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THE INTERPLAY BETWEEN COMMUNITAS AND ANTI-STRUCTURE IN LIMINAL INNOVATION

Research Paper

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Abstract

*This paper contributes to the nascent debate in the information systems (IS) field on liminal innovation by focusing on how tensions can be resolved during crisis. Liminal innovation is used by scholars to describe iterative processes of experimentation and implementation of IS during crisis. We draw on the concepts of *communitas* and *anti-structure* from the literature on liminality to analyse a longitudinal case study of digitalization of contact tracing in Norway during the COVID-19 pandemic and show how they mutually reinforce each other to create a sense of togetherness and urgency. We identify four resolutions to tensions emerging from this interplay: egalitarianism, autonomy, disobedience, and silo breaking. These manifestations of *anti-structure* and *communitas* allowed rapid and responsive innovation during a period of intense organizational and psychological stress, and thus contributed to positive performative outcomes by implementing a digital contact tracing system.*

Keywords: Liminality, Liminal innovation, Anti-structure, Communitas.

1 Introduction

Previous research describes liminal innovation as iterative processes of experimentation and implementation during crisis (Mertens, 2018; Orlikowski and Scott, 2021). Scholars posit that there is an association between liminal innovation and tensions in this context (Orlikowski and Scott, 2021). These tensions are described as pragmatic, tactical, and existential, resulting in strained, disrupted, or discontinued practices, respectively. Drawing on the original insight of Orlikowski and Scott (2021) other researchers present tensions as initiators of “liminal practice” (Santuber et al., 2021, p 3), liminal crisis innovation as “a continuous process of reducing tensions and create opportunities” and creativity (Okoń-Horodyńska, 2021, p 431), and tensions as “triggers for liminal practices” (Haskamp et al., 2022, p 3).

When considering this research direction, we identified the seminal studies of liminality by anthropologists Arnold van Gennep (1909) and Victor Turner (1969, 1979), and in particular the concepts of *communitas*, defined as a state of togetherness during liminality; and *anti-structure*, described as actors’ felt need for rule breaking (Turner 1979). Building on Orlikowski and Scott (2021), we posit that these concepts are highly relevant to making sense of tensions during liminal innovation in organizations, tensions leading to breaking of structures as well as community building. The dynamics between *anti-structure* and *communitas* are pertinent to making sense of tensions in liminality that are present in many studies of liminality in anthropology but underexplored in research into liminal innovation in an organizational and/or IS contexts. Hence, we set out to answer the following research question: “*how does communitas and anti-structure influence liminal innovation?*”

In this paper we use communitas and anti-structure as a lens to explore and analyze a longitudinal case study of digitalization of contact tracing in Norway. Contact tracing is the activities associated with identifying and reaching out to people who may have been exposed to an infectious disease. In our case this is carried out by municipal health workers who are alerted to a positive case of COVID-19. Once identified, the *contacts* of the patients are approached and asked to test, isolate, or quarantine, depending on the current regulations. The analysis demonstrates how a quickly emerging communitas in the 'betwixt and between' state of liminality during the COVID-19 pandemic (the pandemic) entailed actors experiencing a togetherness, a shared sense of being different, in their work to create a digital contact tracing system (CTS). The emergence of communitas was accompanied with anti-structure during liminality that involved actors 'cutting corners', going against established bureaucratized practices and processes to speed up the digitalization process (Tagliaventi, 2019). We thus show how resolutions to tensions, identified as the interplay between communitas, and anti-structure, have played an important role in the initiation and continuation of a liminal innovation. The resolutions are represented as clusters of practices, and by practice, we mean "... recurrent situated activities informed by shared meanings" (Schatzki et al., 2001; Scott and Orlikowski, 2014, p 878).

While Orlikowski and Scott (2021) discuss how in liminality pragmatic, tactical and existential tensions may lead to liminal innovation, they omit a discussion of resolutions that may contribute to resolve these tensions during liminality. A key goal of this paper is therefore to respond to Orlikowski and Scott's (2021) call for research on the relation between tensions and liminal innovation, and thus contribute to the liminal innovation debate. We develop a conceptual framework that associates the three tensions with four resolutions emerging from the interplay between communitas and anti-structure. The four resolutions are labeled *egalitarianism*, *autonomy*, *disobedience*, and *silo breaking*. Together, the resolutions contribute to resolving the pragmatic, tactical and existential tensions. We thus show how the interplay between communitas, and anti-structure has functioned as a positive force for innovation, contributing to positive performative outcomes, represented by a digital CTS. From a managerial perspective, the four resolutions highlight how managers can recognize and foster the unfolding of temporary anti-structure and communitas to facilitate rapid decision making and implementation during liminal innovation.

