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Laato, Samuli; Rauti, Sampsa; Laato, Anni Maria; Al-Msallam, Samaan; Jung, Sangwon ;
Sutinen, Erkki ; Hamari, Juho

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Sacred Spaces in the Digital Age: Perceptions of Lutheran Christian Priests on Augmented Reality at Holy Sites

Samuli Laato
sadala@tuni.fi
Gamification Group, Tampere
University
Tampere, Finland

Sampsa Rauti
sjprau@utu.fi
University of Turku
Turku, Finland

Anni Maria Laato
anlaato@abo.fi
Åbo Akademi University
Turku, Finland

Samaan Al-Msallam
samaan.almsallam@tuni.fi
Gamification Group, Tampere
University
Tampere, Finland

Sangwon Jung
sangwon.jung@tuni.fi
Gamification Group, Tampere
University
Tampere, Finland

Erkki Sutinen
erkki.sutinen@utu.fi
University of Turku
Turku, Finland

Juho Hamari
juho.hamari@tuni.fi
Gamification Group, Tampere
University
Tampere, Finland

ABSTRACT

The concepts of sacred places and spaces appear throughout religions globally. Places such as churches, cathedrals, temples, mosques, synagogues and graveyards are given special meanings, both functionally and spiritually, and separated from the ordinary. Recently location-based augmented reality (AR) technologies and applications have become widespread, and this raises questions regarding how AR content relates to sacred places. In this study, we approached this complex topic by asking clergy of the Lutheran Christian Church (N=47) to reflect on associated phenomena. We approached the data via reflexive thematic analysis and uncovered tensions related to (1) connected vs detached from sacredness; (2) supporting the spiritual purpose of the space vs conflicting with it; and (3) maintaining tradition vs embracing innovation. Overall, our findings suggest that AR technologies and products impact sacred spaces on multiple levels, but currently there is no consensus among the clergy on the impact of these changes.

CCS CONCEPTS

• **Information systems** → *Massively multiplayer online games*; • **Human-centered computing** → **Ubiquitous and mobile computing systems and tools**.

KEYWORDS

sacred space, place of worship, holy grounds, religion, augmented reality, virtual reality

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1 INTRODUCTION

Due to recent advances and innovations in augmented reality (AR) technology, scholars have started projecting future scenarios where AR content is increasingly intertwined with everyday physical objects, spaces and places [34, 49]. With examples such as Pokémon GO that overlay a real time location-based digital world on top real world maps [26, 40], we are seeing increasing discussions related to the ownership of digital space [36, 46, 56], the presentation of the real world in location-based games and services [3] and the various impacts that location-based AR can have on real world places and spaces [33, 39, 45]. A critical research problem in this area, that has so far received only little attention, is how location-based AR interacts with places reserved for religious and spiritual purposes such as places of worship. In this work, we conceptualize our perception of reality to consist of layers, whereby the primary unfiltered experience is referred to "paramount reality" [30], and augmenting this experience results in transformed reality perceptions [40].

According to Statista, roughly 85% of the global population belong to some organized religion [52]. Christianity (with orthodox, catholic and protestant members) currently has the most official members, followed by Islam and Hinduism [52]. Despite these



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numbers, there have been trends of increasing secularism, particularly in western societies. However, there are also some counter trends boosting participation in religious activity [20], and it is clear (e.g., based on the number of followers, number of employees and cultural influence) that religion remains an integral part of the human civilization. Indeed, recently human-computer interaction (HCI) research has also looked into some religious phenomena, and phenomena related to religious elements, such as techno-spiritualism [9], augmented spirituality [29], psychedelic virtual reality applications [28] and applications related to altered states of consciousness [4, 27]. We also have research on various potentially relevant mechanisms, such as applications designed to invoke empathy [10], guide meditation [11] or assist in the exploration of meaningfulness and what life is about [7, 15]. However, so far there is only little attention on how global location-based AR games interact with sacred spaces and places of public worship [18].

In this study, as a study context for understanding the interplay between AR and sacred places, we focus on Christianity, where the concept of sacred place has been at the focus of some theological debate. There are two circulating understandings of what a sacred place is; According to the first view, a sacred place obtains its sanctity through it being the location for religious practice such as worship and commemoration [58]. The second view on sacred space, which according to Yasin evolved in the fourth century, is that particular sites and objects might be sacred in the sense that through them people can come into physical contact with the divine [58]. In addition to these two views, different religions and different confessions have diverging views on what constitutes a holy or sacred space (or place), and what can be regarded as sacred¹. For example, in many religions and confessions, there are special rituals of consecration or desacralization of a sacred building while in others there are not.

So far there have been some studies which to a degree deal with problems arising from superimposing AR content on sacred places. For example, Gabriel showed that when Pokémon GO was popular in the summer of 2016, Church employees took different stands on the game where some saw it as an opportunity to reach out to players while others regarded the AR Pokémon placed on Church grounds as blasphemy [18]. Similar findings were reported by Rauti et al. in data from Church employees collected roughly three and a half years later [50]. While AR technology can elevate visitors' experiences at sacred places, it may also cause conflicts among those visiting the place for religious peace, prayer and worship [48]. The work of Cooper et al. [14] explored this topic by introducing the concept of "church online", a new approach to the Church embedded in social, digital and physical layers. In the church online model, the Church not only implements existing practices digitally, but also reforms by taking advantage of latest technological affordances [14]. Particularly in this line of thinking it is critical to understand the connections between AR and sacred spaces and places. Therefore, in the current study, we explored the perceptions and attitudes of the clergy of the Evangelical Lutheran Church of Finland² on adding AR content on places and spaces reserved for religious special

Table 1: Due to issues in conceptual clarity surrounding the terminology needed to discuss the topic of this study we offer our definitions for key terms in this study.

