos. In places where photography was restricted, we documented the sites through sketches and notes (Figure 5.2). Our data capture focused on rituals performed by devotees, deities worshiped, climate change initiatives led by temple communities, and factors contributing to local pollution.

5.2.1 Analysis of Ethnographic Data

Although only one researcher visited the temples for this study, the second author, a practicing Hindu, has personal experience visiting at least one of these temples as part of their upbringing. This familiarity with the rituals, narratives, and practices associated with both temples provided valuable positionality in analyzing the data. From constructivist grounded theory lens (i.e. researcher co-creates meaning within the domain they are studying (Charmaz, 2015, 2014; Puddephatt, 2006) - here climate change and serious games) we aimed to to identify insights that relate to Hinduism and Climate change, and identify rituals that can be used as interaction mechanics in videogames. As illustrated in Figure 5.2, we developed open codes, axial codes, and selective codes that explore the relationship between Hinduism and climate change, and identify Hindu rituals that could be translated into game mechanics. Section 5.2.2 and Section 5.2.3 discuss findings from the ethnographic study and grounded theory exercise.

5.2.2 Identified Relations between Hinduism and Climate Change

We identified six major instances on how Hindu stakeholders and institutions interact with climate change. We aim to use these interactions as part of our narrative design for the proposed game.

5.2.2.1 Personification of Nature:

Across the hike, numerous elements associated with nature were personified and worshiped. For instance, in Figure 5.5 (h), we highlight how trees were worshiped in Tirupati. Similarly, as shown in Figure 5.5 (i) near Sabarimala we noticed how rivers were worshiped in the form of deities. Further, as illustrated in Figure 5.5 (i),

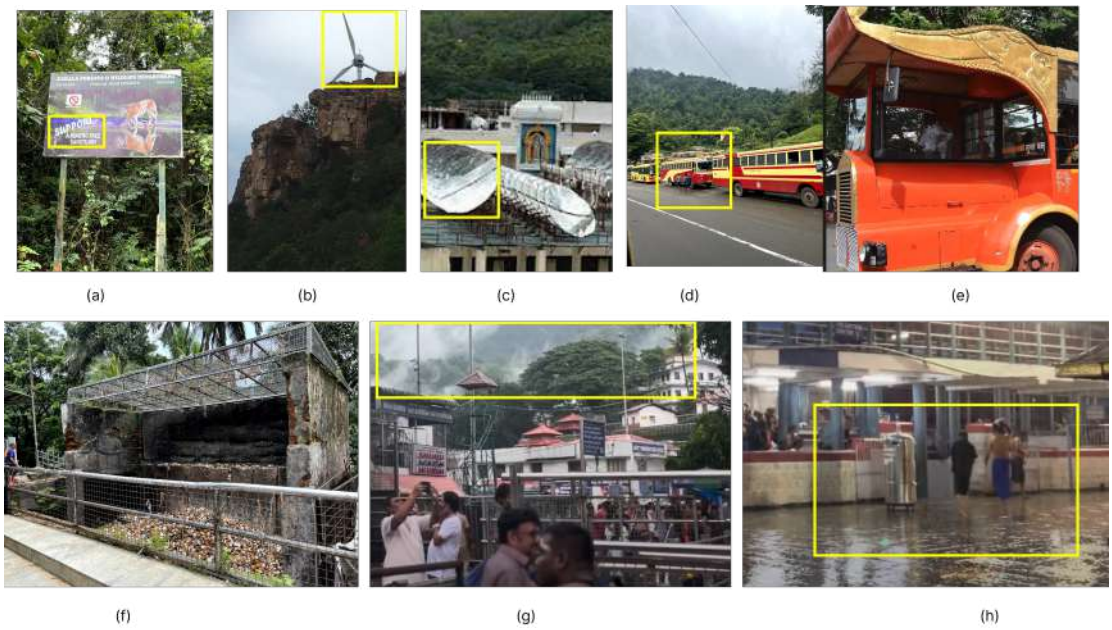

Figure 5.3: (a) Authorities calling for a plastic free hill, (b) Windmills around the hiking areas to the temple, (c) Solar panels being used for holy food preparation, (d,e) Buses and free EV buses to support transportation of devotees to minimize car usage, (f) Dedicate organic segregation and collection centerm (g,h) Fog, low visibility and rain caused devotees to rush back from the queues to cover.

we noticed devotees taking dips, throwing coins, and lighting candles, immersing idols. However, we saw signs and posters by the temple authorities encouraging people to not leave behind coins and idols as they disturb the flow off the river. Figure 5.4 (f) also illustrates how priests near a temple near the ocean, worship the ocean (the ocean god is termed as Varuna in Hinduism).

5.2.2.2 Gods for Climate Elements:

In the temple towns of Tirupati and Sabarimala, we noticed multiple mini-temples for gods associated with climate, as illustrated in Figure 5.1. For instance, we noticed the Sun god being worshiped repeatedly under the name "Aditya" and "Surya". Similarly, the deity of wind (Vayu), the deity of rain (Indra) were also seen to be worshiped. Further, the forests in which these temples resided were also considered holy and had dedicated forest gods (Figure 5.4 (b), where devotees hiked the forest path

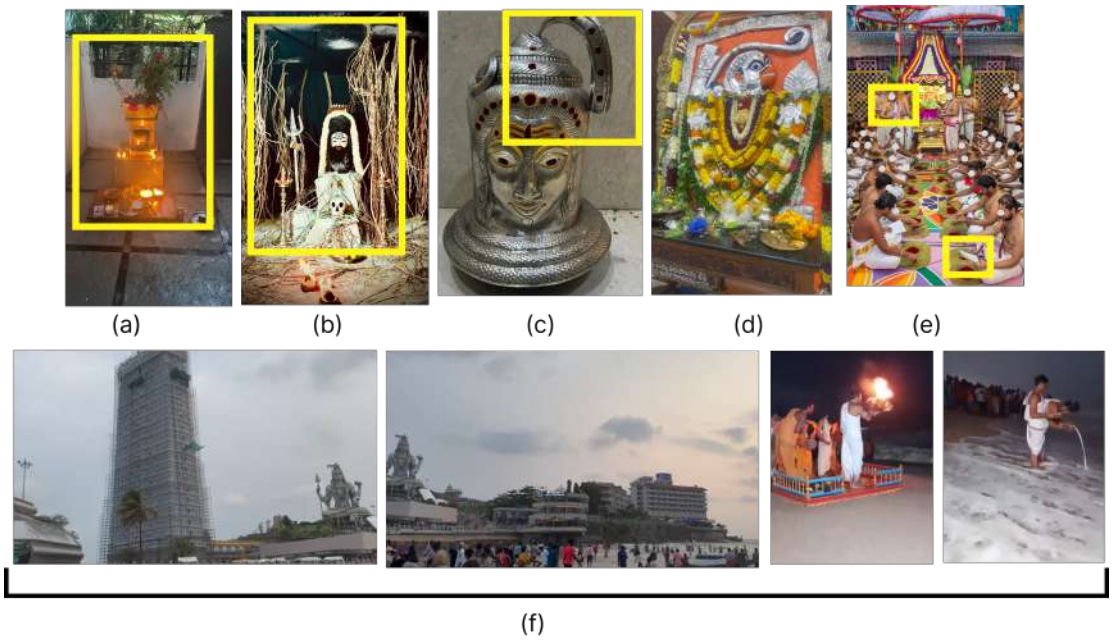

Figure 5.4: (a) The worship of a sacred plant, (b) The worship of a forest in the form of a diety, (c) The River Ganges originating from the Head of Lord Shiva, (d) Hanuman the son of Wind God, (e) Chanting ritual and Holy Book reading ritual, (f) Temple beside the ocean, and priests praying to the ocean.

without footwear and, in cases of extreme devotion, on knees, as illustrated in Figure 5.5 (d). Further, as illustrated in Figure 5.4 (d) we found gods who were children of climate gods. For instance, we noticed several temples of Hanuman, who is considered the son of the wind god.

5.2.2.3 Hindered Pilgrimage due to Climate Hazards:

Both Tirupati and Sabarimala are located on hilltops, requiring devotees to hike through dense forests. However, the weather conditions in these areas often determine how devotees can reach the temple. For instance, the researcher encountered heavy rain before starting the hike to the temple, resulting in the closure of hiking paths and preventing devotees from reaching the temple. Areas where road was available, the rains and fog made the drive dangerous, given the numerous hairpin curves in the hilly terrains, thus preventing devotees from accessing the hill top as illustrated in Figure 5.3 (g). Furthermore, the temple space, as shown in Figure 5.3 (h), was open without a

roof, meaning devotees had difficulty standing in line during the rain. Similarly, during periods of heavy rainfall, the river's flow increased, making it challenging for devotees to take holy dips.

While the researcher did not face any climate-related challenges while hiking Tirumala, they observed warning signs put up by the temple authorities regarding potential landslides [1]. Additionally, due to the extensive development in the temple areas, deforestation was prevalent, and signs warned visitors to be cautious of wildlife, especially leopards.

5.2.2.4 Renewable Efforts:

Additionally, as illustrated in Figure 5.3 (d) and (e), the authorities encouraged the use of public transport by providing free electric buses (EV buses) for devotees to travel around the hill and visit other temples. We also noticed that temple authorities promoted the use of renewable energy sources. For example, Figure 5.3 (c) illustrates how the holy food preparation facilities were powered by solar panels, and similarly Figure 5.3 (b) illustrates how throughout the hiking areas, we saw windmills generating power to support the temple town.

5.2.2.5 Structured Waste Disposal:

The influx of millions of devotees resulted in the generation of various types of waste, including water pollutants, solid waste, and prayer materials. We also observed post-prayer offerings, such as flowers, oil, and charcoal, being dumped in open areas. However, temple authorities have dedicated staff to manage waste disposal, and we also noticed segregation facilities encouraging devotees to recycle their waste, as illustrated in Figure 5.3 (f).

5.2.2.6 Religious Calls for Climate Action:

An interesting aspect we observed was how temples and their authorities support climate action efforts. Both Sabarimala and Tirumala requested devotees to refrain

[1] https://www.deccanchronicle.com/news/landslides-hit-tirumala-ghat-road-amid-heavy-rain-1830576

from using plastic in the forest areas, as illustrated in Figure 5.3 (a). The posters often stated that the forest is the abode of the deity, emphasizing that it is the devotees' duty to protect it. This message conveyed that it is not only an environmental responsibility but also a religious duty to treat the forests and rivers with care and respect.

5.2.3 Identifying and Digitizing Rituals

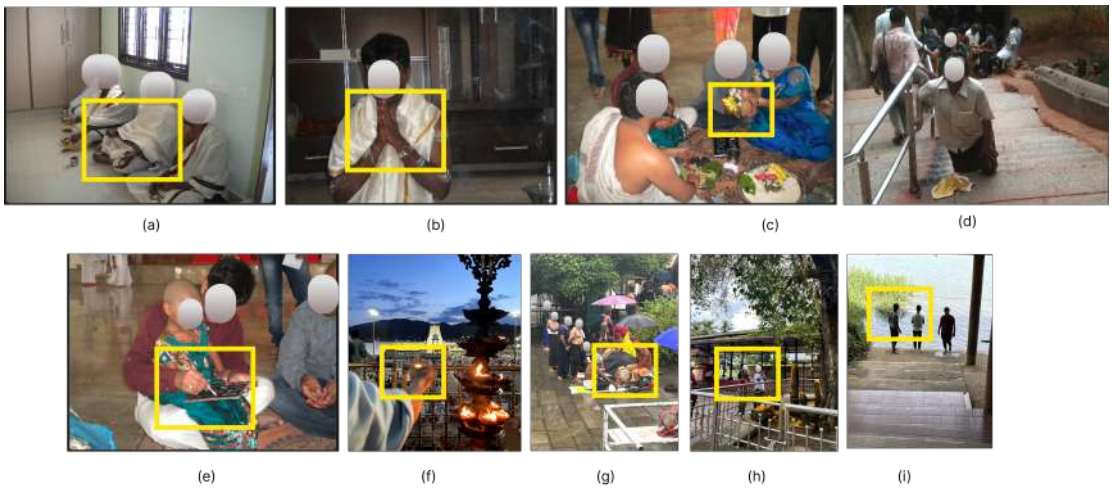

Figure 5.5: (a) Devotees executing breathing rituals, (b,c) Devotee praying with a hand gestures, (d) Devotees participating in inscribing rituals, (e) Devotees engaging in fire/light rituals, (f) Devotees playing musical instruments, (g,h) Devotees praying to personified nature elements (trees, rivers)

In addition to understanding how Hindu stakeholders connect with climate change, our second goal was to identify rituals that Hindu devotees perform as acts of prayer and transform them into game mechanics. We identified seven rituals in total and converted each into a digital mechanic, as detailed below.

- **Chanting:** Along the hike and while waiting in queues, devotees often chant mantras in praise of the deity. Temple authorities play these mantras on loudspeakers throughout the hiking path, encouraging collective chanting, known as 'Bhajans'. Figure 5.4 (e) illustrates group of scholars chanting. To digitize this ritual, we used Whisper (a text-to-speech AI model developed by OpenAI (Radford et al., 2023)), allowing players to record their chanting of mantras as part of the game.

- **Breathing:** Controlled breathing and meditation were commonly observed along the hike and in the temple areas, as shown in Figure 5.5 (a). After completing their "Darshan" (worship of the temple deity), many devotees meditate with deep, controlled breathing within the temple premises. In the evenings, large groups of devotees, often with families, gather to meditate together. To create a digital version of this ritual, we used a microphone to detect breathing sounds.

- **Mudras:** While meditating or praying, devotees often make various hand gestures, known as mudras, each associated with specific deities (illustrated in Figure 5.5 (c),(d)). These gestures are performed in a sequence, often accompanied by soft chanting. We digitize this ritual using Google Teachable Machine (Chen et al., 2020) to create computer vision models trained to recognize these mudras.

- **Holy Book Reading:** Reading holy books, such as verses from scriptures or the Gita, was a common sight (Figure 5.4 (e)). At Tirumala, where waiting times can exceed 8 hours, devotees read these texts to remain engaged in prayer while in line. To digitize this ritual, we used Whisper (Radford et al., 2023) to let players read aloud scriptures connected to different climate gods and natural elements.

- **Inscribe:** As shown in Figure 5.5 (e), devotees of all ages inscribed holy words on boards, rice, and books. Some wrote a single holy word, while others repeated it multiple times. We observed dedicated stations where devotees could leave books filled with these writings as offerings. This ritual was digitized as a mechanic for players to inscribe sacred words within the game.

