AOSIS

The reconfiguration of social, digital and physical presence: From online church to church online

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Digital presence refers to technologies that provide communities a shared experience and a sense of togetherness, despite geographical distance. Emerging technologies for digital presence provide the church with both theological questions (e.g. related to the validity of sacraments when administered online) and practical opportunities. Think of the pros and cons for online communion in some churches: is digital presence real presence? The digital realm as a thread of the universe leads to rethinking of the church as a social, digital and physical unity. What kind of new possibilities could digital presence in digital realities provide to spiritual experience, individually and within the worship?

Contribution: Rather than a plain application of the existing technologies to digitise the current functions and events of congregations for online services, technology should expand and reform the church online. This study aims to discuss the transformation from online church to church online. The technical solution for digital presence was inspired by the demands of a Finnish plug-in campus in an African setting, which draws inspiration from African concepts of community and place.

Keywords: digital presence; church online; affordances; digital theology; digital religion.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has had a profound impact on how to organise the life of the church at a time when traditional physical spaces are not available and social distancing rules the daily life. While this might seem like a pragmatic question, the concrete arrangements have called for a theological debate on the meaning and character of the physical place itself as an expression of the faith of an individual or the church at large. This involves exploration of the theological elaborations of social, digital and physical spaces of worship in the spectrum between the core and periphery of faith considerations. As the church goes online, there are a myriad of challenges that need to be resolved. Among these are theological, ethical, practical and technological questions and problems. In our contribution, we want to specifically look at how churches as sacred spaces can manifest in the digital world and how the communal aspect of churches as well as sacraments can exist online. We take on this task to guide our own development of the next generation of socially intimate communication technologies. We incorporate high quality and interactive immersive 3D video, a technology that can benefit greatly from this analysis, influenced by the African philosophy of Ubuntu that sets the ontological foundation for digital presence.

Church is a space that creates meaningful places for individuals, communities and societies engaged in diverse activities. It not only collects people under the same roof, but it also interlinks the surrounding society as a place. In an inspiring way, the aspects of the physical versus the digital, as expressed in the question of the sacred in space, place and reality, interrelate the classic dialogue between the universal and the particular.

However, while the digital extends the concrete, particular limitations of a physical place or representation of worship, it can also act the other way round. This is because the interactive affordances of technology allow organisations to adapt the digital environment to individual preferences. Various interactive tools allow the fabrication or manipulation of the digital encounter, or even the contextualisation of it towards a representation that is most particular. This creates new opportunities for individuals to transform the social place of church for diverse spiritual needs.

Fluidity between the physical and digital representation in a worship environment enriches the complementarity of the particular and the universal further. Digital platforms have already taught us to expect highly personalised affordances and instant responses 24/7. The speed of digital, its reach, its interactivity and the quantity of data it can handle will continue to affect our behaviour. In the near future, if not quite yet, technology will allow the design of sacred spaces and places which integrate a physical representation with digital affordances to serve the social place for individuals and worship. That would mean that while a person is in a physical place, say a church, they can extend the limitations, or the particular, of the place by digital means, by virtual reality, augmented reality, teleimmersion or a combination thereof. For instance, a virtual reality extension transfers the worshipper to experience a storm on the lake of Galilee, an augmented reality allows the opening up of the interpretation layers of a given symbol, like the shape of a triangle for the Triune God, and teleimmersion allows the sharing of worship with those physically far away in multiple places.

Church in digital reality might have some temporal and spatial features to support the community to be present together independent of time and place and, thus, feel the sense of belonging. As we develop digital spaces, we may borrow aspects of their physical counterparts to recreate the positive experiences. At the same time, digital technology is increasingly invading the physical world through new affordances. A fluid complementarity of the physical and digital can make the experience of the encounter, say, using Zoom, particular and concrete, but at the same time exceedingly open, an expression of the universality of the encounter. The shared meaning is possible to create both physically and digitally. The physical or digital place with symbolic features can support us to experience individually the presence of oneself, community and spirit.

Interactions are at the heart of the experience, whether in person (in a physical space) or online (in a digital space). The social space is about creating shared experiences, whether that is between the communities and its members or among the individuals themselves. As digital technologies become more pervasive, these roles are likely to become blurred. One can choose from two options in this changing landscape: one can conservatively digitise or automate the current functions, such as streaming events, sermons or delivery of sacraments and call this *online church* (Cooper et al. 2021). While the online church is taking shape, not least influenced by the challenges from the COVID-19 pandemic, the focus is still mostly on applying technologies that support digitising the existing church activities, as a set of concretisations of online church. The second option is to reform the way we think about the functions and see how a digitised representation would make them more meaningful, relevant or closer to the original – this is *church online*. In this study, we explore how novel presence technologies, and especially the recent digital presence, can transform the social place in a partly or completely digital space.