Term	Definition in this work
Priest	An ordained leader in a Christian church. We use this word synonymously with clergy and pastors.
Sacred place	A geographical area reserved for a religious function, separated from the ordinary. Examples include places of worship, churches, cathedrals and chapels.
Sacred space	We use this to refer to the inside areas within churches, cathedrals and chapels specifically.
Holy	We use this as a synonym for sacred.
Sacral	Similar to holy and sacred, but refers generally to elements of sanctity associated with specific religious ceremonies or spaces.
The Church	Unless otherwise specified, in this manuscript this refers to the Evangelical Lutheran Church.
Augmented reality	Abbreviated AR, in our context this refers to digital content that is superimposed on the paramount reality.
Paramount Reality	The primary mode of reality as experienced through our senses.

purpose such as churches and graveyards. To guide our inquiry into this topic we formulate the following research question (RQ):

RQ: "According to Lutheran Priests, what kinds of tensions emerge when adding AR content on sacred spaces such as churches or graveyards?"

Through answering the RQ this study makes the following contributions. First, it extends the on-going research regarding the convergence between the real and the augmented [34, 49] by including the perspective of how AR technology can interact with sacred space. Second, it provides insights into how priests of the Church view sacred spaces in relation to AR technology. Third, it extends the philosophical work on conceptualising AR (e.g., [26, 40, 41]) by discussing how the concept of paramount reality [30] (which is defined as the unmediated primary mode of reality experienced through our senses) can co-exist theoretically with the sacred places.

2 THEORETICAL BACKGROUND

Before we dive into the theoretical background we clarify key terms used in this study. We acknowledge that the definitions of several key concepts in this work are debated, and hence, we have gathered the key terms in Table 1 where we offer a definition for each according to how they are used in this work. Alternative definitions and views exist, and thus, we hope to simplify the semantic space, offering clear descriptions of what we mean by key terms.

¹Note that the empirical data presented in this study demonstrates that even within the clergy of a single Church there can be divergent views on sacred places

²From now on referred to as the Church

2.1 Conceptualizations of reality

Kassab [30] synthesised the phenomenological work of the philosophers Schutz [51] and Gurwitsch [21] on existence in that reality can be seen as being composed of “multiple realities” which have an “order of existence”. This philosophy was adopted by Liberati [40] to describe location-based AR, whereby Liberati frames locative AR as an additional layer of reality that is accessible through mobile devices. Within the layers of reality, the primary mode of experience is described as paramount reality [30]. On top of this, various layers of AR [26], as well as other perceived forms of reality, such as the spiritual reality, can be added. Thus, following the work of Kassab [30], the spiritual world of Christianity can be viewed as a layer of reality that co-exists with paramount reality, one order of existence behind the paramount reality. Previous work has demonstrated that this phenomenological approach to reality is particularly suitable for understanding how AR technology can alter our reality perceptions, and thus, we select this approach as a theoretical lens in this work [26, 40]

According to Durkheim [16], in any religion, there is a divide between sacred and profane, where profane is understood as everything ordinary, and sacred something with a special dedicated meaning in the religious context. The sacred-profane dichotomy is distinct from good-evil, as also evil has a special dedicated meaning in the religious context and perhaps counter-intuitively can be described as sacred in the Durkheimian terms [16]. When looking at religious places such as cemeteries, churches and chapels, they can be viewed as sacred [16], since they are separated from the mundane for a special religious or spiritual purpose. Returning to the lens of Kassab on reality [30], we understand that the nature of the sacred space exists in the spiritual realm [21, 51], but that through the physical space reserved for a special purpose, it also manifests in the paramount reality.

Following this line of thought, while both AR games and Christianity contain meta-physical elements, they also have a presence in the paramount reality. The two can intersect in the paramount reality e.g., through the placement of AR content within churches or cathedrals [54], but also in the meta-physical realm through altering people’s perceptions of the place. However, currently the interplay between AR and sacred spaces remains speculative and at a theoretical level, and therefore, practical perspectives and empirical evidence are needed to increase our understanding on this topic.

2.2 Representation of sacred places and spaces in location-based AR

Currently there are four location-based AR games that explicitly connect the playing field to real world locations. These are all developed by Niantic, and are in order of publication Ingress, Pokémon GO, Pikmin Bloom and Monster Hunter: Now. In addition there are social media and other applications that do the same, examples including OpenStreetMaps, SnapChat, Google Maps and Campfire (displayed in Fig. 1). All these applications contain presentations of sacred spaces, including typically a point of interest with some information about the location as well as a 2D outline of the structure on a map interface. These games and apps have motivated players to go to Church grounds and interact with the location [18, 37],