- **Musical Instruments:** Devotees and temple authorities often play instruments in honor of the gods within the temple grounds. The instruments, including trumpets, drums, and other local varieties (illustrated in Figure 5.5 (g)), are played periodically, such as in the morning as a wake-up call for the gods or in the evening as a night song. To digitize this ritual, we recorded various instrument sounds.

- **Arati/Fire/Light Worship:** One of the most common rituals observed was "Arati," where devotees offer fire or light as a form of worship (illustrated in Figure 5.5 (f)). During Arati, devotees move ignited camphor around the temple or the idol, ending

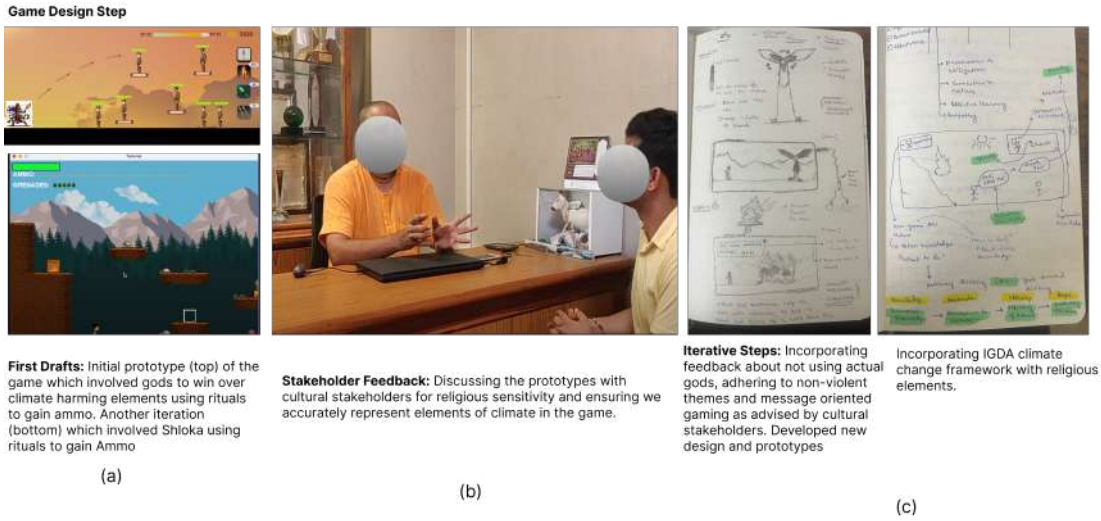

Figure 5.6: (left) First prototype with Ammo and weapons, where climate enemies were being taken down, we discussed with cultural stakeholders to understand and iterate (middle) A prototype version where players take the role of climate gods (right) The final prototype document with the character Shloka and integration of IGDA framework.

the ritual by offering prayers to the fire as a manifestation of the deity. We digitized this ritual using computer vision algorithms to detect light.

	Knowledge Stage	**Attitude Stage**	**Efficacy Stage**	**Hope Stage**
1	The use of fossil fuels pollutes the environment.	Invokes Hanuman with the help of **chanting rituals**.	Grows in size to fix large windmills **supporting renewable energy**.	Hanuman provides **pathways for alternate fuels** in temple towns to reduce carbon footprints.
2	Trash and garbage left behind by devotees in temples.	Invokes Goddess Kali with the help of **music instrument rituals**.	Gains multiple hands to **segregate waste efficiently**.	Goddess Kali advises devotees on **proper disposal practices** in temple towns.
3	Oil pollution in the Holy Ganges from floating diyas.	Invokes Lord Varuna by **inscribing his Holy name**.	Gains a magical trident to **absorb oil and clean the river**.	Lord Varuna suggests eco-friendly materials for rituals.
4	Smog and fog in holy sites on hilltops.	Invokes the Sun God through **light/fire rituals**.	Gains a sunlight generator to identify **and filter vehicle pollution**.	Lord Surya **encourages EVs** to reduce forest petrol/diesel usage.

Table 5.1: Stages Across Levels 1–4 (in Shloka) in Relation to Religion, Climate and Rituals (Part 1 of 2)

	Knowledge Stage	**Attitude Stage**	**Efficacy Stage**	**Hope Stage**
5	Garbage piles on holy beaches and islands.	Invokes Matsya (fish god) **through hand mudras**.	Gains the ability to swim into ocean depths to **collect garbage**.	Matsya advocates for clay idols and natural dyes.
6	Toxic fumes and polluted water in Yamuna.	Invokes Vayu (the wind god) **through meditative breathing**.	Gains the ability to **blow away toxic fumes over the river**.	Vayu **calls for reduced deforestation** and seasonal balance.
7	Forest fires across holy hills and temples.	Invokes Indra (the rain god) **by reading holy books**.	Gains the ability to **generate soothing rains**.	Indra promotes **forest fire prevention and management** in holy towns.

Table 5.2: Stages Across Levels 5–7 (in Shloka) in Relation to Religion, Climate and Rituals (Part 2 of 2)

5.3 Game Design Step: Iterative Design of Shloka

With various rituals digitized and connections between Hindu stakeholders and climate change observed, our next step involved iteratively developing and testing different game narratives and input methods to create a game that links climate change to Hinduism.

For this we used a co-design based approach, where we worked with religious scholars, players and as researchers took on the role of designers and developers. In our first iteration, we adopted a role-playing approach inspired by Rickien's (Reckien & Eisenack, 2013) climate RPGs. As shown in Figure 5.6(a), players assumed the roles of Hindu deities (e.g., Indra, god of rain, or Vayu, god of wind), using digitized ritu-

als—such as chants and mudras—to cleanse forests, oceans, and rivers, and to combat pollution-causing demons, thereby replenishing their powers.

However, consultations with religious scholars (Figure 5.6 (b)) and relevant literature (Maram et al., 2022a; Maram, Pfau, Kasar, & Seif El-Nasr, 2024) revealed two key concerns. First, depicting gods as defeatable or needing to replenish powers was considered controversial, given their omnipotence. Second, allowing players to control these deities was seen as disrespectful, conflicting with beliefs about their supreme nature. Consequently, we revised the narrative to respect religious sensitivities.

In response religious scholars' insights, we introduced a new protagonist named "Shloka," a chosen child with a mission to remove elements harmful to the climate. Shloka's journey educates players about climate preservation without portraying Hindu deities in vulnerable or controllable roles. This shift emphasizes a combat-focused experience, where Shloka eliminates pollutants and other threats to the environment. By embodying Shloka, players engage with digitalized ritual mechanics – such as chants and mudras – while confronting environmental degradation.

Further discussions with scholars revealed that the game's combat elements conflicted with Hinduism's peaceful and spiritual values, which emphasize harmony and respect for all beings, including nature. This contradiction led us to question whether combat, even when metaphorical, was appropriate to convey environmental responsibility within a Hindu framework. Consequently, we refined the mechanics to align more closely with the Hindu philosophy's non-violent principles while retaining a focus on climate action. During the playtests, participants noted that combat overshadowed the climate change emphasis, and the ritual required to gain ammo disrupted the platformer-style gameplay flow.

To address these concerns, scholars recommended re-imagining the Hindu gods as mentors to Shloka, who would invoke their wisdom through rituals to gain insights into climate action. This approach respects religious sentiments by avoiding any portrayal of the gods in controllable or vulnerable roles. Building on this feedback, we adopted the IGDA Climate Special Interest Group's four-step framework for creating climate-focused games (Whittle et al., 2022a). This framework, which emphasizes **knowledge**, **attitude**, **efficacy**, and **hope**, is designed to inspire pro-environmental

action among players by fostering a deeper understanding of climate issues and promoting positive attitudes and effective responses. Each level of our game is structured around these pillars, aligning with game-based environmental education (GBEEs) (Fernández Galeote & Hamari, 2021; Whittle et al., 2022a) to foster deeper climate understanding and pro-environmental action among players.

In the **Knowledge Stage**, IGDA recommends imparting knowledge about the current climate situation. In the game Shloka, a god-mentor (see Figure 5.1) imparts essential knowledge about various climate disasters and the repercussions of poor climate management to holy sites and world. This stage aims to raise awareness and provide foundational knowledge about climate issues. Moving to the **Attitude Stage**, IGDA highlights the importance of players feeling a 'connection to nature' as critical for developing a climate-positive mindset. By performing rituals that invoke climate gods, players develop a sense of unity with nature, aligning with IGDA's emphasis on fostering a connection to the environment. This reflective stage encourages players to perceive their actions as interconnected with the natural world. Further, using the six connections between Hinduism and climate change (Section 5.2.2) we hope to emphasize the connectedness between Hinduism and Climate action.

The IGDA terms the **Efficay Stage** as a stage that enables players to feel suited to fix the climate in the gaming context. In the game, players invoke a climate god, gaining special abilities that empower them to address environmental hurdles within the game. This stage reinforces a sense of capability, helping players feel more effective in responding to climate issues. Finally, the **Hope Stage** aims to inspire optimism by providing pathways for positive climate action. After overcoming a climate disaster, the invoked climate god suggests actionable steps for reducing one's climate footprint (pathway thinking) and shares examples of contributions by the religious community towards climate action (social trust). This stage aims to instill hope by showing that both individual and community efforts can have a meaningful impact.

5.3.1 Shloka - The Game

With the narrative framework finalized, we developed a game consisting of seven levels, each following the structure depicted in Figure 5.7. Inspired by Section

Knowledge Stage (Level 2):
The IGDA framework recommends, this step to provide players essential knowledge about climate change and its impacts. In this level, Ganesha teaches the player about how increasing devotees are polluting the holy forests, which in turn disturbs wildlife, eco-systems.

Attitude Stage (Level 2):
The IGDA framework recommends this step tp provide players a connection with nature. In this level, the path of Shloka is blocked and can not continue in her pilgrimage due to increasing land fills and un-recycled trash. The player develops a connection with to a climate change god by performing a ritual.

Efficacy Stage (Level 2):
The IGDA climate change framework recommends this step to provide agency to players to impact climate action. In this level, the ritual invokes the goddess Kali and provides the player with the power "multiple-hands". The player here is tasked to clear the quickly sort the trash pile, using the multiple hands a power gained. (See how the trash pile blocking on the road is gone, as the player has sorted it during gameplay)

Hope Stage (Level 2):
The IGDA climate change framework recommends this step to provide future pathway thinking for positive climate action. In this level, the player is educated how trash often found in temple complexes can be categorized effectively and keep the holy forests safe.

Figure 5.7: Different scenes from Level 1 in the game Shloka. Other levels adopt a similar structure.

5.2.2.1, the second level in the game, emphasizes the impact of pollution in forests which are deemed holy and are often personified. During the knowledge stage of this level, Shloka (the player) is guided by the Hindu deity of education, who explains the consequences of polluting forests and harming ecosystems (Section 5.2.2.5).

In the attitude stage, the game encourages a sense of connectedness to religion and its connection to climate deities (Section 5.2.2.2). Here, the player performs a digital ritual to summon a climate god. Specifically, in level 2, the player must complete the ritual of "playing musical instruments", as outlined in Section 5.2.3. This ritual calls upon a deity (Figure 5.7) who grants the player powers to address climate challenges within the game.

In the efficacy stage, the player, now equipped with new powers, must complete a task to combat the climate issue presented. This task positions the player to actively restore the environment in the game context. As shown in Figure 5.7, after invoking the climate god, the player gains the ability of "multiple arms" to help the player segregate waste and reduce the trash pile blocking the temple path as illustrated in Figure 5.7,

Finally, in the hope stage, the invoked god provides the player and their community with guidance on positive actions. Figure 5.7 illustrates how the climate god advises devotees on managing pollutants near temples, thus educating the player and inspiring them to advocate for similar practices within their own community (Section 5.2.2.6). Although a brief overview of each level is provided in Tables 5.1 and 5.2, to play each level, we recommend visiting `https://siddu1998.github.io/Shloka/`.

For further clarity we present more details in Figures 5.8, 5.14, 5.10, 5.11, 5.9, 5.12 and 5.13. All the levels are playable at `https://siddu1998.github.io/shlokaNew.html`. The various gods and characters as part of the game are presented in Figure 5.1.

Figure 5.8: **Knowledge Stage:** The player is educated about renewable energy sources. **Attitude Stage:** The player is tasked with chanting mantras to invoke the Wind god. **Efficacy Stage:** The chant provides the ability to generate winds to make the windmill functional. **Hope Stage:** The player is shown various efforts an individual can take to reduce fossil fuel dependence, and various efforts taken by Hindu temples to reduce carbon footprint.

Figure 5.9: **Knowledge Stage:** The player is educated about poor waste disposal. **Attitude Stage:** The player plays a 'Raga' i.e. a musical tune with the instruments to invoke Goddess Kali. **Efficacy Stage:** The player gains a multiple hands power-up to help in fast waste segregation. **Hope Stage:** Kali educates the player about how they can practice safe waste disposal at home, and how Hindu temples are taking an effort to dispose waste in a sensible manner.