The development of our digital presence, or teleimmersion, technology was originally motivated by the desire to create a digitally shared learning environment which would allow students in Africa and in Europe to learn software engineering by exploring, observing and working together. This is why we, after introduction, focus on social place by describing the African concept of Ubuntu as a basis for communication and sacred space, place and reality. In the section 'Church Online as social place', we also introduce Campbell's (2020) six communication traits for realising church online. In section 'Church Online as digital place', we focus on the digital aspects of sacred space, place and reality. Section 'Church Online: Fluidity between the physical and digital space, place and reality' analyses the affordances of digital presence for church online by presenting a framework of configuration of social, digital and physical places and realities. The 'Discussion' section discusses the identified affordances from the perspectives of church growth, African philosophy and the sacramental presence and the 'Conclusion' section closes the study.

Church Online as social place

To discuss the online church as a social place, we build on the African philosophy of Ubuntu because of the fact that the development of digital presence technology discussed in this study has so far been made in the context of global North–South collaboration. The concept of Ubuntu is at the very heart of social place and is described as a basis for communication and sacred space, place and reality. Ramose (1999) claims Ubuntu to be the root of African moral philosophy that emerged from the thoughts of the Bantu-speaking people. Not necessarily the word but the concept Ubuntu is found in all African languages with Bantu-speaking origins. According to Broodryk (2006), the Bantu language word 'umuntu' has been translated into English as 'person' or 'human being', and 'Ubuntu' as 'humanness'. However, Ubuntu is globally known to be a Zulu or Xhosa word or language. The prominent Zulu aphorism 'umuntu ngumuntu ngabantu' is hence interpreted in English as 'a person is a person through other persons' or 'I am because we are', according to Ramose (1999) and Shutte (2001). Zulu is just one of the Bantu languages. The description of the word Ubuntu suggests its nature and contextual application. Thus, to apply this concept appropriately, we have to keep its context intact. Ubuntu is applied in any human endeavour that intends to manifest universal humanness, in particular human actions or aims.

It is implicitly acknowledged that nature, as the potential for a person to manifest their latent humanness, does not necessarily concretise in possibly technical or superficial training or other actions, including communication, according to the Ubuntu conception. It is against this conception that – although by nature all human beings possess humanness – humanness does not always manifest in all human beings, or their actions, mutual interaction or communication. Thus, for a person to become a true human being, communication is needed to facilitate the realisation of the human potential within a social context, for example, as a member of their church community. The role of those in power is critical for setting up communication affordances that support the manifestation process.

If the common ground of humanness does not inform communication, mutual interaction between people can remain at the level of superficial information or even exploitation. However, when Ubuntu is the basis for communication, then human values of interdependence, inclusiveness and respect shape human perceptions and actions. The reality is that communicating humans interact and reciprocally influence one another depending on what a person or a society aims to accomplish.

Interestingly, the expectations of church, especially church online, are aligned with the Ubuntu insights of human potential realising within a social, communicating context.

The nature of church as a community can be reflected through Campbell's (2020) extensive and longitudinal studies on digital religion and church. She has identified six communication traits that reflect the expectations of people from church online. The traits reflect upon the aspects of community and belongingness of people gathering in church and remind of the importance of reaching beyond the plain streaming of conventional activities at church. Church online needs to cater to the expectations of the following six communications traits:

• The church online nurtures its members' sense of relationship. Ultimately, being at church should not be reduced to an individual experience of human–God encounter. An experience of belongingness can and should make use of all the senses, similar to the way in which physical high church services have made use of incense and liturgy to create acts of worship which appeal to the senses of sight, sound and scent.
• The church online needs to be a caring community. This goes beyond a plain relationship. Care is close to empathy that senses, even proactively, the desire of another person for care, consolidation, company, food, safety and self-esteem. Care also rewards the carer.
• A church online appreciates members' contributions to the community by showing the value of their inputs.
• A functional church online provides its community with a 24/7 connection. This is very different from the experience of having access to a physical church, say, on Sunday mornings.
• Church online maintains a safe, open and intimate communication channel with its members. Trust and privacy are key principles.
• Church online supports the fellowship with others that share their faith. Fellowship requires that members can explore, question and challenge each other's ways to understand, express, experience, feel or live their shared faith.