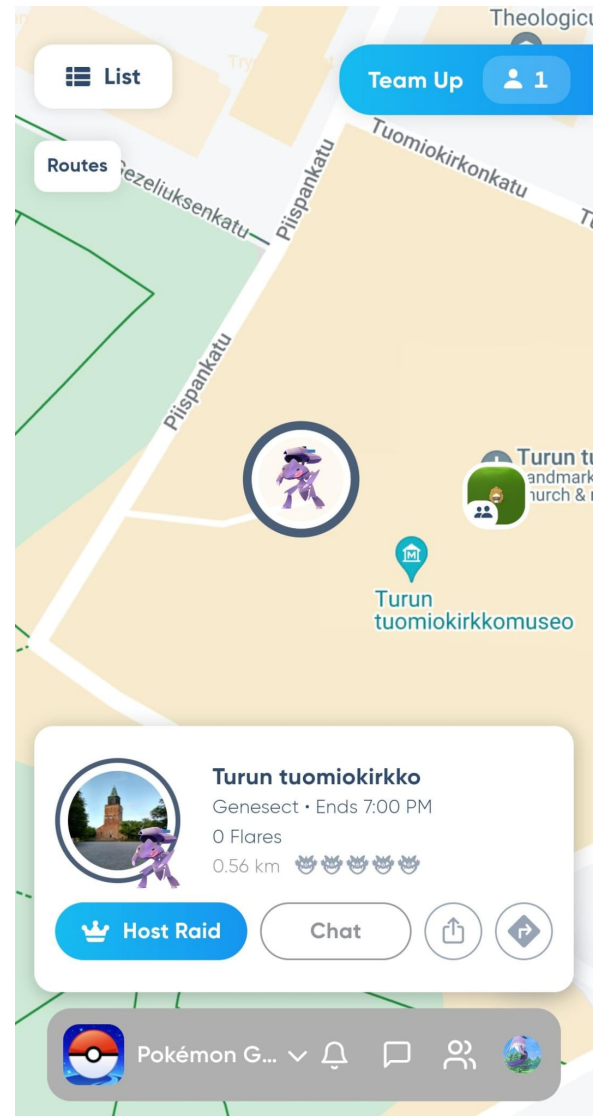


Figure 1: A screenshot taken by the authors from Niantic Campfire, a location-based live service platform that includes a presentation of the Turku Cathedral (Turun Tuomiokirkko), a medieval Lutheran church. The app shows an on-going virtual call for battle on top of the church in the game Pokémon GO. Players can light flares to call others to perform the raid, drawing parallels to how church bells call people for Sunday mass.

suggesting that how location-based apps and AR games choose to represent sacred places can impact people’s behaviour in the paramount reality.

A common interface that location-based AR games choose for representing the world is a map view [3]. The idea is that the initial step in high fidelity AR is to make a digital representation, a digital twin of the real world [59]. Once users accept this digital representation of reality as accurate, we can add content to it, augmenting the

"reality" in this way [3]. In Figure 2 we show three types of reality representations of the Lutheran German Church (Tyska Kyrka), one of the landmark churches in Stockholm, Sweden. In this Figure, by looking at the comparisons of two screenshots from Google Maps, we observe that the same reality may be represented digitally in different ways, emphasising different aspects of it – either in 2D or 3D. The image on the right, a screenshot from Ingress Prime, represents a more gamified [23] approach to the space, but also one where the paramount reality is clearly augmented. In this game special objects within the church as well as the church itself receive additional purposes whereby players can interact with them digitally and battle for their ownership. This game brings AR battle inside churches, but not necessarily in a way that would defile or desecrate the space. In 2016 when Pokémon GO became a global phenomenon, e.g. catholic.org published an article stating *"Does Pokemon Go also reinforce Catholic teaching? Unfortunately, not as far as we can tell. But it doesn't seem to undermine it either."* [13]. However, Pokémon GO is just one AR application, and debates on what kind of AR content is suitable inside churches has been on-going at least since.

There are also AR applications that are located *within* sacred places. An interesting example is presented by Viinikkala et al. [54], who harnessed AR and lidar scanning techniques to position medieval stories within a medieval Cathedral in modern times, allowing visitors to experience events of the past in the authentic environment through AR. In addition to visualizing lost stories and events, researchers have created AR solutions to visualize and recreate demolished churches, allowing participants to visualize sacred places as they were in the past [5, 19], or remotely visit a sacred space in VR [1]. A third application area of AR in the context of sacred spaces is in education, where AR has been harnessed to teach a multitude of things within Churches including about the Church itself, biblical texts, doctrinal contents and a selection of 21st century skills [24]. The benefit of AR is that it can scaffold knowledge acquisition processes that go beyond learning information, as it enables the experiencing of events in situ, theoretically resulting in a more immersive and holistic learning experience [57].

2.3 Previous research on augmenting sacred places and spaces

Given the limited direct related work due to the nascent nature of research on AR's impact on sacred places in general, we turn our attention to relevant studies that have explored similar topics, providing valuable context for our investigation.

One such example is Allal-Chérif's [1] multiple case study examining how Christian cathedrals utilize AR and virtual reality to enrich visitors' experiences. The findings of this study demonstrate the applicability of preservation of cathedrals and the provision of virtual access. However, challenges arise as some visitors perceive these technologies as disruptive distractions; also, older adults may struggle with the complexity and feel inadequate [1]. In another example also revolves around the context of cathedrals; Cisternino and colleagues [12] utilized Spatial AR and AR applications to enhance the visitors' experience of Basilica of Saint Catherine of Alexandria in Galatina. The work showed that AR technologies provided an interactive path through the basilica, showcasing its

beauty and aiding in interpreting its frescoes. Moreover, the authors highlighted the educational potential of the applications developed. There is also research in the context of other religions such as Islam. For example, Owaidah [44] examined the advantages of AR applications in assisting Hajj authorities in Mecca City, Saudi Arabia, in managing the crowded pilgrims at the Hajj ritual places. The findings affirmed that AR technology facilitated the presentation of various types of information (images, videos, audio, etc.) about the Hajj locations. Additionally, it proved useful for navigation, communication, and identifying city landmarks.