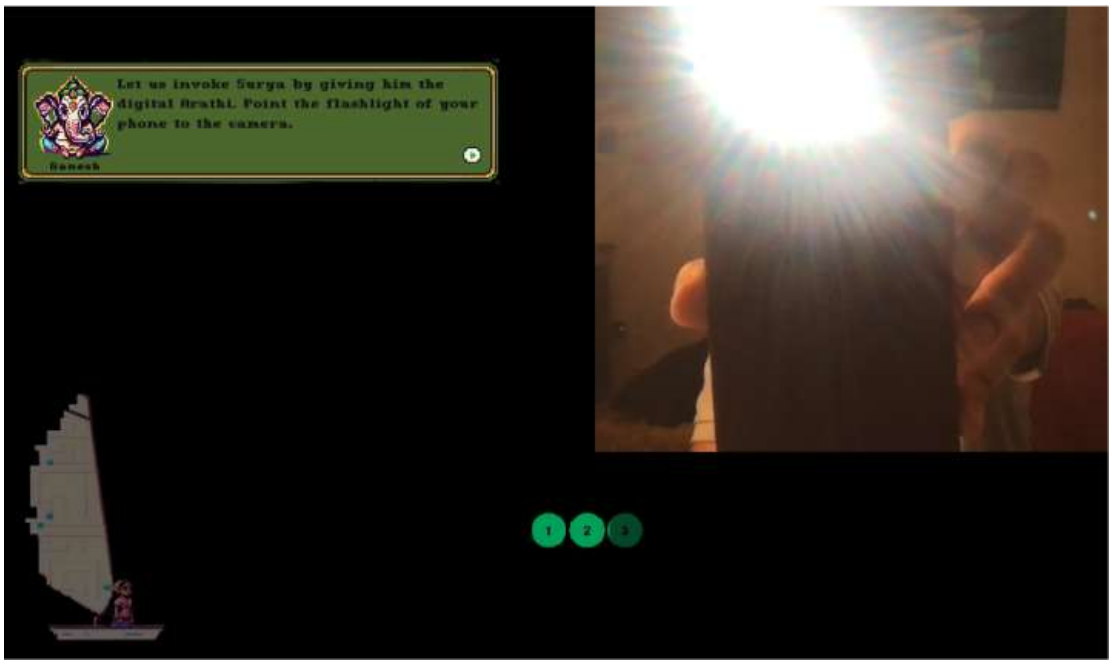

Figure 5.10: **Knowledge Stage:** The player is educated about smog, and visibility issues due to pollution. **Attitude Stage:** The player is tasked with invoking the sun god using light rituals and help clear their path. **Efficacy Stage:** The player using the rays of the Sun god, clears the dark sky. **Hope Stage:** Surya, the sun god educates the player about how to reduce pollution and how temples are focusing on plantations and contributing to green cities.

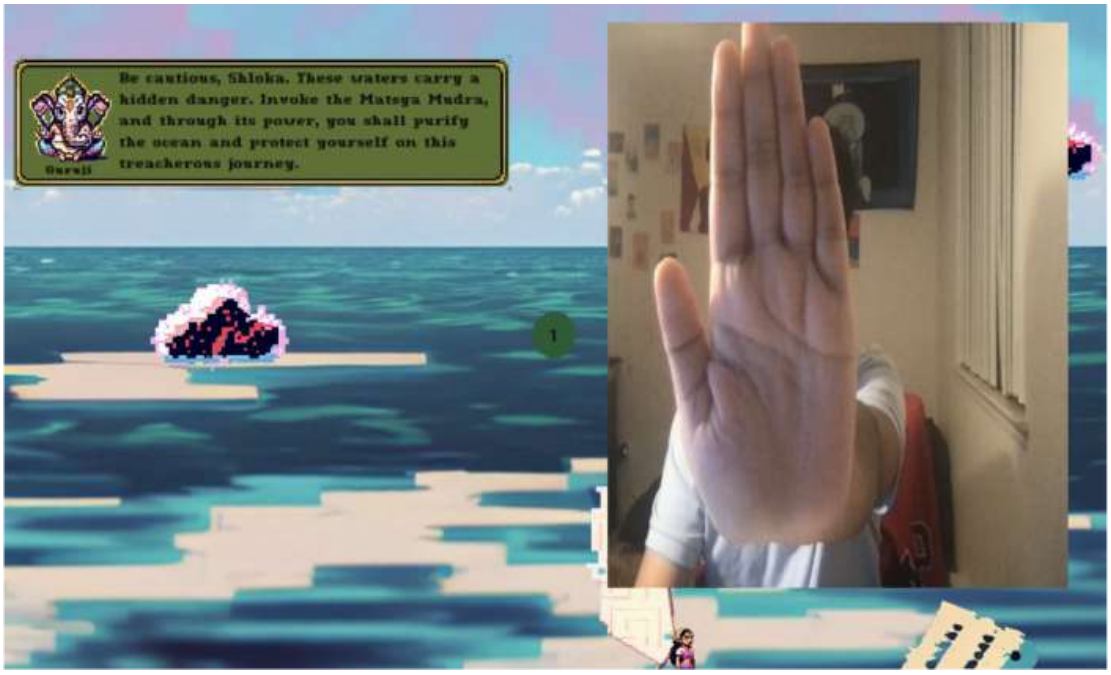

Figure 5.11: **Knowledge Stage:** The player is educated about various forms of ocean pollution, and the great pacific garbage patch. **Attitude Stage:** The player performs the Mudra ritual (hand gestures) invoke the Fish and ocean gods to help them in the process. **Efficacy Stage:** The player is provided with gills to dive and help clean the garbage patch. **Hope Stage:** The ocean gods educate the player about how to prevent water pollution, and efforts taken by temples and Hindu communities to protect water bodies such as the holy river Ganges.

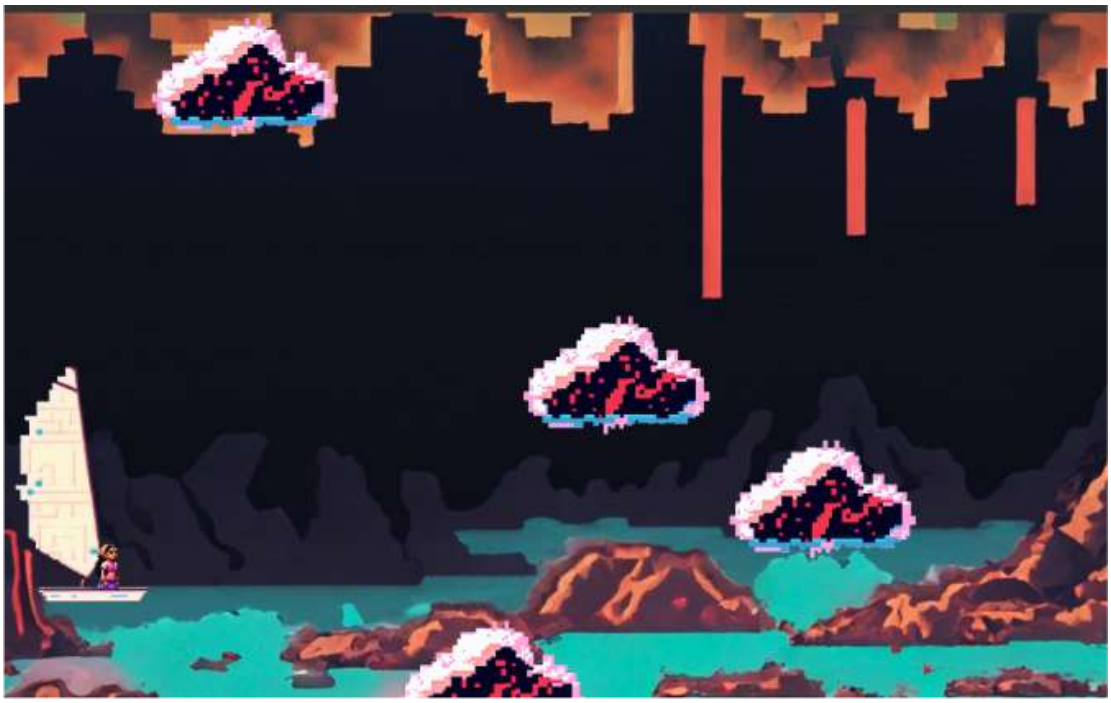

Figure 5.12: **Knowledge Stage:** The player is educated about toxic fumes and acid rains. The player is prevented from entering a religious destination due to toxic air pollution. **Attitude Stage:** The player performs breathing rituals, to invoke Hanuman, a god of strength and who can change size. **Efficacy Stage**: The player gains grow in size abilities to fly through the toxic fumes and use lightning to distort the polluted clouds. **Hope Stage:** Hanuman educates players, about preventive measures of acid rains, and how proper disposal methods to prevent the formation of toxic clouds.

Figure 5.13: **Knowledge Stage:** The player is educated about oil spills, and death of marine species. **Attitude Stage:** The player needs to trace the holy word to help them invoke Lord Rama, who helps the player reach the oil spill using the floating stones. **Efficacy Stage:** The player gains the ability to use floating stones, to reach the spill. **Hope Stage:** The player is educated about ways they can reduce their fossil dependence, and maintaining marine life. The players are shown various water bodies considered holy, and the divine status of water bodies in Hinduism.

Figure 5.14: **Knowledge Stage:** The player is educated about forest fires, causes and impact. **Attitude Stage:** The player performs the ritual of reading holy books, to invoke Indra, the king of gods and also the god of rains. **Efficacy Stage:** The player is given the ability to generate rains, and put off the fires. **Hope Stage:** The player is educated about the how Hindu temples are often situated in forest and hills, and various measures to avoid fires and how temples are deploying officials to monitor forest fires.

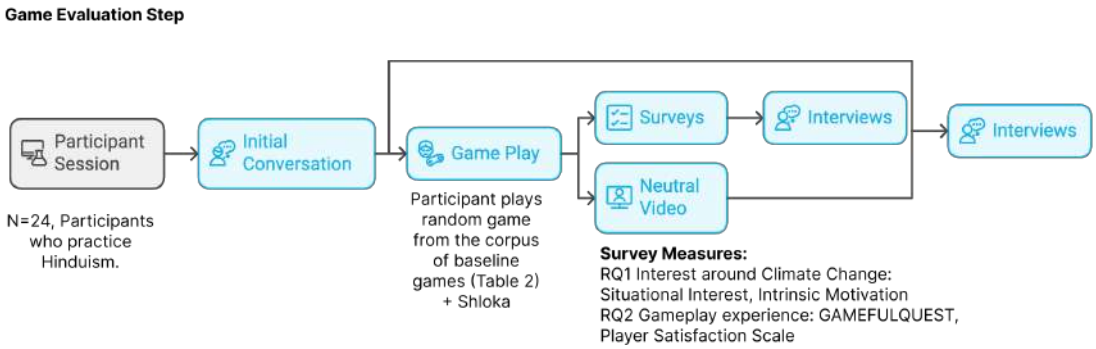

Figure 5.15: Various steps involved while evaluating Shloka against the corpus

5.4 Game Evaluation Step: Playtesting and Comparing with Game Corpus

5.4.1 Establishing a Baseline Game corpus

To evaluate the effectiveness of our religiously themed gameplay we compared it against other climate change games. First, we established a baseline of climate change serious games, each with distinct mechanics, to compare against our game. The term "mechanics" is vaguely defined in serious games and often has varying interpretations. We ground our definition of a mechanic to our research goals. Our paper aims to evaluate whether the use of rituals results in greater gameplay experience and cultivating interest around climate change. Here rituals act as an "interaction mechanic". In that context, we define mechanics as the core systems of player interaction i.e. the actions/verb players can take in a game (Hunicke, LeBlanc, & Zubek, 2004).

To include games into our baseline, we set the following inclusion criterion. First, a playable version of the game must be available either on Mobile or PC. Second, the game must be associated with climate change learning and climate action. With these two conditions, two researchers searched for games in the Google Playstore, Apple Store, Google Scholar, Games for Change database and Web Search (Google) with the query terms, "Climate Change Games", "Climate Change Serious games". We identified a total of 41 games as shown in Tables 5.3 and 5.4. The researchers classified the games according to the interaction the game offered. The classification of games was guided by

the answer to the phrase “The player in the game ...” i.e. “What is the verb the player does while playing the game?”. This approach allowed to constraint the definition of mechanic to how players interact to progress in the game.

The Player in the game ...	**Games**
Chooses the right answer (Quiz Games)	Climate Trivia Game (NASA, n.d.), Marco Polo Weather (MarcoPolo Learning, Inc., n.d.), **ClimarisQ** (Faranda, n.d.)
Strategizes for optimal solutions (City Growth/Puzzle/Riddle Games)	Climate Crusade (Autrement, 2024), Deal: A Green New Election (Blue Dot, n.d.), Beecarbonize (Pedercini, n.d.), Escape Room Climate Change Game (Ouariachi & Wim, 2020), **Human** (ELIA Games, n.d.), Idle Of Carbon City (Lugal Games, n.d.)
Runs and Collects Items (Platformer/Runner)	Reset Earth (Programme, n.d.) , Life of Pika (Frierson, n.d.-b), DOMINO The Little One (A.S, n.d.), Climate Wars (Savethechildren, n.d.), **Climate Changer** (Akyüz, n.d.)
Navigates a Narrative (Interactive Narrative Games)	**Illuminate**(Institute, n.d.), Comando Gioseppo (SLU, n.d.), Climate Quest (Frierson, n.d.-a)
Scans Objects (AR/VR Games)	**H2O - An Ocean of Science (AR)**(Inc., n.d.), Sea Level Rise Explorer (V. P. T. LLC, 2024), Climate Connected (Fernández Galeote, Legaki, & Hamari, 2023), Monstrash (Peterson, n.d.)

Table 5.3: List of Climate Change Related Games Categorized by Player Actions (Part 1 of 2). Games marked in bold are part of our baseline corpus to compare against Shloka.

The Player in the game ...	Games
Adjusts Climate Parameters (Simulation Games)	Climate Time Machine (NASA, n.d.), Terra Nil (Netflix, n.d.), **Coral Bleaching** (Kids, n.d.), Imagine Earth (Brothers, n.d.), Save The Earth (NIVO, 2024), Reef Hero (Sacher, n.d.)
Attacks Climate Enemies (Action)	Life Bubble - My Little Planet (Homa, n.d.), **Mother Nature** (Lab, n.d.), Fate of the World (Redemption, n.d.), Clean the Ocean (z o.o, n.d.)
Cleans Items (Hyper-Casual Games)	Carbon Chaos (412 Technology, n.d.-a), Eco Earth (MeedLight, n.d.), Hazel: Tap Away Climate Change (412 Technology, n.d.-b), **Crabby Claws** (O'Connor, n.d.), Trash Monster(Bunny & Gnome, n.d.), Last Bottle (M. LLC, n.d.)
Uses language (Word/Vocabulary Games)	**Word Wall - Climate Change**(hwright2, n.d.), Climate Change Word Search (WordMint, n.d.), Esol Climate Change Word Search (Courses, n.d.)

Table 5.4: List of Climate Change Related Games Categorized by Player Actions (Part 2 of 2). Games marked in bold are part of our baseline corpus to compare against Shloka.

5.4.2 Understanding the Baseline

As shown in Tables 5.3 and 5.4, we identified nine categories of climate change-related serious games. From each category, we randomly selected one game to include in our baseline corpus.

The first category consists of quiz games, where players must choose the correct answers to progress in the narrative. The second category includes games where players are tasked with ensuring the survival of their character or city by solving climate-related puzzles or optimally allocating resources. The third category comprises platformers, where players collect various items as part of the gameplay.

The fourth category consists of interactive narratives, where players are presented with choices at each scene that influence the direction of the narrative and teach various aspects of climate change based on their choice.