The rest of the paper is structured as follows. First, we present a literature review on liminality and liminal innovation followed by our conceptual framework. Our research approach is then detailed in the methodology section. Next, we present our findings, which we analyze in relation to the conceptual framework. Finally, we return to our research question to discuss and draw conclusions on how our paper furthers the understanding of the association between liminal innovation and tensions in research, how we respond to call for research and contribute to practice, as well as a detail of this study's limitations.

2 Literature review

Extant research on liminality stems from theory developed in the field of anthropology that has been drawn into information systems (IS), human relations (HR), and management and organization studies (MO). In this section, we start by presenting the original definitions of liminality from the anthropologists Arnold van Gennep and Victor Turner (Gennep, 1909). Then we discuss how liminality is applied within IS, HR and MO. Following Turner (Tagliaventi, 2019; Turner, 1979, 1969; Turner et al., 1995), we describe the associated liminality concepts of communitas and anti-structure. Finally, we present our conceptual framework consisting of liminal innovation, and the interplay between communitas and anti-structure.

The anthropologist Arnold van Gennep was the first to use and describe the concept of liminality, which he called rites of margin or limen (Gennep, 1909). Liminality was the second phase in his 'rites de passage' (Turner, 1979). The first and the third he called rites of separation and rites of re-aggregation respectively (Turner, 1985, 1979). What van Gennep thus described, involves a separation from the ordinary, which leads the individual into liminality ('limen', an uncertain period), and finally either into a new state or status or back to the 'old' ordinary (Turner, 1979).

Building on van Gennep, Turner (1979) defines liminality as being on a threshold. "... a state or process which is betwixt-and-between the normal, day-to-day cultural and social states and processes of getting and spending, preserving law and order, and registering structural status." (p 465). It is a state of going from 'something' towards 'something else', the state of temporality, vulnerability and uncertainty (Bye, 2022). Turner (1985) describes liminality as a threshold that may be a separation in time, between work and leisure, as well as in space, a border between two countries. Liminality has also been described as a time or space of flux, where something - not known - might happen. Liminal time may last for a moment to several years (Schrier and Mulcahy, 1988).

2.1 Application of the Concept of Liminality

The concept of liminality is usefully applied in research inquiry in IS, HR, and MO studies to describe a state of suspension into a 'liminal state' due to a crisis, uncertainty, and/or ambiguity (Carugati et al., 2020; Orlikowski and Scott, 2021; Teo et al., 2017). Orlikowski and Scott (2021) draw on, "a liminal time and space", to describe how uncertainty and the feeling of 'betwixt-and-between' may lead to changes in established processes and practices (p 2). These changes may end with the organization finding a way to a "new equilibrium point" (Carugati et al., 2020, p 771). Inversely, the result may be reverting back to the 'old normal' (Orlikowski and Scott, 2021). Prior research in IS has shown how the suspension into a liminal state may result in changes in practices, values and norms initiated by individuals actively participating in the very same practices, and according to the values and norms that are being changed (Henfridsson and Yoo, 2014). Such changes may also entail identity construction (Beech, 2011), and the creation of new organizational roles (Tumbas et al., 2018). Drawing on Orlikowski and Scott's (2021) work, recent studies of liminality is concerned with the association between tensions and liminal innovation. There is a focus on how tensions may play a role in initiating and triggering "liminal practice" (Haskamp et al., 2022; Santuber et al., 2021), and that liminal crisis innovation may be used to reduce tensions and then facilitate creation of opportunities (Okon-Horodyńska, 2021).

