

AstraVerse: Establishing a Culturally Sensitive Framework for Integrating Elements from Mythological Backgrounds

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Abstract. Game designers often refer to sources of inspiration for creating new characters and narratives, with cultural and mythological references being a prominent choice for orientation. This however implicitly entails the importance of preventing the misuse of mythological or religious references to respect affiliated groups and believers. In this paper, we present a three-step framework to augment the ability of designers to create innovative characters using mythology as an inspiration while addressing and avoiding cultural backlash. The efficacy of the framework is verified by implementing the framework on Hindu Mythology. We present qualitative and quantitative findings which indicate that characters designed using the framework report significantly higher appraisal from a Hindu population than controversial portrayals of Hindu deities from actually shipped games.

Keywords: Game Design, Character Design, Co-Design, Culture

1 Introduction

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 video game designers in agile environments that they find it difficult to generate ideas for narratives and inspiration for character design [31]. Considering established literature in the field of design, inspiration is one of the main factors for generating new ideas within game development [9, 46, 25, 36]. According to Hagen [19], 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 [48, 12]; especially Roman and Greek mythology have commonly been utilized to create characters [16]. Successful known titles include gods and characters transplanted from various mythologies [30, 41, 45, 42, 4]. 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.

There have been numerous controversies over transplanting gods into video games, such as *Hanuman: The Boy Warrior* [4], where the literal depiction of an important Hindu figure was perceived as nothing but denigration; or *Faith Fighter* [26], 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 [2, 1, 43]. 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 worshipped iconography and twisted narrative. The contributions of this paper include:

- A three-step framework that allows game designers to prevent transplanting gods from mythology and support the creation of new yet culturally sensitive characters.
- An implementation of the proposed framework on Hindu mythology that proves the framework’s efficacy as well as the publication of a taxonomy of game mechanics inspired from Hindu mythology.

2 Related Work

2.1 Cultural Affordances in Games

Social scientists view games as a new form of cultural expression, and collective behavior [10, 18]. Seif El-Nasr *et al.* specifically expound how even video games are subjected to cultural and religious perception [15]. Convincing narratives and the diminishing line between graphics and reality have made games successful in influencing people [21]. This diminishing line makes it important to study cultural affordances in games. We pay attention to religion since it has been established how video games can create reflection on understanding religion[10]. Twisting actual narratives for game mechanics might influence perceptions and alter religious facts for players [10]. Consider the game *Hanuman the Boy Warrior* [4]. The game requires Hanuman (protagonist) to explore a forest and fight demons. The character re-spawns with the message “You have failed” every time the character falls into water. This is a twist to religious beliefs where Hanuman is considered immortal and has extraordinary aquatic abilities. Vasalou *et al.* reinforce how cultural sensitivity is essential in Serious games and mentions the importance of culturally authentic narratives [44]. The impetus of this work is to help designers design novel and culturally sensitive characters using elements from mythology as inspiration.

2.2 Theology and Gaming

Ferdig mentions how religion can either be found explicitly or implicitly in games [17]. Above that, interactions between religion, new media and games have been discussed frequently [34, 6, 33, 20, 38, 13]. Radde-Antweiler *et al.* and Detweiler provide a detailed account of how historically, various theologists have studied the influence of new media and games on how religion is being shaped in the modern world [33, 13]. Vsisler's work studies the perception of the Arab region, and how Islamic communities are perceived by players due to their representation in video games [38]. Their findings show how representation in games, unfortunately, has stereotyped communities to players and emphasizes how cultural and theological representation is an important point of discussion. Most work in religion and games has revolved around studying the effects of video games on religious perception. To our knowledge, there is no discussion on how religion can inspire designers develop new mechanics and characters, which is a gap this paper addresses.