Table 1 summarises how Ubuntu informs the way the six communication traits by Campbell (2020) can be realised.

Church Online as digital place

When describing the digital place of church online, Campbell (2020) is critical of the current integration of digital technology within church communities. She refers to the domination of the online church agenda: technology has been mainly used to digitise or automate the current processes, especially by streaming various events and functions. To go for church online and strengthen the six communication traits using digital technology, the currently available technologies might pose a critical barrier, as shown in Table 2.

TABLE 1: Communication traits and Ubuntu.

Communication trait	Realisation by the Ubuntu philosophy
1. Sense of relationship	Equality of everyone in the community; shared access to common resources; use of family terms such as brother and sister.
2. Caring	Curiosity about the others' needs, expressed in asking questions such as 'How are you?' and 'How is your family?'
3. Appreciation of value	Everyone's contribution is acknowledged and presented (like taking harvest to the church or gifts at a wedding); by title, role and name. It is an issue from the Ubuntu point of view if someone is not recognised for their contribution: it breaks the balance.
4. 24/7 connection	Continuous availability, not only at the time of sickness or only limited to certain people (like relatives or friends) but universally practised all the time and within the whole community.
5. Intimacy	Deep, beyond controversial or taboo-like problems or difficulties, every person shares the common humanity which is the basis for sharing even delicate questions or challenges. When Ubuntu materialises people do not condemn others based on superficial aspects (e.g. HIV).
6. Fellowship for exploring common faith	You can and need to bring the conflicts, suspicions or arguments onto the table, without the need to please or obtain recognition, with another person or yourself, to clarify your relationship with them or yourself, to express your person as part of humanity.

Note: The communication traits are taken from Campbell, H., 2020, *The distanced church: Reflections on doing church online*, viewed 15 May 2021, from http://hdl.handle.net/1969.1/187891.

TABLE 2: Limitations of contemporary technology.

Communication trait	Limitations of contemporary technology
1. Sense of relationship	A narrow mode for experiencing or expressing human-to-human relationships. Does not make use of all senses nor provide multi-sensory experience.
2. Caring	Experience and, thus, empathy with the physical remoteness of others' context and situation could be missing because of the focus on one-to-one communication only, limited to the views of the preset cameras.
3. Appreciation of value	The contributions introduced might favour those that can be appreciated by their direct visual or auditory appearance, for example, music. What people are doing in the periphery behind the main action, like taking care of the playing children, or their contribution by preparing tasty snacks or a warm handshake are harder to express or observe, say, in a Zoom session.
4. 24/7 connection	Most current 24/7 connections are surveillance systems rather than services for mutual and equal connection between the parties.
5. Intimacy	An intimate connection by the current technology usually serves monitoring and can be intrusive rather than trustful and private. Analysis of the communication data usually only serves one party of the communication and is not transparent.
6. Fellowship for exploration of common faith	Exploring faith questions by technology is usually limited to sharing reflections on, say, Biblical texts by textual discussion or video conference-based communication. Exploring faith and its relevance to the users' immediate contexts is hardly possible.

Note: The communication traits are taken from Campbell, H., 2020, *The distanced church: Reflections on doing church online*, viewed 15 May 2021, from http://hdl.handle.net/1969.1/187891.

While Campbell's (2020) six communication traits refer to the community and belongingness among people, they can also be adapted to, or interpreted as, an individual's dependency or interrelation to the reality at large, maybe even up to relating to the universe. From the perspective of digital presence, the question is how teleimmersion technology can strengthen the experience of one's place in the outer space transcending oneself, or the inner space hiding within oneself, or the imagined space beyond observations.

Technologically, immersing someone in a communication medium involves recreating a multi-sensory experience to achieve a feeling of presence or togetherness with the other individuals. Immersive technologies are enabling sensory immersion but are yet to convincingly recreate people or objects because of the reliance on low-quality approximations of both the visual appearance and bodily actions of participants. Presence involves a high-fidelity connection that is not achieved by video or virtual reality avatars. Before any remote immersive experience, it is necessary to capture and construct a rich representation for subsequent transmission. In essence, the computer needs to first be capable of perceiving the environment in ways that are at least comparable to how we experience it, before there is any chance of recreating that experience remotely for another person. The focus necessarily first turns to vision with 3D capture of an entire space to enable depth perception, peripheral vision and free movement or focusing of attention.