The fifth category includes games where players scan objects, such as augmented reality (AR) and virtual reality (VR) games. The sixth category features simulation games, where players adjust climate parameters to achieve specific objectives.

The seventh category focuses on more aggressive gameplay, where players shoot or eliminate "climate enemies" to protect nature. The eighth category consists of hypercasual games, where players collect trash or form patterns (e.g., three-in-a-row or four-in-a-row) to remove pollutants. Finally, the last category involves games that require players to use words and vocabulary to progress through the game.

To explore whether incorporating religious themes as interaction mechanics and narrative elements increases engagement, interest, and immersion in climate change games, we employed a mixed-methods approach. We conducted playtests, surveys, and semi-structured interviews to gather insights into player perceptions and the impact of religious themes on their experience. In the subsequent sections, we discuss the various measures used in the evaluation process, the procedure, and the participants.

5.4.3 Measures

Assessing gameplay experience is crucial because the effectiveness of educational or persuasive games largely depends on how engaging and enjoyable they are for players (Guillén-Nieto & Aleson-Carbonell, 2012; S. Rosenthal & Ratan, 2022). In the context of climate change games, an engaging gameplay experience can help players better understand complex environmental issues and motivate them to consider their own actions (Fernández Galeote & Hamari, 2021; Borba et al., 2024). For this, we adopted the GAMEFULQUEST (Högberg, Hamari, & Wästlund, 2019) survey. Hogberg's (Högberg et al., 2019) illustrates how the GAMEFULQUEST survey captures various dimensions w.r.t serious games in the context of climate change. The survey has seven dimensions "Accomplishment", "Challenge", "Playfulness", "Guided", "Competition", "Social Connection", and "Immersion". To compare the "Satisfaction" of gameplay, we used the Player Experience of Needs Satisfaction (PENS) scale (R. M. Ryan,

Rigby, & Przybylski, 2006), which assesses "Competence," "Autonomy," and "Relatedness".

We then evaluated the impact of our game on generating interest and fostering intrinsic motivation around climate change (Brick, Bosshard, & Whitmarsh, 2021). Situational interest refers to the temporary spark of curiosity or participation elicited by specific stimuli, such as game content, which can lead to increased attention and willingness to learn (Naul & Liu, 2020). Intrinsic motivation involves engaging in an activity for its inherent satisfaction and personal relevance, rather than external rewards (Galeote, Legaki, & Hamari, 2023; Gugerell, Funovits, & Ampatzidou, 2018). For this, we used the Intrinsic Motivation Survey (R. M. Ryan, Mims, & Koestner, 1983), followed by the Situational Interest Survey. We administered all the measures after participants played each game from the corpus.

5.4.4 Participants

We conducted a statistical power analysis to determine the appropriate sample size for our within-subjects study, where participants play 10 games and complete surveys after each game (as discussed in Section 5.4.3). As with previous work with immersive media (Breves & Schramm, 2021; Högberg et al., 2019; Kaptein, Nass, & Markopoulos, 2010), for a repeated measures ANOVA, we assumed a medium effect size ($f = 0.25$), a significance level of $\alpha = 0.05$, and a power of $1 - \beta = 0.95$ (Cohen, 2016). The required sample size for a repeated measures ANOVA was calculated through G^*power and was found to be 20 (Refer Figure A.1).

We recruited 24 participants (15 male, 9 female) aged between 20 and 55 years (M = 28.3, SD = 9.9). All participants self-identified as practicing Hindus, a criterion verified during the recruitment process. To ensure that the study accounted for diverse perspectives, participants were recruited from varying levels of religiosity. Religiosity was measured using the Santosh-Francis Hinduism Religiosity Scale (Francis, Santosh, Robbins, & Vij, 2008). While the scale includes multiple questions to assess religiosity, a straightforward indicator was the 16th question: "Are you religious?" Based on their responses, 5 participants reported a score between 1–3, 6 participants a score between 3–5, and 13 participants a score of 6 or 7 (with 7 indicating highly religious), indicating

a distribution among the levels of religiosity within our sample. All 24 participants completed the surveys, and 14 participants also took part in extensive follow-up interviews.

Player executing the Holy word writing ritual

Player executing the breathing ritual

Player executing the Hand gesture ritual

Player executing the chanting ritual

We recruited participants from UCSC and Thapar University, Hindu temple groups, and set up a stall at a Hindu religious gathering (Figure 5.4.4 illustrates participants playing Shloka). The participants volunteered in the study with an interest in exploring Hindu media artifacts. They were not compensated monetarily but were provided with holy food offerings, Hindu holy books, and other merchandise in exchange for their participation. Given the bilingual nature of the participants, we had some responses from the participants in Hindi, Telugu, Marathi along with English. We did not need to consult external translators, since three researchers have one of the three languages as their first language and have studied in English instruction schools for over 18 years (at minimum).

5.4.5 Procedure

Each participant attended a three-hour session designed to understand how they interacted with rituals, reflect about climate change and asses their interest around climate change. As illustrated in Figure 5.15, the session began with an open-ended conversation about climate change with the participant.

To ensure randomization and prevent selection bias, games presented in Tables 5.3 and 5.4 were assigned to participants through a Latin squares method (Richardson, 2018). After completing each game, participants filled out two surveys as discussed above: the first capturing player experience, and the second capturing intrinsic motivation and situational interest around climate change.

For participants, taking part in the semi-structured interviews, gameplay sessions were recorded and later shown to the same participants during qualitative semi-

structured interviews. These interviews focused on participant reflections about their gameplay, insights gained regarding climate change, and feedback on game mechanics and narrative elements.

To prevent carryover effects between different games, all participants watched a three-minute neutral video after each game. This method aimed to reset their cognitive and emotional state before proceeding to the next task, a technique that has been employed in previous studies to minimize the influence of prior tasks on subsequent ones (J. Wang, Shi, Xiao, Qin, & Liang, 2022; Berkovsky et al., 2019).

5.4.6 Analysis

Our surveys consisted of questions in the form of a likert-scale. Given we take a within-group study design, and Likert data is ordinal in nature, we employed Friedman tests for repeated-measures comparisons across 10 games. Whenever the Friedman test indicated a significant overall difference, we followed up with post-hoc Wilcoxon signed-rank tests to compare Shloka against each of the other nine games. We refer to these values when applicable in Section 5.5. Further, for interested readers, we have published comparisons per game, with Shloka on different parameters in Appendix A.

For the interview analysis, three researchers adopted a grounded theory approach (Maram, Kleinman, Villareale, Zhu, & Seif El-Nasr, 2024a; Maram, Amato, et al., 2024; Adams, Lunt, & Cairns, 2008). One researcher initially marked key events in the interview transcripts. Considering the two research questions, The researchers independently developed codes, then met multiple times to discuss and refine them, ultimately establishing a finalized codebook (Figure 5.16 and 5.17), discussed in Section 5.5 under each of the research questions. Using the codebook the researchers coded the events, and reached an accepted Inter-Reliability rate of 0.76 (Maram, Kleinman, et al., 2024a). Throughout our discussion and results, we will refer to both the qualitative quotes along with statistical insights to understand the impact of using religion both in terms of gameplay and cultivating interest around climate change.

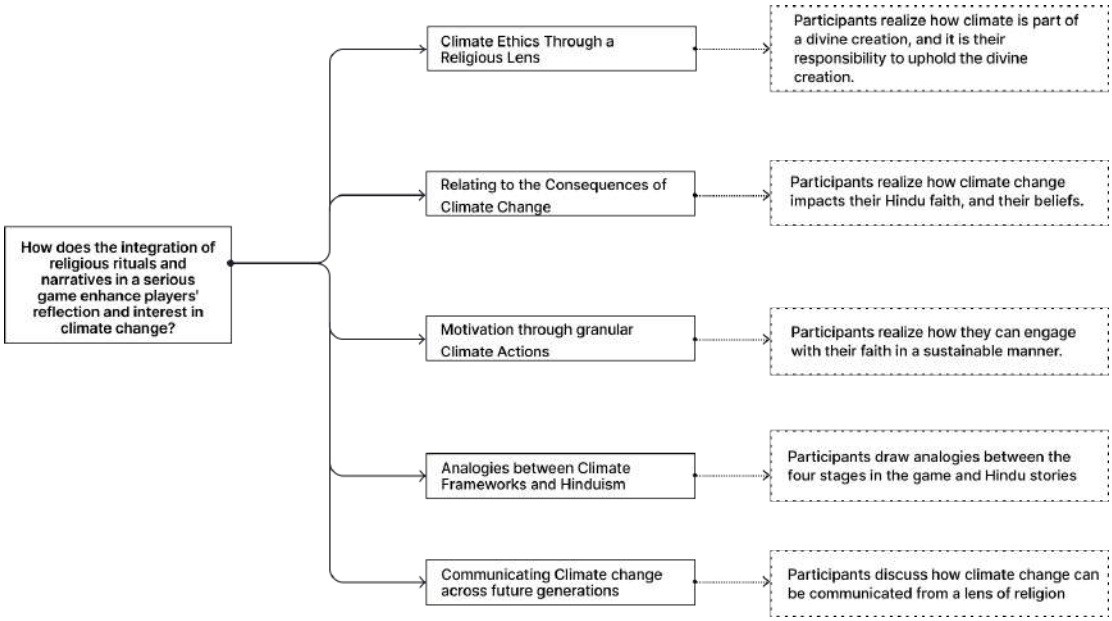

Figure 5.16: Various ways Shloka impacts participants with regards to Climate Change.

5.5 Results

5.5.1 RQ1: How does the integration of religious rituals and narratives in a serious game enhance players' reflection and interest in climate change?

Our first research question aimed to understand how the use of religion in videogames shaped participants' interest in and perception of climate change. We identified five themes, as illustrated in Figure 5.16, which are discussed below.

5.5.1.1 Climate Ethics Through a Religious Lens:

A key objective of the knowledge stage in Shloka was to encourage players to critically consider how certain religious actions might unintentionally contribute to climate change. By connecting religious narratives with climate ethics, this stage aimed to highlight that caring for the environment is not merely a scientific responsibility but also a moral and spiritual one. After completing this stage, participants described how Shloka fostered a heightened awareness of ecological sanctity through a cultural and

religious lens. Participant P2 illustrated this perspective by drawing parallels between established religious practices and environmental stewardship:

> *"What I can see is a reminder for myself or maybe any player to treat the climate as holy. For example, since I was a kid, if we ever touched a book or paper with our feet, our parents told us to seek forgiveness, because a book represents Goddess Saraswati and is holy. It's something similar here. Ganesha in the game is right, the Ganges is holy and devotees, the government, should treat it that way."*

This reflection shows how Shloka reframes environmental care as a sacred duty, linking familiar religious customs to broader ecological ethics. Participant P11 extended this idea by emphasizing the concept of "Ahimsa"—non-violence or peace—highlighting how Shloka could promote a form of "Climate Ahimsa":

> *"Hinduism stresses ahimsa, and it's explicitly said to treat nature as holy. We literally have a goddess for Earth—Bhudevi—so it's basic to understand that Bhudevi must be treated non-violently, and Shloka is getting at that aspect. This is what makes it different from other games. Other games make it like, 'save yourself by protecting the climate.' But here, Ganga is a person, Vayu is a person, so the game elevates the idea to treating someone ethically, which I am more likely to do."*

By framing rivers, wind, and the Earth as sacred entities, Shloka encouraged players to view climate action as a moral and spiritual relationship with nature rather than mere self-preservation. This novel perspective motivated participants to explore Shloka further. The situational interest survey assessed "NOVELTY" and "EXPLORATION INTENT," where Shloka outperformed other games. As tests of normality (Shapiro–Wilk) and homogeneity of variance (Levene's test) indicated non-parametric data, a Friedman test (on the aggregate scores for each question under each parameter) was conducted. Results showed significant differences in "NOVELTY" across games, $F(9, 210) = 19.45$, $p < 0.001$, with Wilcoxon tests confirming Shloka's superior novelty. Similarly, for "EXPLORATION INTENT," Friedman test results indicated significant differences between the games $F(9, 210) = 23.7$, $p < 0.001$, and Wilcoxon tests confirmed that Shloka elicited greater situational interest, prompting participants to explore the game world and its climate change themes. For detailed, results of the Wilcoxn tests, please refer Appendix A (Table A.3).

5.5.1.2 Relating to the Consequences of Climate Change:

In the game Shloka, participants engaged with climate change scenarios uniquely tied to temple towns and sacred religious sites. As outlined in Tables 5.1 and 5.2, Level 3 focuses on the deteriorating state of the Ganges, revered as the holiest river in Hinduism, while Levels 4 and 7 address pressing issues such as forest fires and smog in the temple town of Tirupati. This contextualization prompted participants to reflect on the tangible impacts of climate change in locations they have visited and hold in high esteem. Unlike traditional games or media, which often emphasize distant or abstract consequences of climate change—such as melting glaciers, polar bears, or coral bleaching in regions like the Arctic or Australia—Shloka personalizes the narrative by situating these effects within familiar and culturally significant spaces.

Participants expressed how this grounded approach transformed their perception of climate change from a distant, abstract issue to an immediate and tangible reality. Participant P1 remarked:

> *"I watched a few documentaries on climate change; most of them just talk about the Arctic Circle melting, polar bears, glaciers. Which is fine, and I am sad. Even the other games, like one where it shows water level here in Chittorgarh, it's nice to see that, oh, the fort here will be underwater at the end of climate change (refers to H2O AR Game). But still, other games like the coral bleaching one also show a reef, which I don't think I will ever visit. However, Shloka shows places I know, I have visited, and it's sad to know not 100 years but actually now these holy places are being destroyed. Most games show an apocalyptic age, which I feel is unrealistic; however, this (Shloka) is real."*

Participant P4 added:

> *"I recently watched a cricket match, which was a charity event for forest fires in Australia; [...], like we hear about them even though we are in India. While the scale of destruction is fractional, forest fires happen even in Tirumala, Srisailam, but it hardly gets covered by news, and no one cares to explore why they happened. However, compared to other games, the level I was reading Bhagwat Gita touched upon the forest fires, which is interesting."*

These insights highlight Shloka's ability to make climate change relatable by leveraging players' cultural and emotional connections to these sacred sites. Our survey, measured "RELATEDNESS" and echoed a similar finding. A Friedman's test indicated

significant differences in "RELATEDNESS" across games, $F(9, 210) = 17.080$, $p < 0.001$, with Wilcoxon tests confirming Shloka's superior ability to invoke relatedness as highlighted in Table A.6 in Appendix A.