2.3 Game Design Frameworks and Taxonomies

Taxonomies provide a way to organize and classify themes and concepts [3]. Researchers have established taxonomies on various concepts such as game mechanics [29], death and rebirth [11], bugs [22], player modelling [39], games for health [24, 14], platformer games [40]. Frameworks for Serious Game design [8], Motion-Based Games [27], Collaborative Games [23] discuss design guidelines for different classifications of games. Previous work constituted discussions on formal design procedures and rules but does not discuss religion and cultural affordances. This work offers a case study on how the proposed taxonomy helps identify game mechanics from a specific culture and uses these mechanics to help designers build interesting yet appropriate characters and narratives.

3 AstraVerse Framework

This framework 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 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 [37].

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.

3.2 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.

4 Applying the Framework on Hindu Mythology

The backlash certain games received from Hindu religious groups [43, 2, 1] renders Hindu mythology an appropriate benchmark to verify if characters inspired from Hindu mythology can create engaging characters while still being culturally valid.

In order to showcase and evaluate a use case taxonomy (c.f. Section 4.1) and investigate the general capabilities of the proposed framework (c.f. Section 3), we organized a participatory design workshop. The participants of this workshop were introduced to the taxonomical elements outlined in the appendix Tables 1,2,3 and 4 with visual guiding of characters from Figures 1 and 2. After that, they were requested to design a narrative and describe as well as sketch the visualized game character(s). The following section tackles taxonomical elements constructed from the framework (step 1 of the framework), whereas the subsequent section presents designers creating new characters using the taxonomy (step 2 of the framework) and finally qualitative remarks and interpretations from senior game designers (step 3(a) of the framework) about these creations, as well as assessments of cultural and religious appropriateness from a population with Hindu background (step 3 (b) of the framework).

4.1 Mythological Derivation [Step 1]: Establishing a Taxonomy on Mythological Hindu Characters and Mythical Objects

Hindu mythology discusses and presents a wide range of gods. We refer to works from Bansal [5] 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* [28], 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 1, 2, 3 and split into groups according to the classification by Parrinder [32].

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 4).

4.2 Generative Step [Step 2]: Facilitating the Creation of Characters from the Established Hindu Taxonomy

For the participatory design workshop, we recruited three amateur game designers from a game design program (Masters degree) at <University Name>. 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 in Section 4.1.
- With the introduced knowledge and ideas, the participant is requested to design and visualize game characters.

4.3 Constructed Outcomes from 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.

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 2) and have a extreme size like Kumbakaran (Row 18 Table 2). I will also arm her with Nature Powers like Krishna (Row 8 Table 1). Each head controlling different aspects of nature*”. A visual representation is presented Figure 3.

Table 1. Understanding Attributes and Characteristics of Dashavatara

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
The Serial Number in the table indicates the Visual representation in Figure 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.
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.	Ability 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.
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.
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 race and restart cycle of life.	Swift, Skilled swordsmen, Mythical horse, Flaming sword.

Table 2. Understanding Attributes and Characteristics of Characters from the Mahabharata and Ramayana

The Serial Number in the table indicates the Visual representation in Figure 1				
Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
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 known 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 of the body, Extremely experienced wrestler, Death grip.
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.
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 1). 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.
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. Is labelled as the god of destruction. His dark blue color is attributed to carrying a dangerous poison in his throat to save humanity.	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.	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. Understanding Attributes and Characteristics of Gods of Various Qualities and Elements

Sr No.	Avatar Name	Avatar Description	Genre of Narrative	Usable Game Mechanics
The Serial Number in the table indicates the Visual representation in Figure 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.
21	Lakshmi	This avatar is visualized as a goddess.	The goddess is the spouse of Lord Vishnu (source of Table 1) and is incarnations along with the Dashavatara (Table 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)
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 1).	Aerial ability, Cosmic speeds, Large wingspan, Commands over eagles, Consumes snake as prey, High loyalty.