Building upon the widespread utilization of AR applications in tourism and heritage contexts, researchers expanded their investigation to assess the efficacy of employing AR technologies in heritage ancient sacred sites. A prime example is the work of Ekonomou and Vosinakis [17], who conducted a study introducing a mobile AR application designed as a location-aware portable game for secondary school students. The objective was to engage them in a playful exploration of the area, imparting knowledge about the significant monuments of the sacred site of Delphi and uncovering their history. The study showed positive results in utility, ease of use, and student engagement, igniting curiosity and interest in Delphi's sacred site.

As we can observe from the aforementioned studies, AR technologies have demonstrated positive outcomes when utilized in sacred places. However, despite these benefits and challenges, there are multiple AR dynamics that appear to be understudied in the context of sacred places and spaces. We have gathered five potentially relevant dynamics from previous research in Table 2. Therefore, we argue that researchers still need to continue exploring AR's potential and ethical considerations in sacred contexts among other challenges. As discussed in the Introduction section, our study builds upon previous research endeavors, aiming to address the evident gap in HCI research concerning augmented reality (AR) applications at sacred sites, with a particular focus on Christianity.

3 MATERIALS AND METHODS

Since the interplay between AR content and sacred spaces has so far been studied primarily from a theoretical perspective, in this work, we sought to obtain practical perspectives on the topic. Thus, we designed an open ended survey for the clergy of the Lutheran Church. The perspectives of the clergy are valuable for multiple reasons. First, they are engaging with sacred places and space as part of their profession. Second, they can be considered experts on the practical use of these spaces, but also on the spiritual elements related to them. Third, we know from media and research reports that many had engaged e.g., with Pokémon GO players on church grounds [50]. In addition to these three points, we know that when a topic is novel and understudied, improving our understanding of the status quo through practical empirical insights can offer a valuable starting point for later exploration on the topic. Next we describe our research methods.

3.1 Survey design

Two researchers, both experienced in AR and location-based AR games as researchers and as players, designed the first iteration of a survey, containing questions regarding the interplay of AR



Figure 2: We display three screenshots side-by-side taken by the authors which represent the Lutheran German Church (Tyska Kyrka) in Stockholm, Sweden. On the left is a screenshot of Google Maps using the satellite view layer and tilting the view to display textured models of the real world buildings. On the center likewise a screenshot from Google Maps but with a non-tilted (top-down) view. On the right is a screenshot of the Church in Niantic’s location-based game Ingress Prime.

and sacred spaces. This draft was sent to two experts on religion for review. These two experts (a professor in theology and an IT professor who was also an ordained priest) offered multiple comments and improvement suggestions to the survey structure, based on which the survey was refined – e.g., we dropped quantitative questions and focused only on open ended questions. The question designs were motivated by the researchers’ initial observations of potential conflicts that location-based AR might already have with sacred spaces i.e. battles on top of sacred grounds (see Fig 1) and adding magical creatures with connections to a religion (e.g. Shintoism [18]) inside the sacred places of another religion. We did not want to lead the participants towards any specific view or thought pattern, and hence, the questions were intentionally kept broad. The final survey questions (excluding demographic questions) are displayed in Table 3. One limitation we notice here, however, is that questions #4 and #5 are negatively valenced, leading the participants perhaps to think more of negative aspects rather than positive.

With the first two questions we probed the participants’ beliefs about the spiritual reality in order to better understand their responses to questions where we ask them to compare the spiritual, the physical and the digital. While we had defined AR for the participants, we felt that as experts of divine matters and spirituality, it would be prudent to just ask participants how they viewed the spiritual world and sacred spaces. The first two questions also served as sensitizing questions, preparing the participants by asking them to think about the topics of the study. The third question in Table 3 was more directly linked to the RQ, and it was followed by two more precise questions (inspired by our background research into this domain as explained) that were meant to bring more nuances to the data and help us better understand the informants’ own feelings and perceptions about and around the topic.

3.2 Participants

Once the survey was finalized, we contacted a representative of the Church and asked them to distribute our survey to Church employees. The representative kindly agreed and sent the survey to an internal mailing list consisting of all current employees of the Church. Despite this broad distribution, we decided to limit this study to priests and bishops, since due to their profession, they are constantly dealing with questions related to sanctity, sacred places and also at least to some degree, technology. In religious terms they are described as shepherds of their parishes, while in laypeople’s terms, priests might be described as community leaders. Furthermore, in the study context of Finland, ordained priests of the Church all hold at least a Master’s degree in theology, meaning they have acquired formal higher education, which might increase their aptitude on responding to the questions. These characteristics of their profession mean they are in a unique expert position to offer data to answer our RQ. Altogether we received 367 responses to the survey, out of which 211 were partial or missing crucial information. Out of the 156 remaining responses 47 were from priests in parishes or ecclesial organizations. We display the demographic information of the participants in Table 4.

In terms of representation, the sample seems to have slightly more male priests (66% vs 34%) in comparison to the overall statistics of the Church [43]. There we 42 Masters of Theology and five Ph.D.s. We had an almost equal cut of participants vaguely familiar with AR (47%) and those reported to be more familiar with it (53%). In terms of age and tenure, the participant profile reflects the Church well. We speculate that the small tilt towards male priests responding to the survey is the result of personal preferences, since while the survey was distributed to all church employees, the participants were self-selected. Overall, we estimated the sample to be reliable and fairly representative, and therefore we continued to the data analysis.

Table 2: Five key AR dynamics summarized which based on previous research might be relevant in understanding the impact of AR on sacred spaces.