Our prototype real-time 3D video capture setup consists of eight stereo pairs of cameras, each pair connected to a desktop computer with a graphics processing unit (GPU) (NVIDIA GeForce RTX 2080) for the depth estimation using stereo matching. The cameras are arranged around the edges of the room or group to passively capture the entire scene without intrusion. At a maximum resolution of 1920×1080 pixels and with a depth range of ~1m to ~12m, we estimate the depth in the scene of each pixel using adaptations of the semi-global-matching algorithm (Hirschmüller 2008). Keeping the frame rate above 20 fps and the overall latency or delay low is also crucial if this is to remain a two-way live experience. Our current processing-related delay is ~0.14 s which is only slightly perceptible with fast motions.

Once the depth data are captured from each camera, the camera views are merged together using camera pose information gained through a calibration step to achieve a high-quality fusion with reduced noise distortion and errors in the different individual depth estimates from each camera pair. Following fusion, the data are compressed by converting the depth data to 10-bit Yuv 4:2:0 colour format and tiling all the depth sources into one or more 4K video frame(s) that is then encoded with lossy compression using hardware (NVENC HEVC) for real-time performance. These videos can then be transmitted to multiple remote locations with bandwidths as low as 16 Mbps. After transmission, the multiple video feeds for colour and depth are decoded, compression artefacts are filtered and then arbitrary 3D views can be rendered locally using a straightforward point cloud or mesh rendering combined with reprojection to the colour video feeds to add texture. Virtual Reality headsets are currently being used to present and interact with the 3D video; however, this means that display and interaction are certainly inappropriate for most use cases, including church online, and yet there is insufficient understanding of what the alternative means of interaction should be.

Looking at the situation purely from a technical standpoint would fail to address and take into account the desires of individual users of technology in the context of church online. We need to understand the requirements of the people and the church and accordingly design technical solutions. In the area of school education, we are already deploying the technology to enable a teacher and students to interact, in the process identifying educational uses (affordances) and the benefits for cognitive load, engagement and a sense of social presence. This school study involves a student and teacher collaborating with a virtual whiteboard which they can draw on using only their fingers, perceiving each other in all three dimensions which creates a radically different experience of presence. In the current study, we identify these user desires from the viewpoints of communication traits.

To interlink the technological solution to interaction opportunities, Table 3 presents the affordances of digital presence technology for the six communication traits

TABLE 3: Affordances by digital presence technology.

Communication trait	Affordance by the digital presence technology
1. Sense of relationship	Provides the users full control to explore in the digitally shared space for experiencing or expressing human-to-human relations. Conceptually ready to integrate the use of all senses for an embodied, yet digital encounter. Sense of relationship can also be individualised or differently tuned for the preferences of each participant.
2. Caring	Enriches experiencing and thus understanding and empathising with the physically remote others' context and situation by opening a channel for many-to-many communication. Empathy requires understanding another person's situation from diverse, even uncomfortable perspectives that require cultural interpretation that can be digitally integrated in the connection.
3. Appreciation of value	Opens a holistic, multi-sensory experience of a shared church community where different people use their diverse talents for the common benefit. The Biblical expression of the church as the body of Christ, consisting of diverse members for different functions can be realised.
4. 24/7 connection	A shared environment that offers everyone an informal, cozy and personalised, 24/7 access to the community. Digital technology can also manipulate the appearance of participants for a smoother encounter in cases where the natural appearance for any reason, such as being badly injured in a hospital, might disturb the connection.
5. Intimacy	A non-intrusive, trustful and private intimate connection embedding the contexts of all parties. The level of intimacy can be controlled when approaching sensitive issues. Possible analysis of the communication data is transparent.
6. Fellowship for exploration of common faith	Exploring faith and its conflicts and relevance in the users' immediate contexts. Digital presence gives tools to represent individual or common faith as interactive, shared cognitive maps.

Note: The communication traits are taken from Campbell, H., 2020, *The distanced church: Reflections on doing church online*, viewed 15 May 2021, from http://hdl.handle.net/1969.1/187891.

TABLE 4: An example: Comparison of meaning of place in online church and church online.