Table 4. Understanding Mythical Objects and their Role in Game Loops

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 2) 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 4). 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 resists incoming celestial weapons, The 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.
4	Transport	Garuda, Surya Vimana, Hansa Vimana, Pushpaka Vimana, Tripurajit Vimana	The term Vimana is analogous 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 2). The Tripurajit Vimana is cosmic Chariot used by Shiva (Row 19 Table 2). 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 or armies, fires. The BramhaAstra is an extremely powerful weapon capable of destroying armies and cities. The Trishul is the weapon of Shiva (Row 19 Table 2). 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 analogous to the mighty thunderbolt.
6	Cosmic Weapons 1	Bramhastra, Trishul, Sudarshana Chakra, Vajra	The PushpataAstra 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.
7	Cosmic Weapons 2	PashupataAstra, NarayanaAstra, BrahmashirshaAstra, RudraAstra	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 4) the eagle, which sweeps the serpents. The SammohanaAstra intoxicates enemies, while the PrajnaAstra recovers them from the intoxication.
8	Cosmic Weapons 3	NagaPasha, GarudaAstra, SammohanaAstra, PrajnaAstra	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.
8	Cosmic Bows	Gandeeva, Sharanga, Vijaya, Pinaka	The Nandaka is the sword of the Dahsavatars. The Chandras translates to "crescent" in Hindu mythology there has been references where the crescent of the Moon acts as a sword for the Gods.
9	Cosmic Swords	Nandaka, Chandras	

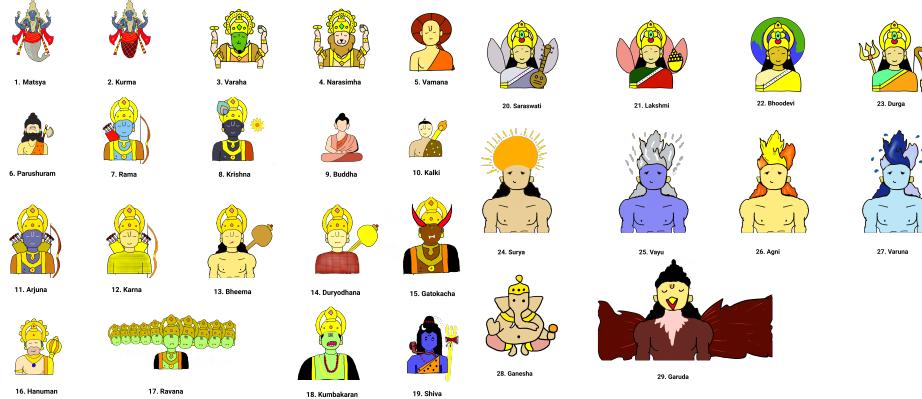


Fig. 1. Visual Representation of Characters Discussed in Table 1 and Table 2.



Fig. 3. Character Visualization of Participant 1

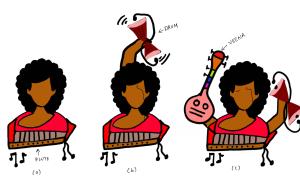
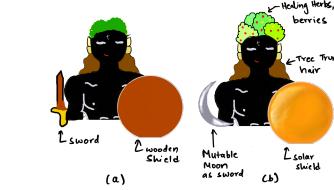


Fig. 4. Character Visualization of Participant 2



Fig. 5. Character Visualization of Participant 3.



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 4, Row 8 Table 1 and Row 19 Table 2).”
- **Visualization :** “I am thinking of giving the protagonist multiple arms like Narasimha (Row 4 Table 1) and Varaha (Row 3 Table 1). The character will unlock more arms and more weapons as the levels progress”. A visualization of this character is shown in Figure 4

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 2) 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) or solar capabilities since they would have a greater gravitational pull.*” A Visual Representation is presented in Figure 5.

4.4 Creative Evaluation [Step 3(a)]: Evaluating the Creative Dimension of Workshop Outcomes

Procedure First, the produced narratives and characters (c.f. Section 4.3, Section 4.3 and Section 4.3) were presented to two senior game designers to evaluate the creative and novelty element of the creations. We recorded these interviews and asked them to quantify their estimation as well.

Measures For measuring creativity and novelty, we asked the senior game developers to judge items (on a scale of 5) based on Brookhart’s rubric [7]. On top of this, the interviewees were asked to comment on the particular narratives qualitatively.