5.5.1.3 Motivation through Granular Climate Actions:

Participants noted that Shloka offered actionable, contextually relevant climate solutions by embedding them within culturally resonant narratives and rituals. Unlike conventional climate change games that often present generic guidelines, Shloka communicated god-sent messages and sacred practices to frame environmental actions as devotional acts. This approach reimagined climate care from a mere civic obligation into a spiritually rooted engagement, forging a deeper emotional bond with the issues at hand and providing greater motivation to contribute towards climate action. .

Participant P6 captured this sentiment when discussing how the game's forest fire level encouraged mindful disposal of camphor:

> *"We are not a god fearing group, we are a god loving group, and sometimes we need to be told how to love and care—in this case love and care for nature. This game helps in realizing that. For example, in the forest fire level, the message is simple, just be cautious while disposing with camphor in forests. I see this as two rituals, pleasing the god and taking care of the god, and we should definitely put this narrative out to make people realize."*

Participants also acknowledged the practicality of Shloka's suggestions. Rather than providing abstract, one-size-fits-all strategies, the game focused on culturally tailored, feasible actions. Participant P2 contrasted these specific steps with generic advice that rarely applies to everyday life:

> *"It is November right now, and see how hot it is, so the whole 'do not use the AC' does not apply to me. [...] And 'do not cut trees' is useless advice, because why would I pick an axe and chop trees? These are just textbook suggestions. But disposing of fireworks carefully after Diwali, or not spilling oil in the river when I put my diya—these are things I can work on. These are workable stuff."*

Our survey indicated that participants reported greater intrinsic motivation (R. M. Ryan et al., 2006) after engaging with Shloka compared to other games. The intrinsic motivation survey measured two key aspects: "INTEREST" and "USEFULLNESS". A Friedman test on the summed scores revealed significant differences in the

interest generated by Shloka across games, $F(9, 210) = 10.78$, $p < 0.002$, with Wilcoxon tests confirming Shloka's superior ability to invoke interest with regards to climate change as highlighted in Table A.4 in Appendix A. Similarly, the Friedman test revealed significant differences in the perceived usefulness of the games, $F(9, 210) = 13.49$, $p < 0.002$ and a Wilcoxn test confirming how Shloka was perceived to add more value with regards to climate change compared to other games in the corpus, as indicated in Table A.5 in Appendix A.

5.5.1.4 Analogies with Core Hindu Principles and Climate Framework:

Shloka was designed following the IGDA framework for developing games on climate change, as outlined in Section 5.3. Participants highlighted the game's strong alignment with this framework, frequently drawing analogies with Hindu narratives and philosophies. This aligns with research indicating that culturally specific content enhances engagement and relevance, as seen in prior studies on serious games (Mortara et al., 2014). Participant P3 shared an illustrative comparison:

> *"This game is a bit like the Bhagvat Gita. This game follows a similar pattern; for instance, Lord Krishna first explains Arjuna Adharma (the bad state of the world due to sins), then reveals his true Godly form (Lord Vishnu) to instill confidence in Arjuna, and then Arjuna defeats many perpetrators of Adharma (Kauravas), resulting in a brighter future. In this game, Ganesha initially illustrates the bad things happening to climate (Knowledge Stage). A god reveals himself helping the player (Attitude Stage), and then this leads to good things to climate (Efficacy Stage). I know it might be a stretch, but there is some alignment."*

This analogy reflects Shloka's ability to resonate with core Hindu ethos, particularly the role of divine figures in safeguarding nature. Research underscores how integrating cultural narratives fosters emotional investment and ethical reflection in players (Frasca, 2001). Participants also engaged deeply with the'Hope Stage," linking it to their personal experiences and concepts like "pathway thinking," often discussed in behavioral change literature (Ojala, 2012). Participant P5 observed:

> *"It is nice to see Ganesha kind of guide through various causes of climate change. My family recently started using only Mud/Clay based idols during Ganesha Festival, and I saw that in level where we need to clean the river, at least I am doing one of the recommendations from Matsya."*

This reflection highlights how culturally relevant games like Shloka serve as a bridge between abstract environmental concepts and actionable behaviors rooted in players' lived experiences. Beyond reinforcing existing practices, participants discovered actionable insights from a religious lens, Participant P9, provided a specific examples:

> *"While I was inscribing, it reminded me of the Ramayana, and the effective story of Ramayana was to have good take over evil. This game is also similar, we have some evil ways in how we treat climate this is not god, and we need to let good practices take over, honestly most Hindu stories are the same and this game is a nice wrap around that reminding us to do good for climate."*

Participants further emphasized how Shloka differs from other climate change games by offering takeaways that are deeply rooted in cultural and community-specific contexts. Generic game mechanics, by contrast, often fail to resonate. Participant P1 compared Shloka to a simulation game:

> *"In the game Human you are essentially choosing what devices to turn on, what to eat, and simulating the Human's life to make things survive long. As a Hindu Brahmin, I am strictly vegetarian (so global warming because of cows and poultry), these do not even apply to me. However, knowing how to protect Tirupati is something I can take and consider. Like reading the Gita in the last level to cause rains to cool the Tirumala fire almost feels like taking an oath."*

5.5.1.5 Communicating Climate Change across generations:

Participants acknowledged that respect and ethical treatment for natural elements—rivers, mountains, and oceans—has not always been effectively communicated to younger generations. Shloka illuminated how religious teachings could encompass the sanctity of nature as well as human relationships. Participants who were parents, reflected how Shloka could provide a valuable opportunity for their kids. Participant P13, reflecting on their role as a parent, noted that traditional morals emphasize respect for people rather than explicitly framing natural elements as sacred:

> *"This country and society are often grounded in the teachings of holy books. 'Maatru devo bhava, Guru devo bhava, Pitru devo bhava' (Treat mother as god, father as god, teacher as god) is essentially why most of our society respects parents, elders, and teachers as gods. I taught it to my son, and of course he treats everyone ethically and respectfully, but I realize now that I never taught him how a river is holy or a mountain is sacred. He would never know. It's a good realization for me*

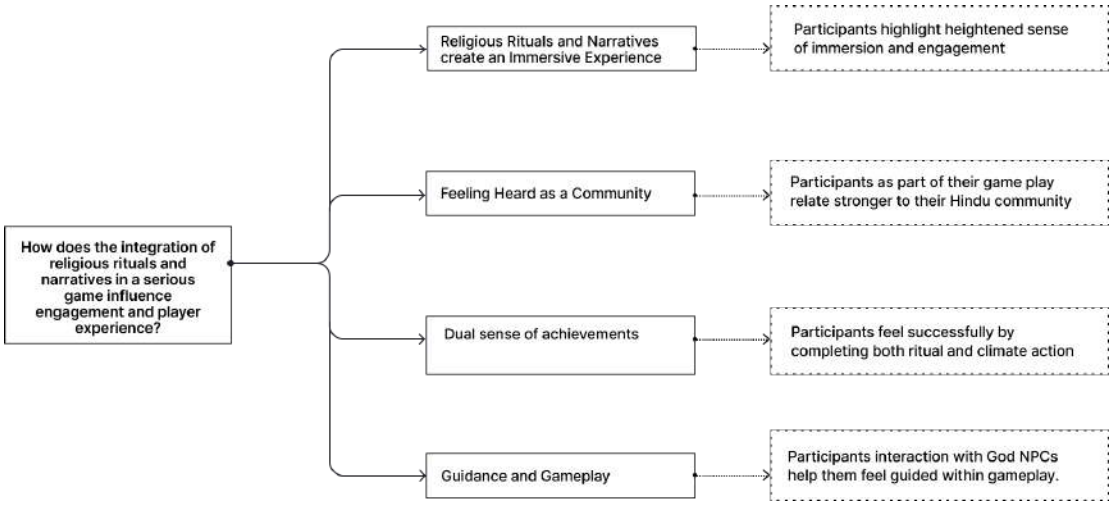

Figure 5.17: Various ways the use of Religion impacts Player Experience

as a parent. It's not like it's not in the Vedas; the ocean is born from Vishnu, so somewhere we have a duty."

Participant P10 reinforced the idea that instilling environmental reverence should begin early, ideally woven into religious and moral education, and games like Shloka would be helpful:

"See, it starts at a very foundational level to learn what needs to be valued and what not. Religion plays a huge role in deciding the morality of treating something in a certain way. And those morals to treat climate ethically have to happen early. We never teach it, at least from a parental perspective, I am not a parent yet, but when I am atleast. This game is like hitting two birds with one stone; I want my children to engage with our faith but also learn about climate, so this serves a dual purpose."

5.5.2 RQ2: How does the integration of religious rituals and narratives in a serious game influence engagement and player experience?

Our second research question aimed to understand how the use of religion in videogames shaped player experience. We identified four themes, as illustrated in Figure 5.17, which are discussed below.

5.5.2.1 Religious Rituals and Narratives create an Immersive Experience:

In Shloka, participants were required to physically execute rituals, with their correct execution directly influencing in-game outcomes. This tangible interaction enhanced the sense of immersion, as players felt a deeper connection between their actions and the game's progression. Participants noted that the physicality of performing rituals added a layer of and engagement, making the experience more immersive compared to other games. Participant P14 shared their perspective on how Shloka stood out from other games in terms of keeping their attention and having them immersed in the game:

> *"In other games, the outcome is pretty expected, like I scan and I know how much I am going to drown, or I choose a wrong answer I know it's game over. It's the being on your toes part which these games lack; however, in Shloka my back was straight I know what I am specifically doing, like ritual which makes it more immersive, and engaging."*

Participants also emphasized how the use of religious narratives in the game helped sustain their interest and presented the issue of climate change in a novel way, encouraging them to pay closer attention. The integration of mythology sparked curiosity and offered a fresh perspective on climate-related challenges. Participant P9 explained how the combination of myth and ritual added an element of intrigue:

> *"The myth, around the movie in Kalki is what makes it interesting, the magic you know. It's the same thing (with Shloka), [....] the curiosity of what magic power through which ritual and god, what my doing can effect the climate in the game is interesting."*

Participants found that engaging with the rituals helped them rethink their relationship to both faith and environmental responsibility. Participant P10 observed that while knowledge of a religion may remain theoretical, rituals transform this understanding into active practice. They noted:

> *"Rituals serve as the bridge between just knowing a story in the religion and practicing the religion. They help you establish continuity and responsibility. In this case, climate change needs a continuous effort and responsible effort and adding a ritual to enable this leaves a lasting impression."*

This emphasis on practical engagement resonated with other participants, who highlighted how rituals like writing holy words on stones—practices often associated

with oceans—could anchor environmental messages more firmly in their minds. Participant P3 explained that performing a ritual, followed immediately by addressing a climate-related task, left a lasting impression:

> *"The story of floating stones after writing holy words is so famous, but I never saw it from the lens of climate change. This is actually the first time I am doing this ritual, and the moment I did the ritual and was able to solve the spill. Next time I see an ocean or someone performing this ritual, it will remind me of climate change."*

Our surveys measured corroborated the above, by measuring "IMMERSION" and "ATTENTION." A Friedman test revealed significant differences between the groups for "IMMERSION", $F(9, 210) = 19.78$, $p < 0.002$, with post-hoc Wilcoxon tests confirming Shloka's superior ability to evoke immersion, as detailed in Table A.1 in Appendix A. Similarly, a Friedman test indicated significant differences in "ATTENTION", $F(9, 210) = 13.51$, $p < 0.002$, with post-hoc Wilcoxon tests showing that Shloka outperformed other games in eliciting attention as indicated in Table A.8 in Appendix A.

5.5.2.2 Feeling Heard as a Community:

Shloka created a sense of community by integrating cultural narratives and interactive tasks, making players feel represented and connected. Participants noted how the blend of narrative and gameplay elements not only engaged them but also highlighted complex issues like climate change in a way that felt relevant to their cultural identity.

Participant P14 remarked on how Shloka struck the right balance between narrative and action, emphasizing the cultural aspect as a key element that fostered a sense of being recognized as part of a community:

> *"I think compared to other games, it (Shloka) has the right blend of narrative and things to do. The culture aspect to it makes it more connecting, which almost feels like being seen as a community, in an interactive way. But also at the same time, kind of driving a complex problem like climate change home."*

Participant P11 highlighted a broader perspective, comparing their experience with Shloka to their appreciation for mythological films. They reflected on how such

representations can give voice to their community, even if they are not deeply engaged with the cultural themes themselves:

> *"Even though I am not deeply into religion, or follow it extensively, it is still part of my identity, and to see my communities stories, and narratives being used for a cause is actually empowering, maybe not from a devotional sense that I need to work towards climate action, but just for the sake of my community I need to think about climate change more actively."*

As part of the GAMEFULQUEST survey, we measured "SOCIAL EXPERIENCE". We aimed to understand if Shloka, provide an avenue to connect with the social aspects (religion, community etc) of the participants. A Friedman's test indicated significant differences between the groups, $F(9, 210) = 30.78$, $p < 0.001$, with post-hoc Wilcoxon tests confirming Shloka's superior ability to evoke social connectedness, as detailed in Appendix A Table A.2.

5.5.2.3 A Dual sense of achievement:

The stages in Shloka require participants to complete ritual-based tasks, which then enable them to tackle climate change-related challenges. Participants highlighted that successfully completing both types of tasks, and observing the connection between them, gave them a heightened sense of achievement i.e. twice as rewarding compared to other games where the sole focus was on solving climate change challenges. Participant P13 remarked:

> *"The whole purpose of going to temples or praying to god, is to wish for good will, and happiness in our lives, in this game, this is evident, like you pray and an outcome happens, apart from the fact i am gaining good deed by chanting I can also learn, as well cause an impact atleast in the game. Other games, I have nothing personal, but here the ritual taps into my personal faith, which makes me feel good."*

Participants further expressed that the ability to successfully execute rituals, combined with systems to verify and validate these rituals, significantly contributed to their sense of achievement. They compared Shloka with other games, such as the AR game H2O and the interactive narrative Illuminate, noting that while these games include tasks to teach the consequences of climate change, they often lack activities that directly involve players in learning or contributing to climate-related solutions within

the virtual setting. In contrast, Shloka tasks players with specific, actionable challenges—such as recycling trash or generating renewable energy—immediately following the completion of a ritual. This integration not only reinforces the learning process but also provides a deeper sense of satisfaction. Participant P7 remarked:

> *"Like in Illuminate, there are a set of choices I need to choose, and the game goes ahead. In that process I win or lose, but I never felt the 'aha' moment. Here once the Rama was written, and the stones started coming up towards the spill, I felt so good, I know this story, I know what is happening and what is being solved."*

Further, analyzing this from a statistically lens, the GAMEFULQUEST measured "ACCOMPLISHMENT". A Friedman's test indicated a significant differences between the games, $F(9, 210) = 23.89$, $p < 0.002$, and a post-hoc Wilcoxn test indicated that Shloka provides a more sense of Accomplishment compared to other games as indicated in the Table A.7 in Appendix A.