ID	AR dynamic related to sacred places	Description
1	Presentation of the place in AR	Particularly location-based AR games contain representations of real world locations and objects usually in the form of a map [3], but may also contain other types of representations.
2	Providing new affordances and interactions	The types of available AR interactions can change the way people behave near and within sacred spaces [37].
3	Digitally supporting a socially shared view of the place	People collectively understand and respect territorial boundaries and e.g., the use purposes of graveyards. AR layers may alter these perceptions and create new socially shared understandings of the places [46].
4	Reinterpreting the ownership of the place	Multiple locative AR games contain mechanics for controlling territory, and this may lead to people claiming ownership of these locations in the digital realm. This may lead to new forms of attachment, and also conflict, over these locations [35, 36].
5	Scaffolding imagination	Through providing visuals that are embedded within spaces, AR technologies can boost players' imagination of content within specific locations [49].

3.3 Data analysis

The resulting data from the informants (N=47) was heterogeneous in terms of content and length. A few informants wrote as much as a paragraph worth of text as a response including individual reflection on the topic, while others wrote a single sentence and no more. Due to the nature of the data it was deemed a suitable probe for the participants' sentiments, but the responses were generally not as in-depth and nuanced as one might get e.g., with focus groups [42] or with an expert interview [6] approaches. By contrast, since participants could fill the survey at their leisure, they could think about the topics at peace and offer more digested responses [25].

Within the confounds set by the survey design, we employed a reflexive approach to the data analysis [8] whereby we began by familiarizing ourselves with the data by reading through the responses. We then assigned codes to the responses to questions 3–5 in Table 3 in the following manner. The first author read the responses to the questions and each response was based in a category.

As the coding progressed the boundaries and names of the categories were changed multiple times. The author returned to some previous codes again and reassigned them to a new category when necessary. In this way, the coding was non-linear and iterative, and informed by the survey questions, the research question and the coder's interpretation of the data. The first author presented the finalized code book and categories to the other authors, who offered their views on the presentation, based on which the categories were refined. While the material was originally in the participants' native tongue, selected quotes were translated from the participants' native language to English by the first author. As an outcome of this analysis, we generated three thematic areas of tensions which were not directly visible in the responses, but which described the data and underscored the participants' responses.

4 FINDINGS

Through our analysis we arrived at three themes which describe tensions in adding AR content to sacred spaces. We summarize these in Table 5. Next we describe the three themes in detail.

4.1 Connected vs detached from sacredness

In general, participants viewed "spiritual reality" as being "everywhere around us but invisible" (P6), "inside in the concrete creations and not detached from it (P13) and a viewpoint to this same reality that we observe with our senses (P41). These responses illustrate thinking that the spiritual reality is part of this reality here and now, and it is not isolated from our daily lives. There were only a few voices who departed from this thinking such as P39 who viewed the spiritual reality as "outside this world, but where people can have temporary access to". Churches, cathedrals and chapels were seen as places of worship, and consequently sacred places reserved for special use in the religion. Against this rather homogeneous backdrop we got more divergence on views regarding the connections to AR. Participants expressed views both in favor of (1) AR being detached from this world and the spiritual (e.g. P20,P22,P25); and (2) it being part of this world in the same way as the spiritual world is. The following two quotes illustrate the former views.

"Everyone should distinguish games or some other virtual world from reality. It is a game and moving in a virtual world: someone's "invention". Reality is something different." (P25)

"I think that a stream of zeros and ones in servers and mobile devices does not harm churches and chapels" (P20)

On the flip side, we had participants who expressed that AR content does indeed impact and interact with sacred places and spaces. The most often mentioned mechanism was related to the role of perceptions of the place through mental images and associations. This thinking followed the thought that churches are perceived as sacred due to their use purpose in our society, being places to worship, pray, hold religious ceremonies and so forth. If AR content starts to offer alternative use purposes to the space, this might change how the place is perceived among people. The following quotes highlight this:

Table 3: Key survey questions summarized. In addition we asked participants their demographic information and various related questions not directly relevant in this work. "AR worlds" was explained to the participants by us whereas what is the "spiritual world" was asked from the participants.

#	Question	Question type
1	How do you understand the concept of "the spiritual world"	Background, sensitizing
2	How important are sacred places such as churches to you?	Background, sensitizing
3	What kind of AR content is suitable to be placed on top or within holy places such as churches? How would you justify this?	RQ-related
4	Do you see issues with there being AR battles going on inside or on top of holy places?	RQ-related, nuance-bringing
5	How would you feel if some black magic AR content was placed inside a church?	RQ-related, nuance-bringing

Table 4: Demographic information of the research participants. All participants were ordained priests in the Evangelical Lutheran Church of Finland. Tenure refers to how many years the informant has been employed as a priest by the Church. Years is abbreviated as yrs so the Table fits on the page.

Education level	Gender	Age (yrs)	Tenure (yrs)	AR experience
Ph.D. in Theology	13% Male	66% 26-40	32% 0-5	21% Minimal
Master in Theology	87% Female	34% 41-60	53% 6-14	36% Substantial
		Over 60	15% over 15	43%

Table 5: Three themes discovered in this work relating to how adding AR content on sacred places and holy sites creates tensions.

#	Theme	Description
1	Connected vs detached from sacredness.	This theme links to how AR had the potential in the long run to alter people's perceptions of a holy site, but that so-far the impact seems to have been minimal.
2	Supporting the spiritual purpose vs conflicting with it.	This theme relates to how AR may support existing spiritual experiences, but also conflict with them.
3	Tradition vs innovation	This theme is about exploring how AR challenges the traditions associated with sacred places, and how we may still end up in a harmonious outcome.