Participants In total, ($n_a=2$) senior game developers (those with 3+ years of Game Production experience) assessed the creative quality of the creations.

Results of Creative Evaluation Table 5 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 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.*”

4.5 Cultural Evaluation [Step 3(b)]: Evaluating the Cultural Validity of Workshop Outcomes

Procedure Students with a Hindu background were presented Figure 3,4,5 as well as depictions¹ of a Hindu goddess that raised controversial discussions in

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>

the multiplayer online battle arena game *SMITE* [42]. 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.

Measures Regarding the cultural assessment, participants were surveyed using semi-structured interviews on their appraisal and statements towards both visualizations.

Participants In total, ($n_b=39$) students were recruited through a call for participation from online Indian Communities at <University Name> 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%).

Table 5. Quantitative Evaluation [7] of Designed Characters and Narratives in Section 4.3 by Experienced Game Designers

	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

Results of Cultural Evaluation Participants were shown a representation of Goddess Kali from the game *SMITE*. The Hindu-affiliated participants had mixed opinions on the representation 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 <Western Country Name> 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 Goddess Kali, we asked participants to comment on characters from Figure 3,4,5. For Figure 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

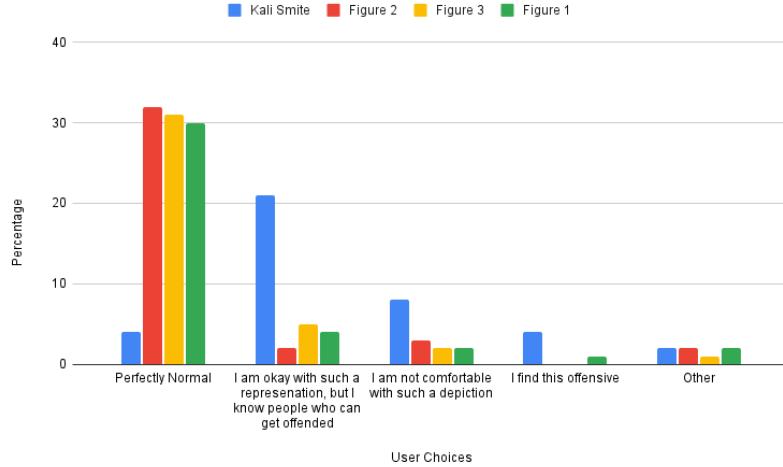


Fig. 6. Quantitative results reflecting cultural acceptance of characters from SMITE and generated characters as part of the study shown in Figure 4,5,3

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 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 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 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.*”

5 Results and Discussion

Figure 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 [47]. For measuring the impact of these comparisons, we additionally computed effect sizes r after Rosenthal [35]. As hypothesized, the *SMITE* portrayal of Kali produced significantly higher indications of offensiveness than the characters of Figure 4 ($p < 0.05, r=0.79$), Figure 5 ($p < 0.05, r=0.83$) and Figure 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 significances with large effect sizes throughout all comparisons further strengthen the potential of our approach.

6 Future Work and Conclusion

In the next iteration of the work, we plan to use standard UX research methods such as Grounded Theory and Card sorting to create the taxonomy. We plan to have a larger participatory design workshop for creating characters (to eliminate any creative bias). In the future, we seek to come up with metrics to determine upper limits on how much a designer can borrow from a taxonomy and prevent misuse by accidentally creating characters which might be perceived as culturally insensitive characters.

In this paper, we presented a framework which allows designers to draw inspiration from mythological references while maintaining cultural validity. As a case study, we build a taxonomy using the proposed framework over Hindu mythology to help designers create culturally sensitive characters. To showcase that the framework supports the creation of creative and novel characters, we discussed outcomes from a study where game designers used a taxonomy constructed from the framework to build novel characters. These created characters were evaluated on the lines of creativity and cultural sensitivity. The outcomes of these evaluations supported our hypothesis of allowing designers to create creative, culturally inclusive and immersive characters using the proposed taxonomy. We believe, the scope of the is paper is not limited to Hindu mythology and is equally valid for other mythologies.

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