During liminality, actors may develop a shared sense of 'being different'. This sense of being different has been described in prior research into the work of management consultants and crowd workers. Analysis reveals how these individuals feel that they participate in a different working environment outside the environment of 'regular' workers (Elbanna and Idowu, 2022; Howard-Grenville et al., 2011). This shared sense of being different in liminality is indicative of communitas (Elbanna and Idowu, 2022; Mertens, 2018; Nicholson et al., 2017; Wagner et al., 2012). Two examples are illustrative, firstly Wagner et al. (2012) who showed how communitas evolved among a group of workers who left their known safe work environment to work in a different location. Secondly, Nicholson et al. (2017) demonstrated how communitas can play out in liminality in the case of a social responsibility scheme between organizations – a bank, outsourcing firm, and a school in India – brought together for a good cause.

2.2 Theoretical Lens: Liminal innovation, and the Interplay Between Communitas and Anti-structure

Liminal innovation describes iterative processes of experimentation and implementation during a crisis (Mertens, 2018; Orlikowski and Scott, 2021), responding to pragmatic, tactical or existential tensions (Orlikowski and Scott, 2021). The three tensions hence lead to innovation and change influencing established practices. While pragmatic tensions lead to an urgent need to change established practices, tactical tensions disrupt established practices. Finally existential tensions occur when a crisis leads to such big changes that existing ways of doing things does not make sense any longer, entailing not being able to repurpose existing capacities for new and different practices, but experimenting with new practices, adopting new ways of doing things and thus abandoning old practices.

Building on Orlikowski and Scott's (2021) insight, our theoretical lens develops a conceptualization of the continuous interplay between anti-structure and communitas in liminal innovation, resolving the three tensions.

The first characteristic of liminal innovation is *liminality*, a threshold (in space or time), a feeling of being in ‘betwixt – and – between’ (Bye, 2022; Turner, 1979). The second characteristic of liminal innovation is *communitas*. Turner et al. (1995) defines *communitas* as a community or a communion “of equal individuals who submit together to the general authority” during a liminal period (p 360). *Communitas* does not necessarily relate to a specific place but more to the shared feelings within a group of people. It is thus “an experience of community that occurs within a group of people when their lives together achieve a common, mutual meaning.” (Bye, 2022, p 1). One of the reasons why *communitas* may emerge is “when disaster strikes” (Matthewman and Uekusa, 2021, p 969). The threat of a crisis, such as the pandemic, bonds individuals together and it leads to a “shared social identity” (Matthewman and Uekusa, 2021; Drury et al., 2019, p 142). Drawing on van Gennep’s foundational ideas, Victor Turner describes *communitas* as “a condition of anti-structure” (Turner, 1969; Matthewman and Uekusa, 2021), which brings us to our third characteristic of liminal innovation: *anti-structure*. We define Anti-structure as the felt need for rule breaking and changing of organizational communication and collaboration structures due to a crisis (Schrier and Mulcahy, 1988; Tagliaventi, 2019). Tagliaventi (2019) writes: “Liminal experiences are characterized by the breakage of consolidated order with its hierarchy, status recognition, and sets of rules” ... “Coping with liminality is [therefore] intertwined with the erasure or fading of established roles, rules, and procedures that can also turn into an animated contrast” (pp 105-106). Liminality “replaces established structure[s] with alternative points of references: the void is filled with rules, norms, and routines that do not apply to individuals who have not embarked upon a similar pathway” (Ibid.). Liminality facilitates *communitas* (Kapferer, 2019), in the sense that in liminality individuals are “pushed out into an unknown” where the usual and familiar structures no longer exist (p 1). There they create a communion in their feeling of being different. Turner juxtaposes *communitas* with a situation of anti-structure, where ordinary rules, norms and practices are abandoned in favor of potentially new opportunities (ibid.). From anti-structure new structures emerge (Schrier and Mulcahy, 1988, p 150). Schrier and Mulcahy (1988) posit that a new worldview emerges among the actors in liminality (p 150). *Communitas* can thus be seen to be in interplay with anti-structure: The structural changes further influence *communitas*, which again affect the group work practices, norms and rules that furthers anti-structure. *Communitas* and anti-structure are in a continuous interplay during liminality (ibid).

We posit that liminal innovation is influenced by this interplay between *communitas* and anti-structure. A crisis pushes individuals, organizations, and in the case of the pandemic, whole societies into uncertainty, with emerging tensions and needs for digital innovations such as digital contact tracing. Realization of innovation needs depends on new and flexible practices, communication- and collaboration structures. Structure and anti-structure undergo an endless cycle of renewal, decline and rebirth, which influence *communitas* in a way that affects relations, meanings, and values (Kapferer, 2019, p 1). The structural changes and new social bonds between those in *communitas* further influence liminal innovation. The conceptual framework is summarized in table 1 below.