"No building in itself is good or bad, rather it is about the associated mental images." (P18)

"... we have to think about how many negative mental images we associate with these places." (P22)

Related to this, the informants expressed a view that location-based AR worlds are part of this world the same way as the spiritual reality is part of this world. For example, P27 argued that we should not discuss AR as something extra, but instead, as something integral and part of this world, i.e.: "AR is a misleading term. You cannot add anything to reality." We can summarize that it appeared clear that those people who were engaged in AR content that was specifically tied to a sacred space, were impacted by it. More precisely, the AR content would alter their perception of the sacred space, providing them with new meanings for the place, but in the case of e.g., Pokémon GO raids, also new social activities in the place. In light of this, it seems that the church should be mindful of the types

and kinds of AR content that is located on church grounds, and appraise the interplay between the spiritual purpose of the place, and the new purposes given to the place through locative AR.

4.2 Supporting the spiritual purpose vs conflicting with it.

A key component in assessing whether AR content supported the spiritual purpose of a sacred space, or conflicted with it, was the AR content itself. The participants also discussed the intentions behind adding AR content as key factors in determining whether a specific kind of AR content was appropriate at a sacred space or not. Among the types of suitable content participants mentioned generic good things such as "ethics, vegan nutrition and love", Christianity-related content, "other neutral and good-nature content such as music" (P11) and "content that supports the building of a Christian identity" (P16). Regarding the perspective of intention, participants speculated

that if the intention was to show respect or do good, then the AR content was appropriate, but if the purpose was to defile, insult or somehow disrespect the place, then that content was unacceptable. The following two quotes illustrate these views:

"Fictional characters can be ok, for example, educational cartoons, Martin Luther as an animal figure, as long as the intention is to teach, not to insult." (P1)

"If the purpose of the content is not to disrespect the Church or religion, then I don't see an issue. But if the intention is to in some way or another hurt or be disrespectful, then I see [that kind of AR content] as problematic." (P44)

A few participants commented explicitly on the given example of black magic. We saw opinions mostly against it with various justification such as P10 mentioning that *"respect should be shown to the nature of the church, and adding black magic inside churches without context does not show respect."* but one participant (P3) felt that Churches could offer an atmospheric setting for that kind of content and argued that as long as the content was not inside a sacred place, but rather in its vicinity, there was no issue. This highlights the importance of distinguishing between AR content specifically placed in sacred space vs AR content vaguely placed near a sacred place. Even the few participants who believed that AR content does not interact or defile the holiness of sacred places expressed that this was not a trivial issue. For example, P12 argued that it is not good taste to add black magic AR content on sacred places, and P21 stressed that the sanctity of places of worship is a serious issue and even though AR content there might not harm the church, it should be treated with care. Quotes from these participants are given below.

"[Black magic] is not necessarily in good taste, but that does not make the spiritual reality, the church or even the honor of God any weaker." (P12)

"Game developers are toying with perhaps a serious thing [when adding AR content to sacred places], but such things have always been done. I do not see them doing damage to the Church." (P21)

On this topic, P20 and P22 were consistent in their thinking that AR would not impact or defile sacred space. These participants viewed AR as separated from the sanctity of places of worship, and expressed that *"there is no need to limit AR"* (P20) and *"I cannot think that the church would somehow be corrupted by this kind of content"* (P22). There were also discussions on the temporal aspect in relation to suitability of AR content. Those with a generally positive stance on AR for sacred spaces were reserved when it came to interference with church ceremonies e.g., *"During the mass of course I do not wish people to come in and play"* (P1). When asked about battles that take on top of churches and sacred places (See Fig. 1), participants were also reserved, but in general saw no issues as long as the battles were conducted and performed outside the sacred space (e.g. a church). For example, some participants argued that it was unlikely that players of the location-based AR game Pokémon GO were thinking about the church when performing raid battles next to the church as follows:

"You could wish for respect inside a church, but I do not see an issue in virtual characters climbing on the outside walls of a church" (P4)

"In my view the gyms in Pokémon GO are merely located in the same places, but there are no indicators in the game itself that would suggest that you are now battling in a church" (P11)

"I do not think that [Pokémon GO players] give even a single thought to the fact that they are battling on church grounds."

4.3 Tradition vs Innovation

The third and final theme and tension related to traditionalist vs innovative views on whether and how AR content should be used, and allowed to exist, within holy sites. Some participants (e.g., P3, P34) noted that churches, chapels, cathedrals and graveyards are owned by the Church in light of the law, and hence the Church has a say on what kind of activities are suitable to be performed in and within these locations. For example, P3 noted the following:

"The inside of a Church is not public space, even though it is generally accessible. The owner of the property should reserve the right to remove any AR content that is in conflict with the intended use of that property " (P3)

In terms of the traditionalism-innovation tension, the majority of the participants appeared to be reserved regarding AR content placed on holy grounds and spaces. For example, when presented the dilemma of including AR battles on top of sacred places (see Fig. 1), we saw comments mostly against the idea, with various justifications. The following quotes illustrates such careful position:

"[AR battles on sacred places] seems odd to me, and a bit problematic, but I cannot say for I am not more familiar with the phenomenon. These battles are, in fact, a new thing for me. I was not aware of them before." (P23)

"Connecting with God is suitable for churches - connecting to all kinds of other places does not belong there". (P4)

Churches should be churches also in AR. I believe that the playing experience will reflect on the players' perception of what is holy, especially when [the playing] takes place in a holy place. (P9)

"The Church is a sacred space, meaning it is separated for encountering the holy, and that is how it should be treated and used" (P28)

Furthermore, some participants argued that AR content may distract church-goers from encountering God by *"invading the thoughts"* (P33) and that for this reason, particularly if virtual AR worlds are perceived important, they should not challenge the purpose of the sacred place. What united these thoughts was an idea that sacred places have a special use purpose that is connected to how humans perceive them, and hence technologies such as location-based AR apps that alter these perceptions should be approached critically.