Community	Previous Work	Our Contributions
Religion and Videogames	Maram (Maram et al., 2022a; Maram, Pfau, Dodechani, & Seif El-Nasr, 2023; Maram, Malegaonkar, et al., 2024; Maram, Pfau, et al., 2024), de Wildt (de Wildt & Aupers, 2021; De Wildt, 2022; de Wildt et al., 2020b; de Wildt & Aupers, 2023), Zeiler (Zeiler & Mukherjee, 2022a; Zeiler, 2020): Focus on religious elements and design taxonomies. Lack practical evidence of applying the taxonomy, or have playtests capturing opinions of players.	**Advancing Design Space**: Introduces a novel framework connecting religious practices with climate change, expanding beyond character/narrative design to explore cultural rituals as game mechanics. **Rituals as Input Mechanics**: Showcases the use of religious rituals (e.g., chanting, mudras, verses) as core input mechanics in videogames, moving beyond narrative elements to integrate ritualistic actions into gameplay.

Table 5.5: Implications and Contributions to different Academic Communities (Part 1 of 3)

Community	Previous Work	Our Contributions
Climate Change Serious Games	Barnes (Barnes et al., 2017), Madani (Madani et al., 2017), Fjaellingsdal (Fjællingsdal & Klöckner, 2020): Focus on climate change communication through games, climate change policies, and specialized stakeholders.	**Localized Climate Change Framing**: Demonstrates how personalized, culturally anchored narratives and religious elements create stronger player connections to climate change as a sacred responsibility. **Religion as a Learning & Reflection Mechanic**: Introduces religious elements not just as thematic content but as active learning and reflection mechanics, positioning climate change as a sacred responsibility, enhancing player engagement and personal connection.

Table 5.6: Implications and Contributions to different Academic Communities (Part 2 of 3)

Community	Previous Work	Our Contributions
Religion and Design Research	Markum (Markum et al., 2023), Wolf (S. Wolf et al., 2023), Gonsher (Gonsher et al., 2024): Designing artifacts to support faith practices, limited to personal faith.	**New Path for Design**: Highlights the potential of using religious contexts in broader educational tools, opening pathways for designing culturally relevant, engaging educational artifacts. Further, highlights how Religion can be used beyond developing religious practice, devotion and prayer tools.

Table 5.7: Implications and Contributions to different Academic Communities (Part 3 of 3)

5.5.2.4 Guidance and Gameplay:

In Shloka, players received guidance from a mentor-god who introduced them to climate change issues, explained the rituals they needed to perform, and clarified how each completed action contributed to environmental well-being. Participants noted that this mentorship style made them feel supported, informed their decision-making, and encouraged attention to key details. Comparing this experience with other games, Participant P10 reflected on the impact of divine guidance:

> *"Other games have us doing most of the thinking, which is fine, but I never felt helped. Here, you have multiple gods helping me, pointing out mistakes, showing the consequences, and guiding me to solve them—like Ganesha in all the levels or specific gods in specific levels. I am a Hanuman bhakt (devotee), so hearing from him, even in a game, makes me take his words seriously."*

Participants appreciated how these mentor-gods not only provided practical advice for taking positive climate action but also reinforced core spiritual principles—living in harmony with nature and recognizing a deeper connection to the natural world. Participant P12 described this realization as a wake-up call:

> *"I see it as a wake-up call. I know so many people named 'Varun', 'Vayu', and at least half a dozen 'Aditya's—all these names are direct references to climate. When*

Varun, Aditya appear in the game and tell us how to live, it reminds me of the spiritual connection we have with nature and how we tend to forget it."

The GAMEFULQUEST survey, measures the attribute of "GUIDANCE" a game provides. A Friedman's test indicated that there exist significant differences between the groups, $F(9, 210) = 27.98$, $p < 0.001$, with post-hoc Wilcoxon tests confirming Shloka's superior ability to guide players into the aspects of climate change and how to navigate the game.

5.6 Discussion and Implications

As depicted in Tables 5.5, 5.6, and 5.7, our research and its outcomes significantly contribute to three key academic communities: the intersection of religion and videogames, the religion and design community, and the climate change serious games community. Our work offers insights and opportunities for further exploration in each of these domains.

The integration of religious artifacts into videogames has been explored by scholars such as Maram (Maram et al., 2022a; Maram, Pfau, Dodechani, & Seif El-Nasr, 2023; Maram, Malegaonkar, et al., 2024; Maram, Pfau, et al., 2024), de Wildt (de Wildt & Aupers, 2021; De Wildt, 2022; de Wildt et al., 2020b; de Wildt & Aupers, 2023), and Zeiler (Zeiler & Mukherjee, 2022a; Zeiler, 2020), among others. However, prior research has predominantly focused on analyzing existing videogames to identify religious elements or on establishing and evaluating religious design taxonomies. Our work advances this area in three key ways. First, in Sections 5.2.3 and 5.2.2, we present a novel design space that connects religious practices with climate change themes, moving beyond previous studies that centered on character or narrative development. Second, We aim to prompt discussions on how religion can transcend its traditional role as a "myth"-creating element to serve as a "learning" mechanic, thereby inspiring artists and religious scholars to create games that explore these dimensions. Finally, in Section 5.5.2, we move beyond theoretical considerations by offering qualitative and quantitative evidence that demonstrates how religion can enhance reflection, immersion, representational depth, community engagement, and player guidance within

serious game environments. Further our themes, such as “Religious rituals and narratives creates an immersive experience”, “A dual sense of achievement”, ”Guidance in Gameplay” highlight various ways religion can contribute to gameplay.

The climate change and serious game community has explored various approaches to communicate the message of climate change (Barnes et al., 2017; Madani et al., 2017; Fjællingsdal & Klöckner, 2020). However, few studies have examined the cultural dimensions of both narratives and gameplay mechanics. Participants reflection demonstrate how localized narratives and framing climate change as a personal issue can foster a greater sense of connection for players. Additionally, we explore how incorporating religious elements can position climate change as a sacred responsibility, thus instilling a sense of ownership. Beyond these contributions, Shloka also highlights the limitations of traditional climate change games, which often fail to resonate with individuals' lived experiences (Lehtonen, Salonen, & Cantell, 2019). In contrast, Shloka anchors environmental actions within participants' cultural and ritualistic contexts, making them not only more relevant but also actionable. This approach aligns with previous research (Hirsh, Kang, & Bodenhausen, 2012; Hammady & Arnab, 2022; Boyle et al., 2016a; Billet, Baimel, Sahakari, Schaller, & Norenzayan, 2023; Suganthi, 2019), which underscores that personalized and context-specific messaging leads to more meaningful and lasting behavioral change. Further, our themes such as “Feeling heard as a community”, “Communicating climate change across generations”, ”Motivation through granular climate actions” highlight how the presence of religion in climate change games can motivate deeper reflection.

To the design research community, we aim to demonstrate how religion can serve as a rich and effective design space. Our work highlights how collaboration with religious stakeholders and cultural contexts can lead to the creation of meaningful and engaging artifacts. While there has been some research on designing artifacts that support users in practicing their own faith (Markum et al., 2023; S. Wolf et al., 2023; Gonsher et al., 2024), few studies have contextualized religion for broader educational purposes. We hope that this work opens a new pathway for both the religious design community and the design research community, encouraging the consideration of lived faith experiences as a crucial element in designing educational tools, communicating

important messages and artifacts for diverse age groups.

Implementation note: involving cultural stakeholders. Shloka was developed through close collaboration with Hindu practitioners, religious scholars, and community members, and that collaboration was central to what made the game work. Several of the design decisions that mattered most (depicting deities as guides rather than combatants, grounding climate crises in specific sacred sites, representing rituals with care) came directly from that ongoing dialogue, not from literature review or the design team alone. Anyone looking to build a similar game around a different cultural or religious tradition should treat this kind of stakeholder involvement as a basic requirement of the process, not a validation step at the end. The gap between how a tradition looks from the outside and how it is actually practiced and experienced by its community can be large, and it shows in the design.

Chapter 6

Bringing It All Together

"The old gods are not dead. They have simply changed their address."

When I stood as a six-year-old, chanting the mantra *Sarva-Manggala-Maanggalye*, I could not have imagined that fifteen years later, those same syllables would echo through the opening trailer of a videogame. Yet that encounter — the collision of the deeply personal and the digitally playful — is precisely the nexus this dissertation has sought to understand. *Scripture To Console: The Nexus between Religion and Digital Play* began with a simple but potent observation: religion is everywhere in videogames, yet the field of game studies had only partially reckoned with this. Designers borrow from it, players debate it, religious communities wrestle with it, and the friction between all these stakeholders had never been mapped from a unified, empirical, Human-Computer Interaction perspective. This thesis is my attempt to draw that map.

The three directions pursued in this dissertation are not merely sequential chapters; they form an interlocking argument. Direction 1 establishes the generative potential of religion as a design space. Direction 2 reveals the social and cultural tensions that arise when that design space is deployed into commercial games. Direction 3 demonstrates that, when religious content is thoughtfully co-designed with stakeholders and deployed in a purpose-built serious game, those same tensions dissolve into measurable engagement, reflection, and motivation. Together, they trace a path from inspiration, through reception, to application — and in doing so, they open a new sub-field at the intersection of HCI, game studies, and religious studies.

6.1 Revisiting the Three Directions

6.1.1 Direction 1: From Sacred Space to Design Space

The first direction began with a methodological conviction: to understand how religion could inspire game design, one must study religion first and games second. Earlier work in the field had taken the opposite route, beginning with commercially available games and cataloging the religious elements already present in them. While valuable, this approach is inherently bounded by the creative choices of studios, which are themselves shaped by market forces, existing IP, and the knowledge of individual designers. My religion-first approach, grounded in visual ethnography at Hindu temples and grounded theory analysis of the resulting data, produced a qualitatively different outcome.

The AstraVerse 1.0 framework demonstrated that by decomposing mythological characters into their constituent syntagms — weapons, narratives, physical features, moral alignments — and recombining them, designers can create characters that are simultaneously novel and culturally legible. Critically, the characters produced through this process were judged significantly less offensive by Hindu-identifying evaluators than the direct transplantation of deities practiced by games like SMITE, suggesting that the framework's modular approach can reduce cultural friction without reducing creative possibility.

AstraVerse 2.0 extended this work in three important ways. Visual ethnography replaced text-based analysis as the primary data collection method, enabling the capture of embodied, ritual, and aesthetic dimensions of religion that do not appear in scriptures or films. Grounded theory replaced researcher intuition as the coding mechanism, yielding a hierarchical taxonomy of 141 open codes, 22 axial codes, and four selective codes spanning character features, weapon systems, fashion, and game mechanics. Finally, the evaluation framework was reformed: novelty assessment was made more objective through quantitative divergence scoring against the existing taxonomy, and sensitivity assessment was extended to include consultation with religious scholars and pandits, not merely lay practitioners.

The contribution of Direction 1 is therefore both a design artefact and a

methodological template. Game designers gain access to a rich, structured repository of culturally validated elements; researchers gain a replicable pipeline for constructing equivalent repositories from any religious or cultural tradition.

6.1.2 Direction 2: Mapping the Fault Lines of Reception

The second direction turned from the question of design to the question of perception. Even the most carefully crafted religious design space is worthless — or worse, harmful — if designers do not understand how their choices will land with the communities most affected by them. Direction 2 addressed this gap by studying, at scale, how both gaming communities and religious communities discuss the intersection of religion and videogames on Reddit.

The BERTopic analysis of over 3,000 posts and comments revealed a landscape far more complex than a simple binary of offense versus appreciation. Three overarching themes emerged. First, *blasphemous elements of videogames*, encompassing ten sub-themes through which communities identify specific game mechanics, aesthetics, and narratives as sinful or haram — from role-playing as a god to virtual gambling, from in-game alcohol consumption to the addictive pull of play itself. Second, *religion as a design space for games*, encompassing eight sub-themes through which players and indie developers actively co-create concept art, propose new gods and narratives, and lobby studios for historically accurate Islamic architecture or additional Hindu festival skins. Third, *videogames for religious education and community formation*, in which games function as instruments of catechesis, community building, and interfaith awareness.

The cross-community comparison yielded particularly important design implications. The Hindu subreddit showed a higher share of design discussion (58%) while being comparatively less focused on blasphemy (34%), whereas Islamic and Christian subreddits showed higher blasphemy discussion (52% and 63% respectively) but also more active use of games for religious education. Game subreddits inverted this pattern for Hinduism: player communities raised blasphemy concerns around Hindu gods more often than around Islam or Christianity, because titles like SMITE and Crusader Kings directly feature and permit players to control or defeat Hindu deities. These asymmetries have direct implications for studio communications, content policies, and

community management strategies — implications that could not have been derived from studying games alone.

Direction 2 is also a methodological contribution to the field. Previous scholarship on player perception relied on qualitative interviews and in-game ethnographies, necessarily small in scale and limited to researcher-selected participants. By applying transformer-based topic modeling (BERTopic) to organic, pseudonymous community discourse, this direction offers a scalable, researcher-bias-minimized window into stakeholder perception across multiple religions and game titles simultaneously.

6.1.3 Direction 3: From Reception to Mobilization

The third direction asked the most ambitious question: if religion is such a potent force in cultural life, and if videogames are such a potent medium for communication and motivation, can the two be deliberately combined to address a global crisis? Direction 3 answered this question in the affirmative, through the design, development, and empirical evaluation of *Shloka*, a serious game that integrates Hindu rituals and environmental narratives to engage players with climate change.

The design process drew directly on the two preceding directions. The ethnographic methods from Direction 1 were redeployed at Hindu temples to identify the specific rituals, metaphors, and divine personifications of natural elements that would inform the game's mechanics and levels. The stakeholder tensions identified in Direction 2 shaped co-design decisions — ensuring, for example, that deities were cast as guides rather than as combatants, and that sacred sites were depicted with reverence rather than as ruined backdrops for action. The result was a seven-level game in which players perform physical ritual interactions (chanting, mudra gestures, inscribing sacred words) to address environmental crises tied to specific holy sites, guided by mentor-gods drawn from Hindu cosmology.