Space, place and reality	Online Church: streamed Holy Communion	Church Online: shared Holy Communion
Sacred space: objectively observed physical location, e.g. altar.	Altar as a main physical space streamed to multiple locations by the set of cameras.	Altar as one physical place among other places in multiple locations shared and experienced as a multi-sensory entity by a set of cameras.
Sacred place: subjectively experienced place, e.g. an individual worshipper, kneeling	Altar is streamed, and it is visible and hearable.	Teleimmersion could provide subjective expression and opportunities to join the altar and experience the act of kneeling.
Sacred reality: shared experience within and around the place – belongingness to the Holy Communion	Holy Communion is something to follow – not something to own from multiple locations.	Holy Communion is feeling the togetherness with others at the altar, sharing the interactive experiences of participation; however, digital presence does not facilitate remote eating and drinking of bread and wine yet.

(Campbell 2020). The affordance concept (Gibson 2014) is particularly useful for understanding how church online can facilitate digital presence.

Table 3 illustrates the transformative potential of digital presence for the design of church online in pastoral counselling, teaching, diaconia, interfaith dialogue and worship. In general, digital presence, when implemented functionally, can transform communication and encounter towards its understanding by Ubuntu: everyone sharing the same humanness, without the formality or fear that so often characterise development. In order to realise the potential, close collaboration between theologians and computer scientists is required, not in libraries or closed laboratories, but in real settings, with targeted users, as a living laboratory within the roots of Ubuntu, in Africa.

Affordances refer to the interaction opportunities that an object offers an actor (Gibson 2014) or to the perceived opportunities that an object offers an actor (Norman 1988). Diverse actors in church online can differently use the digital presence technology as perceived opportunities. It would be interesting to analyse how digital presence can enhance reflections on space and an individual's existential position, complemented with interpretation of sacred texts. Additionally, the universal time present at the moment as well as at the time before and the time ahead can manifest, fabricate or manipulate our existential experiences of belongingness. The interpretation of these experiences and their spiritual or theological validity is possible; however, it is beyond the scope of the current study.

Church Online: Fluidity between the physical and digital space, place and reality

After describing the social and digital perspectives of church online, one can question the significance of physical place. When moving church from physical space and place to the digital realm, it is important to consider the spatial and physical connotations of digital reality. Space is about physicality and physical aspects of a specific location such as a church building. Place considers both physical and social aspects (Devine-Wright 2009). It includes a variety of meanings and emotions associated with the location of individuals or groups. Place provides the setting for exploring people's place attachments. This could be thought of as the bonding of people to place (Altman & Low 1992).

It is a sense of place, rather than the structure of space, which frames our behaviour. Our sense of place is a cultural or communally held understanding of the appropriateness of styles of behaviour and interaction, which may be organised around spatial features but is, nonetheless, quite separate from them (Harrison & Dourish 1996).

The sense of place can be observed by comparing the earlier mentioned two options: online church and church online. For instance, while the physical altar is a particular, concrete and limited place, it is also a place where a finite individual meets with the infinite God. While the physical encounter is typically particular and limited in time and space, the digital might be understood as, if not completely unlimited, at least far less limited in both time and space: it can reach beyond physical boundaries and be repeated synchronously but also asynchronously. The differences are based on the assumption that the digital presence is available. The comparison is presented in Table 4.

In online church, the experience of place is streamed, but in church online, the experience is shared. When coming to church online, one needs to reflect on the spatial behaviour of individuals. Spatial models are increasingly popular in the design of all sorts of collaborative environments and in digital environments too. Harrison and Dourish (1996) state that these designs are based on the assumption that, because many aspects of our behaviour seem to be organised around spatial elements of the everyday world, we can carry over these patterns of behaviour to virtual environments by designing them around the same affordances for action and interaction that the everyday world exhibits: doors, windows, walls, distance, proximity, etc. However, the place-based real-world behaviour is not fully following the social interpretation of different artefacts. That makes it more important to consider the potential of shared imagination to transform digital spaces to digital places and realities, which we can experience and where we can belong. So the question is whether a digital encounter might be closer to the nature of the universal, transcendent encounter with God than its physical, limited predecessors. Reality created by digital place provides new opportunities for spiritual experiences.

Knott (2009) claims that theology's reflections about space and place provide a deep challenge and an urgent necessity for theology to become aware of its embeddedness in the existential spatiality of life. Recent social and cultural theory has reconceived place as dynamic, in terms of its relationship

to power, history, time, its condition of simultaneity and the various ways in which it is experienced and represented. No longer is it seen as the passive container or backdrop for human activity. It is thoroughly enmeshed in embodiment and everyday practice, knowledge and discourse, and in the processes of production and reproduction, and, consequently, it is enmeshed in religion no less than other areas of social and cultural life, states Knott (2009).