Concept	Definition
Liminality	A state of being on a threshold, betwixt-and-between, relating to either or both time and space (Turner, 1979). A state of being on the way from something known towards something unknown, the state of temporality, vulnerability, and uncertainty (Bye, 2022).
Communitas	Entails a special sense of togetherness in feeling different, where a community or communion of equals share a common and mutual meaning of a situation (Turner et al., 1995), away from their ordinary lives and/or work situation. Related to shared feelings within a group of people, more than to a specific place (Bye, 2022), the feeling of being different from those outside liminality.
Anti-structure	Entails rule breaking and changing of organizational communication and collaboration structures due to a crisis (Kapferer, 2019; Tagliaventi, 2019). Actors diverge from established structures, leading to the fading of established roles, rules and procedures (Tagliaventi, 2019).

Table 1. Liminal innovation characteristics

3 Methodology

This paper is a result of an ongoing longitudinal interpretive case study (Walsham, 2006, 1995) into the digitalization of contact tracing during the pandemic in two municipalities in Norway. Between January 2021 and June 2022, we conducted 19 semi structured interviews, and performed 9 hours of outsider observations in one municipality (Mun1). In municipality 2 (Mun2) we conducted one focus group interview and three semi-structured interviews between January 2022 and September 2022

The research methods literature on focus groups recommends sampling from homogenous groups from the same hierarchical level because participants may not express their thoughts if a manager is present (Acocella, 2012). Our approach brought together a heterogenous group to enable us to observe group members' behaviour in relation to hierarchy during liminality. The results contrasted with the norm of a Norwegian hierarchical organization within the health care sector (Leiren and Jacobsen, 2018), described below in the findings section. The focus group consisted of four people and the interview lasted for 70 minutes. We used the same interview questions with the focus group as we have used in the other interviews. For each questions all members of the focus group responded by informing us about their story from their point of view. The four were all keen for everyone to give their answer to each question.

In total, we have conducted 26.66 hours of interviews (see table 2 below for a summary). We recorded two of the interviews while for the remaining 21 we relied on our own note taking. We transcribed recorded interviews, and discussed, compared, and collected our notes for the other interviews. Both notes and transcriptions were uploaded to NVivo. To maintain the interviewees' anonymity all interviewees have been assigned pseudonyms. Interviewees in both municipalities were part of the municipalities' corona teams and corona clinics, who have worked with digitalization of contact tracing in Mun1 and Mun2.

Municipality	Number of interviews	Hours of interviews
Mun1	19	22.33
Mun2	4 (including one focus group interview)	4.33
Total	23	26.66

Table 2. Total number and number of hours of interviews conducted in Mun1 and Mun2

We followed the interview guidelines in Myers (1997) and Myers and Newman, (2007). In the first round of interviews, from January 2021 to December 2021, we used interview guides based on a set of open-ended questions around contact tracing practices, work processes, collaboration between actors involved in the corona clinic, as well as collaborations across units and across different sectors and municipalities. For instance, we asked “*Could you tell us about the start of the corona clinic; who initiated it, who was involved in the start, what tasks were you given?*”, “*How has the corona clinic collaborated with the rest of the municipality and with other corona clinics in other municipalities?*”, and “*What role have you had in the digitalization of contact tracing and how have you been involved?*” This provided historical reconstruction of events and an overview of how the digitalization process had been conducted including the collaboration between different actors. The next rounds of interviews, dating from January 2022, included questions specifically related to liminality, *communitas*, and anti-structure as these resolutions became pertinent. For example, “*Could you reflect on how the work relationship has been throughout the pandemic?*” and “*Could you tell us about how you have experienced changes in contact tracing the past years, with regards to new work positions, routines and new systems?*”.

During the winter and spring of 2021, all interviews were conducted online, using Zoom video conferencing, because the pandemic restrictions prohibited interviews in person. A downside of conducting Zoom-interviews is the unfamiliarity with the technology and potential disturbances (Oliffe et al., 2021) and the possibility of missing “in-person interview nuances” (Ibid, p 1). However, our interviews started in the middle of the second wave of the pandemic, and by then most people had already used online conference technology, such as Zoom, Teams or similar solutions.