Contrasting these careful and traditionalist view on common AR solutions such as Pokémon GO were hopeful and innovative

perspectives on the potential of AR. In this line of thought, there was room to explore how AR among other technologies could be used to enhance the in situ spiritual experience, even in a theological sense. Things such as AR visualizations of sacred elements and AR-supported rituals could be some potential examples. P19 noted that the Church itself could have a stronger presence in the AR realm as follows:

"Churches should be churches also in augmented reality. I believe that the playing experience will reflect also on the perception of sacred when it takes place in a sacred place." (P19)

While there was some idea generation such as the quote above suggests, several participants (e.g. P5,P6,P8,P16,P17,P32,P41,P42) noted that the issues of interplay between AR and sacred places are still rather new, and that since the Church has no official guidelines how to deal with location-based AR, we should engage in continuous discussions and reflection on the topic. For example, P6 rather explicitly stated:

"We need discussions on these matters and the agreed practices." (P6)

5 DISCUSSION AND CONCLUSION

5.1 Key Findings

Through analyzing the open ended responses of 47 priests of the Finnish Lutheran Church, we arrived at three thematic tensions: (1) connected vs detached from sacredness; (2) supporting the spiritual purpose vs conflicting with it; and (3) tradition vs innovation. These themes describe the tensions that priests currently employed in the Lutheran church see with AR games such as Pokémon GO and AR in general becoming an increasingly prominent part of our cities, society and sacred places. Through the lens of Kassab [30], we noticed that the participants expressed arguments both in the realm of the paramount reality and the meta-physical. Next we discuss the theoretical contributions and practical implications of our findings.

5.2 Theoretical contributions

While the question of adding AR content to sacred spaces is new, discussions on what makes a place holy and are some places holier than others have perplexed theologians for centuries [58]. Our findings showed that also today there is a lack of consensus even amongst a homogeneous group of priests of the same Church, all with formal education on theology (at least a Master's degree). Indeed, we found strong evidence that the sensitivity and complexity of the relationship between sacred places and AR content stems from different perceptions regarding the idea of the sanctity of these places. Consequently, there were differences in individuals' views on what may be considered desecration or infringement on the sanctity of the holy place. The tensions uncovered in our work can help readers understand and navigate some of the pressing issues on this topic. Furthermore, so far studies on AR at sacred places have been primarily conducted in the context of Islam (see e.g., [22, 44]) and thus, we contribute to the HCI research in this field through involving perspectives from Christianity.

Our study contributes also to the AR literature that has explored the convergence between AR and the paramount reality [34, 49] by investigating how clergy of the Lutheran church view the situation. While scholars such as Liberati [40] and Jensen et al. [26] have proposed viewing AR as an additional layer of "reality" superimposed on top of paramount reality, this thinking was only implicitly present in the participants' responses. A more prominent view was that the spiritual reality is present everywhere around us here and now, inseparable from the paramount reality. Consequently, AR was seen as part of this same reality. Therefore, the interplay between AR and sacred spaces occurred within paramount reality. However, there was also a meta-physical element, as participants discussed the mechanism of AR changing human perceptions of sacred spaces, and through this influence, popular AR apps may slowly begin to reshape our understandings of sacred places.

5.3 Practical implications

The insights from this study offer recommendations to companies operating in the AR sector. First, companies creating global AR products, or AR that might be used in religious environments, can derive practical knowledge from our study regarding how Church employees might react to their products. Due to the discovered tensions (partially practical, partially theological), there is potential for controversy to arise on this topic in the near future. With new AR technologies such as Apple's Vision Pro headset being released to the public [2, 38], we may see a new wave of AR solutions that pose more concrete challenges on sacred spaces. This study demonstrated that while some Christian priests in the Finnish Lutheran Church were positive or indifferent regarding the use of AR at sacred places, many showed reservations and caution regarding the integration of AR in sacred places as discussed in the tension related to tradition vs innovation.

Another practical contribution of our study relates to what is allowed and forbidden in sacred places when it comes to AR. According to our findings, the challenge lies in striking a balance between providing an interactive and innovative experience whilst maintaining respect for religious values and traditions. This connects to the complex developments we have in the realms of techno-spirituality [9], church online [14], digital theology [53] and others, where, for example, post-human capabilities [55] may challenge currently prevailing (religious) understandings of humanity and divinity, and on a similar vein, constantly evolving AR technology may challenge our conceptions of what is real [49] and what is augmented [34]. We encourage designers and developers, as well as legislators to follow these developments, and encourage more research to better understand these phenomena. With a better understanding on this topic we can mitigate potential future scenarios of accidental desecration and blasphemy arising from the lack of considerations towards the interplay between AR and sacred space.