Space and place reflections and increasing interest, for example, through spatial metaphors can be identified. Bergmann (2007) describes two directions of theology in its spatial turn: on the one hand, theologians explore what Christian images and practices as symbols in space and at place meant for theology's classical questions; on the other hand, they move, slowly but safely, into other discourses by experimenting with theological contributions to other disciplines and public discourses. He states that the embedding of theology in a broader ecological perception and understanding of Creation, the new plastic and spatial theology, increases its strength to operate on different scales of nature, society and culture (Bergmann 2007).

To integrate the Ubuntu perspective of configuration of spaces and places to more fluid entity with digital spaces and places, one can consider place as a subjectively expressed space, with a meaning. In this way, Ubuntu reminds us of its foundation in shared humanness. That means that the sacred space calls for realising one's humanness in order to make the place one's spiritual home. As an instantiation of ontological reality, the experienced and shared sacred place is not limited by its physical form or those physically inside at a given time but can be easily interpreted to consist of a larger community, even those passed away. Digital sacred space, place and reality have to be rooted in human basic potential which is humanness and should be expressed and experienced in concrete reality which is social context or church through digitised communication traits.

To sum up, Figure 1 summarises the concept of church online.

Discussion

Church online is at the intersection of technology and theology. The dialogue between them can have three perspectives. The intention is not to provide answers but more to open up topics for further and deeper theological analysis as a basis for future church online (Figure 2).

Perspective 1: Church online and church growth and decline

Perhaps one of the most iconic images associated with the secularisation thesis, which broadly argues that religiosity decreases as society modernises, is the sepia photograph of a former church building operating as a carpet warehouse. The image forms the front cover of Steve Bruce's widely cited book, God is Dead (2002), which explores secularisation in
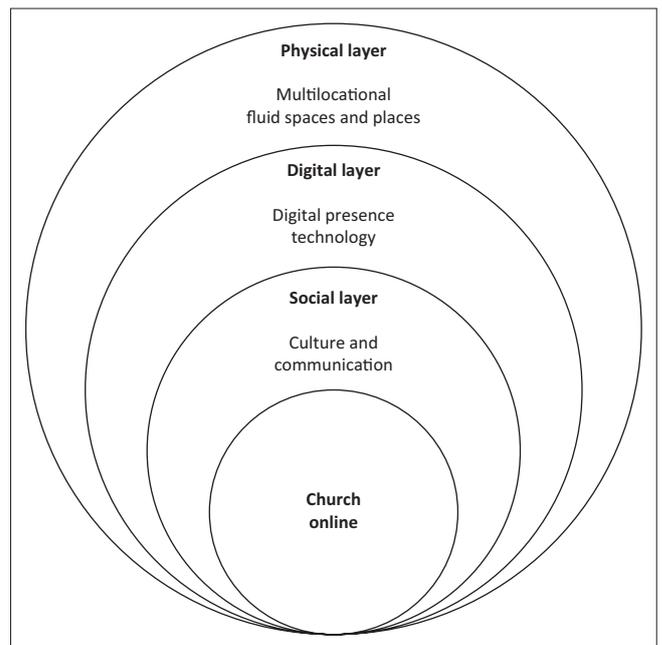

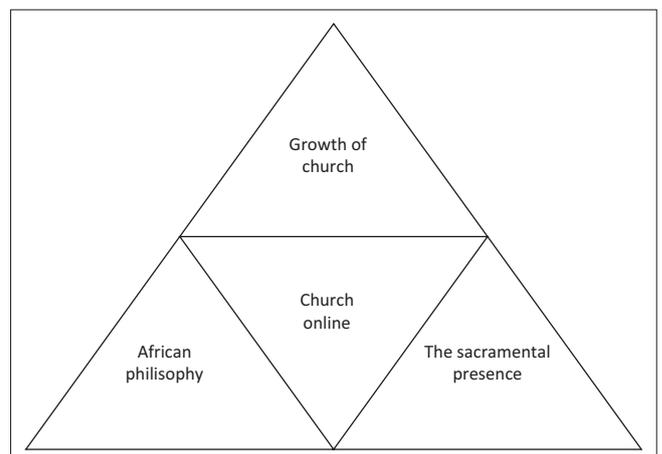**FIGURE 1:** The concept of church online.