In August 2021, when the lock-down was lifted, the first author visited Mun1's corona clinic located in the basement of a church and observed contact tracers' work two days per week over a period of three weeks, as an outside observer, i.e. having a relatively neutral role (Walsham, 2002). An advantage of being an outside observer is that interviewees may have found it easier to respond frankly to questions (Walsham, 2002). The researcher was allowed to walk around the premises and observe and listen to how the contact tracers used the digital contact tracing system "FiksCT", as well as how they collaborated with each other. A notebook was used to jot down observations following the guidance in Walsham, (2006, 2002). During coffee and lunch breaks the researcher was able to informally interview COVID-19 testers and contact tracers who shared some of their experiences. The researcher was also allowed to attend staff meetings at the corona clinic and meetings between the corona clinic and the chief municipal physicians. Notes were taken from conversations and meetings that later were shared with the co-authors. In addition to interviews and observations, the data collection includes chat logs from the publicly available chat log 'OneTeamGov' situated on the chat platform 'Slack'. The chat log contributed with relevant and interesting information about the digitalization process in Mun1. Through the chat log 'OneTeamGov' we contacted the Mun1 corona team administrator.

On the experience of liminality and the feeling of in-betweenness, Turner is clear that it should be voiced by the researched and not the researcher (Turner, 1985, 1979). It is therefore not a question of describing if an individual, an organization or an institution is in transition but whether the researched individuals feel in transition or not. While keeping this in mind, we were careful to ask open questions about where respondents had worked prior to the corona clinic, how they were employed there and what they felt about being a part of the corona clinic team. Additionally, we asked how they had organized their contact tracing work during the pandemic to minimize the spread of COVID-19.

3.1 Data analysis

Following Noir and Walsham (2007), our approach to data analysis is as an intermediate position in relation to grounded theory and direct application of theory to data. Data collection and data analysis took place iteratively. We conducted an inductive thematic analysis triangulating the interviewees' responses with the authors' interpretations (Braun and Clarke, 2006). Firstly, open coding was conducted without any theoretical theme in mind using NVivo. In weekly meetings the authors discussed emerging codes and how some codes interconnected and could be clustered together into higher level themes. We discussed and studied what the themes were an example of, which led to a deeper understanding of the data. In the cases of uncertainty or disagreement in how we perceived a statement from an interviewee, we have had email correspondence with the interviewee afterwards.

Theorisation of the data was emergent and involved intense discussion between the authors as well as presentation of the findings at stages to colleagues at several internal University workshops. Filtering the emergent findings through the minds of others is a strategy suggested by Walsham (1995) and this enabled the 'creative leap' (Langley, 1999) that brought us to the current theorisation of liminal innovation. Our theorizing of liminality thus "emerged as a convincing explanation" (Elbanna and Idowu, 2022, p 134) during our research to make sense of the breaking of rules, and the observed emerging togetherness that occurred during the liminal innovation process in the municipalities.

3.2 Case description

This paper draws on a single longitudinal case study based on data collected in Mun1 and Mun2, in Norway. In the following we describe the two municipalities' organizational structures, why we chose the two municipalities and the argument behind framing them as a single longitudinal case study.

Mun1 and Mun2 are neighbouring municipalities in the same county. They are two of the ten most populous municipalities in Norway with approximately equal population sizes of around 100,000, situated within the same county south-east in Norway. They share a common county management with employees from both municipalities, and a hospital and a police station serve citizens in both municipalities. Several students in Mun1 attend high school in Mun2 and vice versa. Employees in both municipalities cross the municipal border for work.

Mun1 and Mun2 experienced a high number of COVID-19 infections throughout the pandemic, and both municipalities had a dire need for a digital CTS. Digitalization of contact tracing necessitates participants with different knowledge backgrounds, such as lawyers, health informatics experts, health personnel, and infection control experts. Hence, an initial challenge for an efficient digitalization was the two municipalities' silo-structures, as they make interdisciplinary collaboration difficult.

Mun1 and Mun2 are both appropriate for studying liminal innovation. In collaboration with national agencies and other municipalities, Mun1 developed FiksCT as their digital CTS. Mun2 first developed their own digital CTS before they switched to FiksCT. We posit that studying a county's two different "digitalization stories" (Mun2 corona administrator), provides a broad insight into CTS digitalization in the county (Stake, 2005).