The comparative playtest — evaluating Shloka against nine other climate change serious games on measures of immersion, accomplishment, social experience, guidance, novelty, exploration intent, relatedness, and intrinsic motivation — provided consistent evidence that religious mechanics constitute a distinct and measurably superior form of engagement for participants who share the relevant faith background.

Participant quotes illustrated why: Shloka personalized climate change by situating it in sacred sites players had visited, framed environmental action as devotional duty rather than civic obligation, produced a "dual sense of achievement" by rewarding both ritual mastery and environmental problem-solving, and explicitly represented the participant's community as moral agents in the narrative. These mechanisms are transferable: the research-through-design methodology documented in Direction 3 constitutes a replicable blueprint for serious games that leverage any faith tradition for educational purposes.

6.2 The Interlocking Argument

The three directions are not additive but multiplicative in their contribution. Direction 1 without Direction 2 risks producing design tools that inadvertently offend the communities they draw from. Direction 2 without Direction 1 diagnoses problems without offering solutions. Direction 3 without Directions 1 and 2 would be a game developed in ignorance of both the richness of the available design space and the specific sensitivities of the target audience. Together, they constitute a closed loop of responsible design: generate, interrogate, apply.

This loop also resolves the tension that animated the opening anecdote. My family's discomfort with the Razi game was not a categorical rejection of religion in digital play; it was a specific objection to a perceived lack of care in representation. Direction 1 provides the tools to represent with greater care. Direction 2 provides the empirical map of what care looks like across different communities. Direction 3 provides the proof that, when care is exercised, the result is not merely inoffensive but actively powerful.

6.3 Contributions to the Field

This dissertation contributes to four academic communities. To *game design research*, it offers validated frameworks (AstraVerse 1.0 and 2.0) for extracting and evaluating design spaces from cultural and religious sources, and a topic-modeling methodology for understanding large-scale community discourse. To *religion and digital play scholarship*, it introduces empirical, quantitative methods to a field that has

been predominantly qualitative, and it centers religious stakeholders — not only players and designers — as primary voices in the conversation. To *serious games research*, it introduces religion as an under-explored but highly effective design dimension for engagement and reflection, and provides the first rigorous comparative evaluation of religiously-themed serious game mechanics. To *HCI and design research more broadly*, it demonstrates how ethnographic fieldwork in physical religious spaces can be systematically translated into interactive digital artifacts, and how faith-based design can extend beyond devotional tools into broader educational contexts.

The overarching methodological contribution is the introduction of a mixed-methods, UX-informed research paradigm to the study of religion and digital play. The field has historically been led by media scholars, religious studies scholars, and cultural critics working with interpretive methods. This dissertation shows that discourse analysis, grounded theory, BERTopic modeling, within-subjects playtesting, Friedman statistics, and participatory design workshops can be applied to questions of religion and games with rigor and yield, without reducing the richness of the human experience being studied.

6.4 Future Work

6.4.1 Extending the Frameworks to Other Religions and Cultures

The most immediate extension of this work is its application to religious traditions beyond Hinduism. The AstraVerse 2.0 pipeline was designed to be replicable: visual ethnography at a mosque, church, synagogue, or gurudwara, followed by grounded theory coding and participatory design with community members, would yield equivalent design taxonomies for Islamic, Christian, Jewish, or Sikh visual and ritual vocabularies. Direction 2 already identifies specific lacunae that such work would address — the Islamic design space in particular, with its rich architectural, calligraphic, and historical traditions, emerged from the Reddit analysis as strongly desired by both Muslim players and game communities, yet underserved by studios. Future work could productively close this gap.

Similarly, Shloka's methodology is generalizable to other faith traditions and

other global challenges. The climate-religion nexus explored in Direction 3 is not unique to Hinduism: Indigenous traditions, Buddhism, and West African spiritual systems all offer cosmologies in which nature is sacred and environmental stewardship is a spiritual obligation. Designing culturally embedded serious games for these communities, following the research-through-design pipeline developed here, could substantially extend the reach of climate change education into communities that existing secular serious games have failed to engage.

6.4.2 LLMs and Automated Design Space Discovery

The most transformative near-term opportunity for this line of research lies in the rapid advancement of Large Language Models (LLMs) and multimodal generative AI. Each of the three directions in this thesis involved time-intensive manual processes: temple visits, image annotation, grounded theory coding, PRAW scraping, topic labeling, game prototyping. LLMs and related technologies stand to dramatically accelerate each of these stages, while simultaneously opening research questions that were not previously tractable.

For Direction 1, the design space generation process could be significantly augmented by LLMs trained on or prompted with religious texts, commentaries, mythological encyclopedias, and temple databases. Where AstraVerse 2.0 required weeks of ethnographic fieldwork and iterative coding to identify 141 design elements from four temples, an LLM pipeline could potentially synthesize thousands of elements from the full corpus of available Hindu scripture — the Vedas, Upanishads, Puranas, Mahabharata, Ramayana — as well as from digitized temple archives, museum catalogs, and YouTube documentation of rituals from communities worldwide. This raises a critical research question: do LLM-derived design taxonomies produce characters and mechanics that are perceived as equally novel and culturally sensitive by religious communities as those derived from embodied ethnographic fieldwork?

Beyond text, multimodal LLMs that reason over images can analyze the visual vocabulary of religious iconography at a scale no team of ethnographers could achieve manually. A researcher could query such a model with hundreds of temple photographs and receive structured descriptions of posture, gesture, adornment, color symbolism,

and compositional hierarchy — precisely the granular elements that AstraVerse 2.0 codes by hand. Future work should examine both the potential and the limits of this approach: where does automated visual analysis match human expert judgment, and where does it fail to recognize the culturally specific significance of a particular hand gesture or floral arrangement?

6.4.3 Real-Time Stakeholder Perception Monitoring

Direction 2 conducted a retrospective snapshot of community discourse — a cross-section of Reddit discussions gathered at a particular moment in time. But the conversation about religion in games is not static. Every major game release, every controversial design decision, every DLC that introduces new religious content generates a new wave of discourse. Future work could deploy the BERTopic pipeline in a continuous, near-real-time monitoring capacity, providing game studios with a "community sentiment dashboard" that tracks how stakeholder perceptions of specific religious representations evolve over time, across platforms including Reddit, X (formerly Twitter), Discord, and YouTube comments.

LLMs offer a further opportunity here: rather than waiting for community reactions to develop organically after release, studios could use LLM-simulated stakeholder panels to pressure-test proposed religious designs before a game ships. By fine-tuning or prompting LLMs on the discourse data gathered in Direction 2, a researcher or designer could ask: "How might the Hindu community respond to depicting Ganesha as a playable combatant with a health bar?" and receive a nuanced, evidence-grounded prediction. This kind of AI-mediated pre-release consultation could substantially reduce the risk of the controversies that have historically surrounded games like SMITE, *Hanuman: The Boy Warrior*, and *Faith Fighter* — and it would democratize access to community consultation for small indie studios that cannot afford large-scale user research.

6.4.4 Generative AI and the Future of Religious Aesthetics in Games

The emergence of high-quality generative image and audio models (diffusion models, text-to-speech systems, music generation models) creates both opportunity and

risk for the religious design space opened by Direction 1. On the opportunity side, a designer equipped with the AstraVerse 2.0 taxonomy could use a text-to-image model to rapidly prototype characters by combining selected syntagms — "character with zoomorphic elephant head, multiple upper limbs, jeweled crown, holding a trident and a lotus" — and iterate on visual designs in hours rather than weeks. Future work should evaluate whether this workflow accelerates culturally sensitive character creation or whether it risks shortcutting the deliberative, stakeholder-engaged process that AstraVerse 2.0 was designed to require.

On the risk side, generative AI trained on web-scraped data absorbs the full distribution of how religious imagery has been represented online, including appropriative, stereotyped, and outright offensive representations. A model prompted to generate "a Hindu goddess in a fantasy game" may default to the hypersexualized, decontextualized aesthetic that the Kali SMITE controversy exemplifies, because such representations are prevalent in its training data. Future work should investigate how the AstraVerse taxonomy can be used as a structured constraint or fine-tuning signal for generative models, steering outputs toward representations that are more likely to be perceived as culturally valid. This is not merely a technical question but an ethical one, and it invites collaboration between AI researchers, game designers, religious scholars, and community members.

6.4.5 Religion as a Mutable Concept in the Age of Digital Media

A deeper thread running through all three directions is the question of what religion itself means as a category, and how that meaning shifts as the technologies through which it is mediated evolve. Durkheim (Durkheim, 2016) defined religion through the dichotomy of the sacred and the profane; Geertz (Geertz, 1973) emphasized its symbolic and meaning-making dimensions; Davidsen (Davidsen, 2018) pointed to its presence in unexpected digital places. The evidence from this dissertation suggests that videogames are not merely sites where pre-existing religious content is deposited; they are sites where the concept of religion is actively being renegotiated.

Direction 2 revealed that players who identified as atheists reported developing attachment to mythological deities through gameplay, a phenomenon de Wildt (de Wildt

& Aupers, 2019) terms the "secularism-to-enchantment" transition. It revealed that deeply religious Muslim players navigated a complex internal debate about whether immersing oneself in a polytheistic game world constitutes the sin of shirk. It revealed that gaming communities are functioning as new arenas for interfaith awareness, with festival celebrations in Civilization and SMITE introducing non-Hindu players to Diwali lore and non-Islamic players to Ramadan traditions. These are not marginal phenomena; they are evidence that the 1.5 billion hours of videogame play that occur globally each week constitute a significant new domain in which human beings encounter, interpret, and negotiate the sacred.

This process will only accelerate as AI-generated content becomes standard in games. Procedurally generated open worlds that can adapt religious content dynamically to individual players, NPC characters powered by LLMs that can engage in theologically coherent dialogue about any world religion, quest systems that generate new sacred narratives on demand — these are not distant speculations but near-term engineering realities. When they arrive, the taxonomy of what constitutes religious representation in games will need to be radically expanded, and the stakeholder perception research that Direction 2 began will need to be continuously updated. Future work in this area should track not only how players and religious communities respond to these AI-generated religioscapes, but how the act of generating, personalizing, and interacting with AI-produced religious content changes the meaning that players assign to religion itself.

6.4.6 The Evolution of Serious Games for Social Mobilization

Direction 3 demonstrated that religious mechanics can outperform conventional game mechanics in motivating reflection and engagement around climate change. This finding opens a wide horizon of future work at the intersection of serious games, religion, and global challenges. Climate change is only one of the areas in which religion and interactive media could be productively combined: public health behavior, vaccination hesitancy, water conservation, biodiversity protection, and intercommunal conflict resolution are all domains in which religious frameworks carry significant moral authority among the populations most difficult to reach through secular informational

campaigns.

Future work should investigate whether the Shloka research-through-design methodology can be extended to these domains, and whether its findings generalize across faith traditions. A serious game for water conservation grounded in Islamic teachings on water stewardship (*siqaya*), or one for biodiversity protection grounded in Buddhist conceptions of interdependence, could be developed using the same pipeline and evaluated using the same comparative playtest methodology. If religious framing consistently enhances engagement and reflection relative to secular alternatives across multiple faith traditions and issue areas, the implications for public health communication, environmental advocacy, and development education are substantial.

The advancement of LLMs also opens a new direction for personalizing serious game content to individual religious backgrounds in real time. Rather than designing one game for the entire Hindu community, an LLM-powered system could adapt narratives, character dialogue, ritual mechanics, and sacred site references to the specific sub-tradition, regional practice, or level of religiosity reported by each player at the outset of a session. This kind of adaptive, LLM-mediated religious personalization could dramatically increase the ecological validity of findings like those from Direction 3 — and it could produce a serious game that is genuinely useful to the widest possible range of community members, rather than one optimized for an average participant.

6.4.7 Studying Religion in Games Through the Lens of AI-Generated Content

The rapid proliferation of AI-generated content in games — AI-generated music, dialogue, characters, and environments — creates a genuinely new research frontier that did not exist when the foundational literature of religion and digital play was written. When a game's religious soundtrack is generated by an AI trained on recordings of temple ceremonies, and a game's NPC priest speaks in AI-generated language modeled on scriptural commentary, and a game's sacred architecture is procedurally designed by an algorithm trained on images of real mosques, the question of what it means to represent religion faithfully becomes acutely complex.

Future research should ask: who bears moral responsibility for AI-generated

religious content that members of a religious community find offensive? How do players distinguish between AI-generated and human-authored religious representations, and does this distinction affect their reception? Can the topic-modeling methodology of Direction 2 be adapted to continuously audit AI-generated religious content in games for potential community harms before it is deployed? And more fundamentally: as AI systems trained on religious texts begin to generate new religious-sounding narratives, rituals, and characters, how do religious communities understand and adjudicate the authenticity of what is produced?

These are questions that sit at the intersection of AI ethics, religious studies, and game design, and they will require interdisciplinary collaboration. This dissertation provides one foundation for that collaboration: a body of empirical evidence about how communities currently understand the relationship between religion and games, a set of methodological tools for studying that relationship at scale, and a design framework for navigating it with care.

6.5 Limitations

No dissertation is without limits, and this one is no exception. The Design Space developed in Directions 1 and 3 is grounded exclusively in Hinduism; claims about its generalizability to other religious traditions are suggestive rather than demonstrated. The Reddit analysis in Direction 2 is bounded by the demographics of Reddit users, who skew younger, more tech-literate, and more globally connected than the broader religious communities they nominally represent; the voices of older, less digitally active community members are underrepresented. The Shloka evaluation was conducted with a relatively small sample of 24 participants, all self-identified practicing Hindus, all recruited through networks associated with UCSC and Hindu religious organizations in California and India; the findings may not generalize to Hindu communities in other geographies or demographic profiles, or to other faith traditions. Future work should address each of these limitations directly.

6.6 Closing Reflections

When I shared the Razi trailer with my family and they expressed unease at seeing their mantras in a videogame, they were articulating a concern that this dissertation has taken seriously from the first page to the last: the concern that the sacred can be trivialized by the profane, that commerce can hollow out culture, that entertainment can reduce the weight of the transcendent to the flicker of a screen. That concern is legitimate, and the controversies documented throughout this thesis — SMITE's Goddess Kali, the baptism mechanic in BioShock Infinite, the discomfort of Muslim players with in-game polytheism — testify to the real harm that careless religious representation can cause.