FIGURE 2: Church online and three perspectives.

the west, and is an image which resonates strongly with many people. It resonates for a number of reasons including the emotional connection which people often feel towards familiar spaces such as church and other religious buildings and because of the prevalence of such secularisation – for many people, the carpet warehouse image evokes memories of other church buildings, closer to home, which have been re-purposed for non-church use. Much less discussed in the academic literature, however, is the concept of desecularisation. Cooper and Goodhew (2017) explore the concept of desecularisation by providing a case study of re-sacralisation, or the resurgence of religious importance to societal life, taking place in the UK city of York. In that study, the authors detail new churches that have taken over previously secular buildings such as schools and a pub. In one case, a new church had even been restored to religious use, a once sacred space which had, for a time, fallen to secular use. Thus, the story of secularisation versus desecularisation is not a straightforward one. Nor is the operating context of churches more generally – studies of

church attendance have regularly struggled to achieve accurate results because of 'the difficulty in capturing data from congregations which regularly form, merge, move, split and close' (Cooper 2017:40). It is clear, therefore, that church buildings and meeting locations are vital considerations when exploring the role of church in a modernising and rapidly changing society.

The concept of church online, and even online church, therefore creates interesting challenges and opportunities for those interested in studies of the sociology of religion. Measuring church growth or decline for example, is likely to become increasingly complex. A recent study into the ways in which churches responded to the COVID-19 pandemic by shifting their activities online (Cooper et al. 2021), for example, found that there were a variety of unsolved questions which would need to be addressed in order for robust studies of online church attendance, growth or decline to be conducted. These unsolved questions included:

- Approaches to estimate the number of people watching a service per screen;
- Approaches to estimate the number of unique screen views where people potentially dip in and out of services; and
- Approaches to compare viewing metrics for different technologies and platforms (e.g. the number of rooms in Zoom versus the number of views on Facebook).

Thinking beyond considerations of church attendance, there are a plethora of other challenges and opportunities which an increased shift to online church or church online will create. The ability to more readily access church services and activities which very closely resemble offline services and activities has the potential to greatly increase accessibility of church to individuals who might otherwise, for reasons such as reduced mobility or geographical isolation, not have had the opportunity to regularly partake in the activities of church community. Conversely, however, in situations where church online increases in prevalence beyond church offline (as is the case in several countries at the time of writing this article, owing to the lockdown measures imposed in response to the COVID-19 pandemic), church leaders will need to be careful to ensure that digital exclusion does not threaten to isolate sections of the church community who lack digital resources and skills.

Where teleimmersion digitally recreates physical spaces and places as online spaces and places, there are interesting questions to be addressed around the role of space and place in the acts of worship of those meeting for church. For example, questions around the impact of acts of worship on those meeting in the physical space versus on those meeting in the online space. Or around the sense of community felt by those physically meeting together and physically interacting, for example, through handshakes when sharing a sign of the peace, compared with those meeting online in the online place and interacting only digitally with other worshipers. In this sense, it will be interesting to explore how the shift to

doing church online might even, in some cases, affect the design and conduct of church services and the use of liturgy and tradition and the impact this might have on services and activities conducted traditionally in offline spaces. Because of these and other similar challenges, it is highly critical that theologians, church leaders and congregation members are aware of the affordances of the digital presence and express their insights on the design issues of concrete applications.

Perspective 2: The sacramental presence in the Holy Communion of church online

A particular feature that makes online faith communities particularly interesting for research is the encounter of the physical and the digital. The way that God is present in physical material, like bread and wine in the Holy Communion or water in Baptism, is studied, analysed and elaborated in Christianity by sacramental theology. The question is what is the limit of the physical? Can the consecrated material be a sacrament within an online faith community, extending the physical borders of the church around the equally physical altar and administered to those connected to the altar digitally? While many of the so-called mainline churches are still struggling with the issue and suggesting alternatives such as spiritual communion (Lange 2020; Silverkors 2020), many free and non- or interdenominational churches have already embraced online communion, enriching or perfecting the online faith community.

The Holy Communion is the core of any Christian faith community and materialises its unity with Christ. The role and administration of the Holy Communion is critical for an online faith community to be a real Christian faith community. The following observations were made during the recent Finnish discussion about online Holy Communion at the Evangelical Lutheran Church of Finland.

In the first place, soon after the Government declared the lockdown in Finland, limiting the maximum number of people at any gathering to 10 people, the bishops ordered that to apply also to funerals. The coming Easter season, and especially Maundy Thursday that has been traditionally one of the most popular days of the year for people to go to a church to worship, naturally with the Holy Communion, had the bishops ban an online Holy Communion, while they suggested that the communion can be administered to the maximum 10 people at the worship that was to be broadcasted online. However, according to the recommendations, the Eucharist should not be a performance so some churches pointed the video onto the ceiling during the Holy Communion. For those participating online, the celebrant of the communion read aloud a message referring to spiritual communion without bread and wine. The recommendations were further supported by the analysis 'Digital Worship and Sacramental Life in a Time of Pandemic' by Prof Dirk G. Lange (2020).