FiksCT was developed using an established open-source platform, which had already been applied to COVID-19 contact tracing in other countries. It offers municipalities support for registering and following up confirmed cases and their associated contacts. The development was dynamic throughout the pandemic, adding over time vaccine status, integration with other systems such as lab and national ID, and eventually self-registration by patients ¹.

4 Findings and Analysis

In this section, we describe and analyse our findings using the theoretical lens as described above. We divide our findings into two periods, pre COVID-19, prior to and right up to the pandemic, and liminality, the period from the start of the pandemic in Norway, on 12 March 2020, until September 2022. First, however, we argue why we describe COVID-19 as one period and briefly describe the Norwegian infection control regime.

During the pandemic, decisions to enter a municipality into lock down, depended on infection rates and number of individuals hospitalized, characterized as "the different waves" (omsorgsdepartementet, 2022; Tjernshaugen et al., 2022). Despite different waves, our interviewees experienced the pandemic as one period. An example is from a Mun1 contact tracer who expressed the sense of isolation: "You are in a box; it feels like f*ing h*ll. This pandemic how long does it last?" (Mun1 contact tracer). We therefore argue that the pandemic, can be described as one long period of betwixt-and-between, a long-lasting uncertainty where the end and the result is unknown.

In Norway it is the municipalities' responsibility to implement systems, practices and routines for infection control, including testing, contact tracing, isolation, quarantining and vaccination of citizens infected by a notifiable infectious disease (SMVL, 1995). Usually, testing is done by a medical doctor (MD), if a MD suspects an outbreak of a notifiable infectious disease, the MD will notify the chief municipal physician. Then the chief municipal physician will set in motion the system for infection control. However, Norwegian municipalities are autonomous and have the authority to decide how they want to implement these procedures and processes as well as how they advise and guide their citizens.

Notifiable infectious diseases due to their severity and infection potential, must be reported to the Norwegian Institute of Public Health (NIPH) (NIPH, 2016) by medical microbiological laboratories and clinicians, such as tuberculosis and meningitis. For almost 200 years, the Norwegian health care sector has established routines, practices, norms, and rules regarding contact tracing of notifiable infectious diseases.

4.1 Pre COVID-19

Mun1 and Mun2 have dedicated nurses responsible for contact tracing cases of tuberculosis, and yearly follow up of potential outbreaks of meningitis. A positive case of a notifiable infectious disease sets in motion contact tracing with the help of a phone, pen, and paper, as well as notifying NIPH by sending

¹ A more detailed description of the implementation of FiksCT and how DHIS2 works, can be found in Gunderson et al. (2021, 2020) and Nicholson et al. (2022).

a filled in PDF-form by regular post. The contact tracing nurse in charge then manually creates a report on statistics on notifiable infectious diseases by counting the number of infected, writing the numbers down in an email and sending it to the municipal management, who discusses the numbers and potential challenges the notifiable infectious disease may cause. Finally, the numbers are reported to NIPH and depending on the numbers of infected, these are published on the municipality's website, as information to their citizens. This manual practice and routine worked well, because herd immunity against notifiable infectious diseases in Norway prevents larger outbreaks. However, with COVID-19 there was no herd immunity, and the virus could spread everywhere, influencing the infection rate. There are 150 – 200 annual registered cases of tuberculosis in Norway (Arnesen et al., 2021a, 2021b). In 2020, 2021 and 2022 Mun1 and Mun2 registered in total 75,509 COVID-19 cases. The municipalities did not have routines, practices, or digital systems to handle the volume of the emerging information flow nor were they able to meet the information needs from the different actors. At the onset of the pandemic, the municipalities decided that testing and contact tracing of potential COVID-19 cases had to be handled by a centralized health care unit, separating COVID-19 patients from other vulnerable groups. This was the start of the municipalities' Corona clinics.

4.2 The COVID-19 crisis and establishing the 'liminal space'

In this section we explore the interplay between *communitas*, anti-structure and innovation in four examples drawn from the case study. Each example shows a particular instantiation of the interplay that we label accordingly. At the end of each subsection, we explain the interplay using the conceptual lens. First, however, we describe the establishing of the 'liminal space'.