Sacred spaces remain physical places where we can walk, but they have a spiritual purpose (in both the physical and metaphysical realms). However, we argue based on our findings that now with increasingly many locative AR games adding content on top of, and inside, sacred places, the places now obtain new purposes in the AR realm. These purposes then cause the tensions discussed in our empirical study. We summarize this transformation process

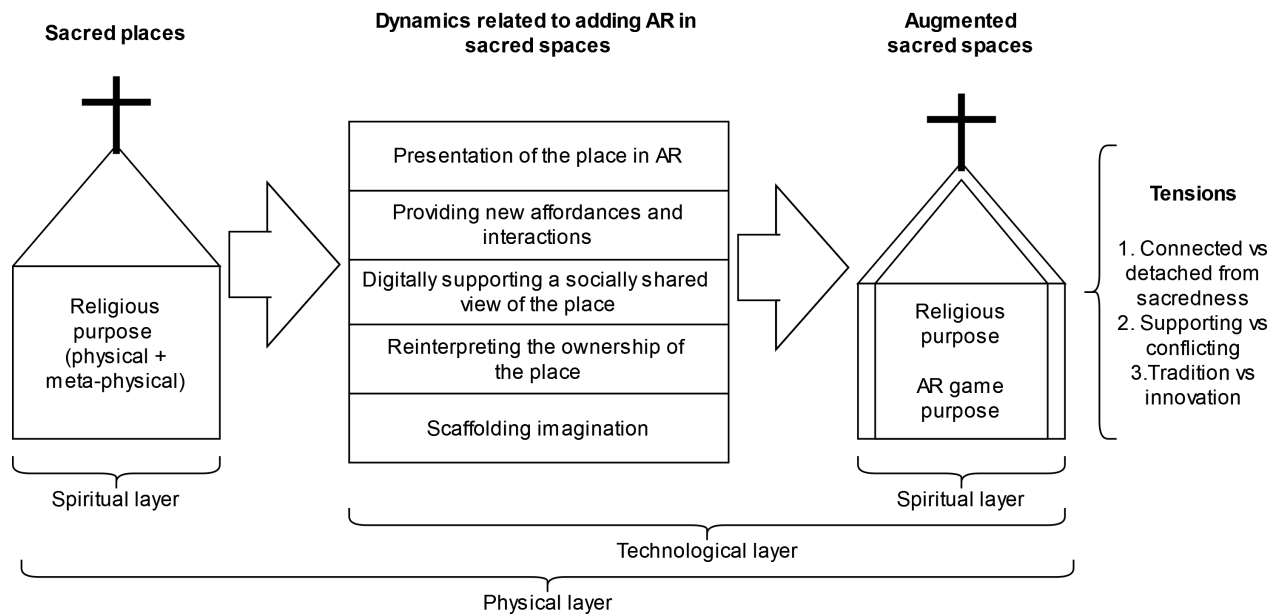


Figure 3: Displaying the transformation of sacred places into augmented sacred spaces. Sacred places now obtain new purposes in the AR realm, leading to the tensions discovered in this study. Our key contributions are shedding the light on what new global AR systems bring to sacred places, and what tensions arise from this. We follow the phenomenology of Schutz and Gurwitsch and denote three layers of reality in this conceptualization: (1) the spiritual layer; (2) the technological layer; and (3) paramount reality (physical layer). The dynamics related to adding AR in sacred spaces were derived in the Background section based on previous research.

in Figure 3. We display on the center some of the new elements that AR technologies bring to sacred spaces, present in previous literature and also implicitly in our study. We then show how the tensions elucidated in this work operate at augmented sacred spaces. With this practical view, we extend the previous research on sacred places and people’s mediated experiences with them [1, 5, 31, 48] by elucidating the new dynamics that AR introduces at sacred places, and show what tensions arise from the transformation of sacred places to augmented sacred places. The augmenting of sacred spaces can be done in many ways, but in essence all these relate to adding AR content on a virtual representation of the world such as a map interface or the view of a mobile device’s camera [3, 32]. It is clear that the transformation from sacred place to augmented sacred space is a complicated non-linear process, and that there are various additional components involved that were not explicitly discussed or focused on in this study, such as the individual’s experience and the relationship between space and place. Thus, multiple future research avenues and open questions remain, and next we discuss these a little bit further.

5.4 Limitations and future work

Similarly to all empirical research, this study has limitations. First, as is typical for open ended surveys, the questions influenced and directed participants’ responses, and consequently the resulting data. We acknowledge that alternative questions, as well of course

alternative methods, would have produced different data. For example, the negatively valenced questions relating to battling and black magic might have led the participants to provide more negative views than otherwise. We encourage future researchers to replicate our work, also in other similar contexts and with alternative methods, to increase the reliability and external validity of our knowledge in this domain. Second, due to the sample size and selection bias, the findings should not be used to draw any quantitative inferences such as $x\%$ of Lutheran priests think y . Third, the data and analysis were carried in the context of the Evangelical Lutheran Church of Finland, and should not be generalized to other contexts without careful thought.

The limitations coupled with the novelty and importance of the topic mean there is a need to continue research on this topic. As a key future research avenue we highlight the importance of obtaining theological perspectives on this topic, which could be studied under e.g., the recently formed field of digital theology [47, 53] While our study provided an overview of the current thinking around this topic within the clergy, it was ill-equipped to go in-depth into the involved theological dimensions. The theological perspective might lead to more coherent thinking patterns, which might also then be adopted by the clergy for them to be able to form a more unified view of what it means to add AR content into sacred places. Another important future research avenue arises from observing the virtual worlds and their sanctity. Questions such as can a virtual world be sacred, how and what does it mean,

are already relevant today. As our perceptions of reality become increasingly technology-dependent, the Church needs to revisit and perhaps also reappraise the concept of sanctity in relation to space and place. Regarding our empirical research specifically, we encourage follow-up quantitative studies to identify trends within the discovered tensions to see, if religious organizations tend to currently lean more towards one side within the tensions. This type of research could reveal societal trends that can be helpful for understanding the ongoing developments in the interplay between AR and sacred spaces.

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