When the Professor of Practical Theology Jyrki Knuutila was interviewed at the main newspaper close to the Evangelical

Lutheran Church, Kotimaa, he emphasised the priority of physical togetherness and community of traditional worship the lack of which, according to him, would not make online Holy Communion convey the same act as the physical event. However, the idea of the reality of Christ's presence opened by the digital technology beyond the physical boundaries of the church did not come out of the short interview. The last author of this study submitted his positive opinion of online Holy Communion to the same newspaper, causing little, if any, reaction among the newspaper readers, whether those of the traditional or online version of the newspaper.

The very preliminary observations of the discussion of online Holy Communion further indicate the potential of technology to shape theology, even in its core contents, such as the administration of sacraments. Theologies on sacraments, and so also of Holy Communion, naturally differ between the denominations. Whereas, for example, the theology of reformed churches symbolically understands sacraments, that is the bread and wine, as symbols of Christ's body and blood, the Lutheran theology emphasises the real presence of Christ in the sacrament, that is in bread and wine. While the bread and wine are consecrated at the altar of a Lutheran Church, the mystery of the Holy Communion does not follow the transubstantiation of the material to Christ's body and blood, as understood in the Catholic theology. These very simplified and short summaries of various theologies on Holy Communion point out the importance of the nature of reality in physical and digital services. The crucial question is, especially from the Anglican, Lutheran and Catholic viewpoints, whether, or to what extent, the physically distributed online faith community shares the same reality as the physical altar. The results show that technology, if not shapes, then at least challenges theology to new interpretations and thus practices, requested by the contemporary, if you will, spiritual affordances of technology.

Perspective 3: African philosophy and church online

The realisation of human potential in a social setting is at stake, as it is threatened or limited by various factors, within and beyond human control. The physicality of the sacred spaces might be one of these factors, causing also constraints in communication: church members might be shy to communicate with those that they feel are superior to or different from them, or who are outside the physically bound space. However, the power of human innovation, in our case digital technology, has potential to reach beyond limitations. The presence of digital technology in sacred space and place will help human beings overcome limitations imposed on them by physical circumstances. With the availability of and access to digital technology in churches and sacred spaces and places, interdependency, inclusiveness and respect will get a new momentum. For an individual and for humanity, these values will be guaranteed by a digital extension of Campbell's (2020) six communication traits: relationship, caring for other people, the appreciation of essential human values, unlimited connection, intimacy and fellowship for exploration of common faith.

Conclusion

We have shown the social, digital and physical affordances of digital presence technologies for church online. The identified affordances, if early and preliminary, indicate the potential of the digital to extend, rather than narrow, the aspects of togetherness, belongingness and relevance of church membership and worshippers' existential and spiritual encounters with God.

Firstly, the universal orientation of Ubuntu with its perspective of humanity is critical for understanding and interpreting the way in which the digital thread of reality extends the particular expressions of church space and community towards the universal. It does not limit or reduce the universal to the particular instance of a given event with a given group of gathering people. While both members and clergy of the Western churches have used digital tools longer and more than their African counterparts, it is strange to see their hesitation of integrating technology into acts of worship, as seen for instance in the discussion of online Holy Communion.

Secondly, whereas the aspects of communication and space easily divert within theology towards their own specialities, like sociology of religion and practical theology, and especially the Western understanding of the church, the African idea of Ubuntu gives a holistic basis for an integrative approach that enriches online church but also radically transforms church online. Interestingly, the ontological basis can help to make creative use of technology to extend a church towards a digitally extended community that opens a particular place by digitally enriched communication. Communication and place are two modes of the same faith.

In many ways, Africa is called to radically reinvent the ways technology is integrated into the complex fabrics of society. In this study, we have tasted the first appetisers of how the African philosophy of Ubuntu explains and encourages us to integrate digital technology to theology and apply it to the life of church in ways not limited by an individualised, discipline-oriented, conventional understanding of communication and space within church communities. The new explorations, which are still but taking their first, shy steps, will pave the way to the renewal of theology in its methods and contents, towards directions that take seriously the universal character of the church that concertises its particular instances by digital means.

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