In mid-March 2020, the Mun1 chief municipal physician together with the Mun1 corona team, established a corona phone service, see figure 2 below. By end of March 2020, a corona polyclinic was created, and mid-May 2020, the physician decided to relocate the new corona clinic into the basement of a church. At the same time, the Mun2 chief municipal physician together with the Mun2 corona team, created a corona clinic in the office building of the municipal public health office. At the beginning of May 2020, Mun2 created a separate test station. Mun1 conducted testing and contact tracing at the same geographical place, while in Mun2 contact tracing was conducted at one site while they tested potential infected at a different site.

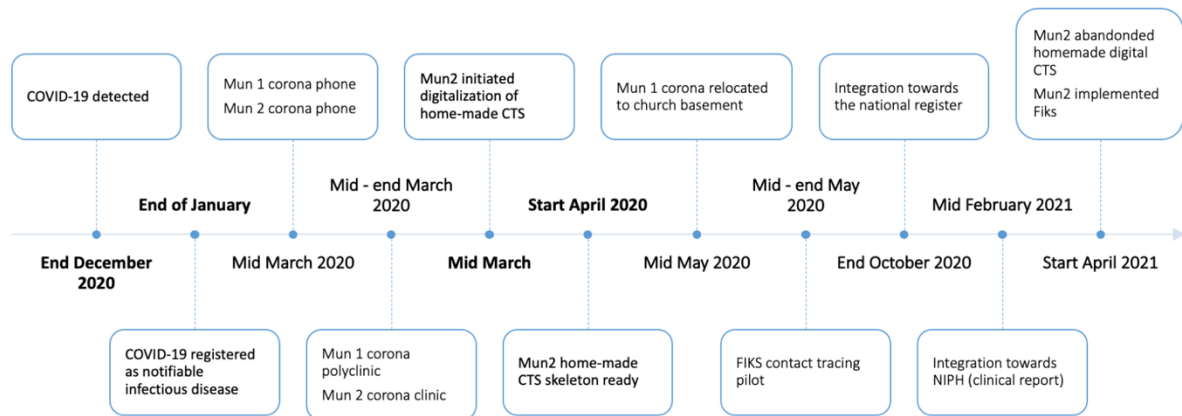


Figure 1. Timeline displaying innovation steps.

Both clinics initially consisted of teams of health personnel who had knowledge of and experience within infection control. They were reallocated from their regular positions in the municipality and were ready to answer calls from their citizens, register positive cases using pen and paper and a spreadsheet, and notify NIPH according to the existing, paper-based, reporting routines. However, it soon became clear that existing systems did not suffice to register, contact trace, and notify the quickly rising numbers of COVID-19 positive cases in the municipalities illustrated by the following quotations:

“*[They] reallocated people from other places in the municipality*” (Mun1 contact tracer). “*The contact tracers work in an unsuitable room where everyone who enters the building pass them. When the door is opened cold air comes in. It is both a temporary and an unsuitable room to work in.*” (Mun1 contact tracer). The contact tracers who had been reallocated from their original positions in the municipality felt that they were transferred from a known space to an unknown one without any foreseeable end to the reallocation. In Turner’s words, they experienced a liminal space and time (Turner, 1969; 1979; 1985; Tagliaventi, 2019).

Two main challenges quickly emerged. One, there was a constant need of health personnel to conduct contact tracing. Two, they needed a digital CTS, where they could register positive cases and their close contacts. It was a stressful work situation where the employees felt a strong responsibility trying to limit the infection rate. The corona team administrators in Mun1 and Mun2 expressed that it became important to ensure that their employees were well taken care of. They therefore worked to create a cohesion amongst the corona team members, which facilitated openness, and a community characterized by cooperation, and trust, where everyone’s opinion was listened to. For instance, the contact tracing team initiated a vote on whether they would work from home or not. Before they voted, they all agreed that if one contact tracer wanted to work at the corona clinic then all had to be present there and could not work from home. “*The premises were not the best, but it worked incredibly well. A collective was created*” (Mun1 contact tracer).

In the following we explore the interplay between communitas, anti-structure and innovation in four examples drawn from the case.

4.2.1 Communitas established with a flat hierarchy enabling anti-structure

In this subsection the interplay between communitas, anti-structure and innovation is shown using the example of flattening hierarchical structures throughout the Pandemic.