But the findings of this dissertation also testify to something else: the profound capacity of games, when designed with care, to do what religion has always done — to make the sacred tangible, to bind communities through shared narrative and ritual, to motivate action in the face of overwhelming challenge. The participants who played Shloka and felt, for the first time, that climate change was their problem because it was happening to their holy river, the Ganges — they experienced something that a documentary, a lecture, or a policy brief had not given them. They experienced it through play.

The gods have not left. They have found a new console. The task for future designers, scholars, and communities is to ensure that when they appear on that console, they arrive with the gravity and the grace they deserve.

Appendix A

Appendix G: Statistical Calculation for Shloka Participants

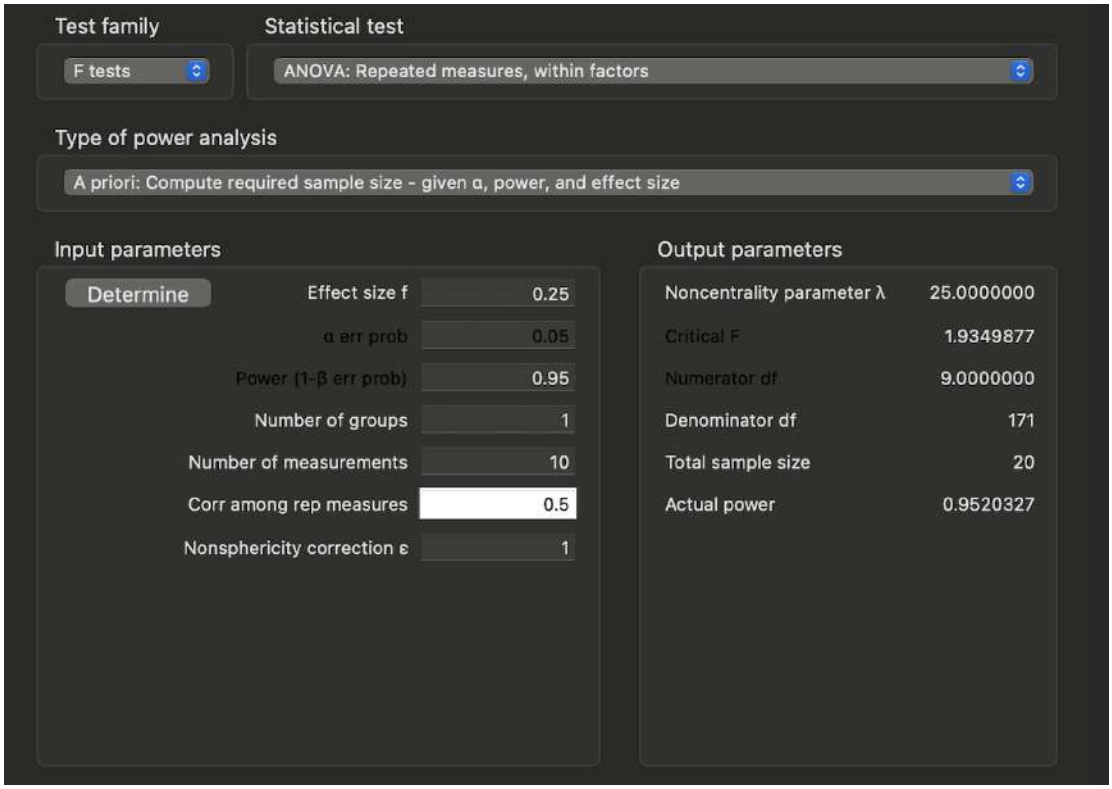

Figure A.1: Screenshot from G*Power highlighting the required Sample Size for the ANOVA.

A.0.1 Wilcoxn Tests for Various Games

Table A.1: p-values and effect sizes when comparing Shloka with other games on the parameter of IMMERSION. G1 = Climate Changer, G2 = Crabby Claws, G3 = Climariqs, G4 = Coral Bleaching, G5 = Mother Nature, G6 = Human, G7 = H20, G8 = Word Wall, G9 = Illuminate.

Statement	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**
IMMERSION									
When playing the game, I feel transported to another time and place.	P: <0.002, r: 0.80	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.81	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87
Exploring the game world feels like taking an actual trip to a new place.	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.83
When moving through the game world I feel as if I am actually there.	P: <0.002, r: 0.86	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.86
I am impacted emotionally by events in the game.	P: <0.002, r: 0.82	P: <0.002, r: 0.87	P: <0.002, r: 0.73	P: <0.002, r: 0.85	P: <0.002, r: 0.78	P: <0.002, r: 0.81	P: <0.002, r: 0.86	P: <0.002, r: 0.84	P: <0.002, r: 0.87
The game was emotionally engaging.	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87
I experience feelings as deeply in the game as I have in real life.	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.78	P: <0.002, r: 0.84	P: <0.002, r: 0.83	P: <0.002, r: 0.83	P: <0.002, r: 0.86	P: <0.002, r: 0.82
When playing the game I feel as if I was part of the story.	P: <0.002, r: 0.81	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87
When I accomplished something in the game I experienced genuine pride.	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.86
I had reactions to events and characters in the game as if they were real.	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.85

Table A.2: p-values and effect sizes when comparing Shloka with other games on the parameter of SOCIAL EXPERIENCE. G1 = Climate Changer, G2 = Crabby Claws, G3 = Climariqs, G4 = Coral Bleaching, G5 = Mother Nature, G6 = Human, G7 = H20, G8 = Word Wall, G9 = Illuminate.

Statement	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**
SOCIAL EXPERIENCE									
Gives me the feeling that I'm not on my own	P: <0.002, r: 0.82	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.82	P: <0.002, r: 0.86	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.86
Gives me a sense of social support	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86
Makes me feel like I have someone to work with	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.82	P: <0.002, r: 0.86	P: <0.002, r: 0.76
Makes me feel like I am socially involved	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87
Gives me a feeling of being connected to others	P: <0.002, r: 0.86	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.86
Feels like a social experience	P: <0.002, r: 0.87	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.80	P: <0.002, r: 0.86
Gives me a sense of having someone to Share my endeavors with	P: <0.002, r: 0.85	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.86	P: <0.002, r: 0.85	P: <0.002, r: 0.73	P: <0.002, r: 0.87	P: <0.002, r: 0.84
Influences me through its social aspects	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.82	P: <0.002, r: 0.87	P: <0.002, r: 0.84	P: <0.002, r: 0.86	P: <0.002, r: 0.79	P: <0.002, r: 0.87	P: <0.002, r: 0.86
Gives me a sense of being noticed for what I have achieved	P: <0.002, r: 0.81	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.79	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.86	P: <0.002, r: 0.87

Table A.3: p-values and effect sizes when comparing Shloka with other games on the parameters of NOVELTY and EXPLORATION INTENT. G1 = Climate Changer, G2 = Crabby Claws, G3 = Climariqs, G4 = Coral Bleaching, G5 = Mother Nature, G6 = Human, G7 = H20, G8 = Word Wall, G9 = Illuminate.

Statement	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**
NOVELTY									
This activity is new to me.	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86
This is a new-fashioned activity for me to do.	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.78	P: <0.002, r: 0.86	P: <0.002, r: 0.87
This activity is fresh.	P: <0.002, r: 0.85	P: <0.002, r: 0.86	P: <0.002, r: 0.85	P: <0.002, r: 0.82	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.86
EXPLORATION INTENT									
I want to discover all the tricks in this activity	P: <0.002, r: 0.81	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.83	P: <0.002, r: 0.81	P: <0.002, r: 0.86	P: <0.002, r: 0.87
I like to find out more about how to do it.	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.80
I like to inquire into details of how to do it.	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.86
I want to analyze it to have a grasp on it.	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87

Table A.4: p-values and effect sizes when comparing Shloka with other games on the parameter of INTRINSIC MOTIVATION. G1 = Climate Changer, G2 = Crabby Claws, G3 = Climariqs, G4 = Coral Bleaching, G5 = Mother Nature, G6 = Human, G7 = H20, G8 = Word Wall, G9 = Illuminate.

Statement	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**
INTRINSIC MOTIVATION									
I enjoyed doing this activity very much	P: <0.002, r: 0.77	P: <0.002, r: 0.56	P: <0.002, r: 0.66	P: <0.002, r: 0.66	P: <0.002, r: 0.83	P: <0.002, r: 0.56	P: <0.002, r: 0.50	P: <0.002, r: 0.74	P: <0.002, r: 0.64
This activity was fun to do.	P: <0.002, r: 0.70	P: <0.002, r: 0.62	P: <0.002, r: 0.57	P: <0.002, r: 0.71	P: <0.002, r: 0.87	P: <0.002, r: 0.76	P: <0.002, r: 0.58	P: <0.002, r: 0.56	P: <0.002, r: 0.67
I thought this was not a boring activity.	P: <0.002, r: 0.81	P: <0.002, r: 0.49	P: <0.002, r: 0.54	P: <0.002, r: 0.72	P: <0.002, r: 0.67	P: <0.002, r: 0.62	P: <0.002, r: 0.65	P: <0.002, r: 0.59	P: <0.002, r: 0.54
This activity held my attention at all times.	P: <0.002, r: 0.49	P: <0.002, r: 0.63	P: <0.002, r: 0.63	P: <0.002, r: 0.54	P: <0.002, r: 0.44	P: <0.002, r: 0.29	P: <0.002, r: 0.86	P: <0.002, r: 0.62	P: <0.002, r: 0.47
I would describe this activity as very interesting.	P: <0.002, r: 0.80	P: <0.002, r: 0.61	P: <0.002, r: 0.75	P: <0.002, r: 0.80	P: <0.002, r: 0.71	P: <0.002, r: 0.80	P: <0.002, r: 0.68	P: <0.002, r: 0.71	P: <0.002, r: 0.84

Table A.5: p-values and effect sizes when comparing Shloka with other games on the parameter of USEFULNESS. G1 = Climate Changer, G2 = Crabby Claws, G3 = Climariqs, G4 = Coral Bleaching, G5 = Mother Nature, G6 = Human, G7 = H20, G8 = Word Wall, G9 = Illuminate.

Statement	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**
USEFULNESS									
I believe this activity could be of some value to me.	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.81	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.86
I think that doing this activity is useful for learning about climate change	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87
I think this is important to do because it can help me learn about climate change	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.81	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.83
I would be willing to do this again because it has some value to me.	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87
I think doing this activity could help me to understand the impact of climate change	P: <0.002, r: 0.84	P: <0.002, r: 0.85	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.84	P: <0.002, r: 0.82	P: <0.002, r: 0.87
I believe doing this activity could be beneficial to me.	P: <0.002, r: 0.85	P: <0.002, r: 0.84	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.83
I think this is an important activity.	P: <0.002, r: 0.81	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.82	P: <0.002, r: 0.86	P: <0.002, r: 0.81	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.87
I thought this activity was quite enjoyable.	P: <0.002, r: 0.77	P: <0.002, r: 0.72	P: <0.002, r: 0.74	P: <0.002, r: 0.54	P: <0.002, r: 0.75	P: <0.002, r: 0.58	P: <0.002, r: 0.87	P: <0.002, r: 0.72	P: <0.002, r: 0.69
While I was doing this activity, I was thinking about how much I enjoyed it.	P: <0.002, r: 0.71	P: <0.002, r: 0.73	P: <0.002, r: 0.77	P: <0.002, r: 0.66	P: <0.002, r: 0.72	P: <0.002, r: 0.73	P: <0.002, r: 0.74	P: <0.002, r: 0.66	P: <0.002, r: 0.71

Table A.6: p-values and effect sizes when comparing Shloka with other games on the parameter of RELATEDNESS. G1 = Climate Changer, G2 = Crabby Claws, G3 = Climariqs, G4 = Coral Bleaching, G5 = Mother Nature, G6 = Human, G7 = H20, G8 = Word Wall, G9 = Illuminate.

Statement	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**
RELATEDNESS									
I find the relationships in this game fulfilling.	P: <0.002, r: 0.83	P: <0.002, r: 0.75	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.80	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.82	P: <0.002, r: 0.81
I find the relationships in this game important.	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.86	P: <0.002, r: 0.85
I feel close to the characters/NPCs (Modified Question).	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.72	P: <0.002, r: 0.87	P: <0.002, r: 0.82	P: <0.002, r: 0.84	P: <0.002, r: 0.82	P: <0.002, r: 0.81	P: <0.002, r: 0.87

Table A.7: Statistical Calculations: Accomplishment Items with P-values and Effect Sizes Across Groups. G1 = Climate Changer, G2 = Crabby Claws, G3 = Climariqs, G4 = Coral Bleaching, G5 = Mother Nature, G6 = Human, G7 = H20, G8 = Word Wall, G9 = Illuminate.

Statement	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**
ACCOMPLISHMENT									
Makes me feel that I need to complete things	P: <0.002, r: 0.78	P: <0.002, r: 0.85	P: <0.002, r: 0.83	P: <0.002, r: 0.81	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.84
Pushes me to strive for accomplishments	P: <0.002, r: 0.85	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.86
Inspires me to maintain my standards of performance	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87
Makes me feel that success comes through accomplishments	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.84	P: <0.002, r: 0.85
Makes me strive to take myself to the next level	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.84	P: <0.002, r: 0.86	P: <0.002, r: 0.86	P: <0.002, r: 0.84	P: <0.002, r: 0.83	P: <0.002, r: 0.83
Motivates me to progress and get better	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.85	P: <0.002, r: 0.84
Makes me feel like I have clear goals	P: <0.002, r: 0.79	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.80	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.76
Gives me the feeling that I need to reach goals	P: <0.002, r: 0.87	P: <0.002, r: 0.83	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86

Table A.8: Statistical Calculations: Attention Items with P-values and Effect Sizes Across Groups. G1 = Climate Changer, G2 = Crabby Claws, G3 = Climariqs, G4 = Coral Bleaching, G5 = Mother Nature, G6 = Human, G7 = H20, G8 = Word Wall, G9 = Illuminate.

Statement	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**
ATTENTION									
I was concentrated.	P: <0.002, r: 0.87	P: <0.002, r: 0.84	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.79
I was focused.	P: <0.002, r: 0.85	P: <0.002, r: 0.86	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.84
I was very attentive all the time.	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.82	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.87	P: <0.002, r: 0.85	P: <0.002, r: 0.87

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