Indications of the presence of communitas were shown in a focus group in Mun2 that took place in January 2022. Almost two years since the outbreak of the pandemic, we could sense a special togetherness between the participants. The focus group consisted of four people, all part of the liminal group, each representing different parts of the municipality: the public health office, COVID-19 contact tracers, ICT integrators and the ICT project managers. Two of the participants held management positions. While three of the participants have a decade long experience from working in the municipality, the fourth started working with the Mun2 corona team during the pandemic. We were surprised that they all behaved as if they were at the same level of seniority as participants talked in an animated and uninhibited manner and regularly interrupted each other, regardless of rank or position in the municipality hierarchy. For instance, the Mun2 corona team administrator expressed that “*[c]ompetence, knowledge, and experience is more important than where you are placed in the hierarchy ... everyone must be heard and taken seriously*” (Mun2 corona team administrator). Thus, amid a tough and stressful situation, while feeling different, the corona teams managed to create a special sense of togetherness, explained by Mun2 corona team administrator: “*I don’t think you should underestimate the time spent together. Spending time together, eating breakfast, lunch, and dinner together. Get to know each other not only at work but create the good bonds. Get under people’s skin a little. Know each other. It makes quick gains and avoids many misunderstandings as well.*” (Mun2 corona team administrator).

In Mun1 they also focused on creating a togetherness in liminality, here explained by the Mun1 corona clinic administrator “*I try regularly to buy fruits and we bake waffles or buy sweet pastries, in order to create a feeling of togetherness in an otherwise hectic and stressful environment.*” (Mun1 corona clinic administrator). The strong sense of shared togetherness in an unfamiliar situation, closely corresponds to Turner’s conceptualization of communitas in liminality (Turner, 1969), because it refers to a community of individuals who share a common and mutual meaning of a situation. This shared mutual meaning grows when individuals share time together away from what is known and familiar. Overall, by creating a ‘team of equals’ with different experiences and backgrounds, involved actors breaking with established structures, normal practices, and norms in the municipalities. For those in liminality,

the traditional hierarchy was replaced by a flatter organizational structure, which facilitated potential for anti-structure and new opportunities in the form of organizational and digital innovations (Kapferer, 2019).

4.2.2 Communitas and overruling the bureaucracy

In this subsection we show the interplay between communitas, anti-structure and liminal innovation using the example of how actors' choice to make decisions 'above their paygrade' was necessary to maintain the pace of innovation.

Both municipalities' corona team members had a shared common goal: keep the infection rates down. Sometimes that entailed making decisions without conferring with management. For instance, when Mun2 corona team ordered face masks for one million Norwegian kroner: *"Early in the pandemic, we bought over a million kroner worth of face masks. It's a decision we just make. When you are in that situation, you just have to act."* (Mun2 corona team administrator). The corona team shared a sense of responsibility to do what they could to protect the citizens from a rising infection rate, serious illness, and death. As a Mun1 contact tracer said, *"COVID-19 infects very quickly. Most people get sick very quickly. We are often a little behind."* (Mun1 contact tracer).

The digitalization of COVID-19 contact tracing has been called one of the speediest digitalization processes in Norwegian history (Haugland, 2022), and the corona teams played an invaluable role in that process. Despite the speedy process, the corona teams wished they had a digital CTS 'yesterday'. As a Mun2 software developer said, *"There was delay in the management to decide if we would get resources to develop something. We got [a budget to employ] four people for two weeks, and then it [the digital CTS] should be completed. We only got a skeleton of a system up and running, but it was not usable. The communication with the preparedness department was bad. So, we used our spare time to manage and develop the system. We lived at the office and worked 24/7. ... We lacked grounding [with the municipal management] and made it [self-developed system] under the radar."* (Mun2 developer). They argued that for a continuous innovation they had to take actions on their own; *"F*ck it! Now we just must get something working and then we just must take the consequences [afterwards]. Not everyone is comfortable with it, but in an acute crisis, this is important. Someone must act. Then perhaps the bureaucratic aspects are set aside."* (Mun2 contact tracer).

The knowledge that the corona team were in it together, that they all shared a mutual understanding of the situation, made it easier to break norms and rules to do what they thought necessary, including developing digital tools. As the Mun1 corona team administrator said: *"[w]hen we got access to the national vaccination register, we transferred data to our local system, we did this a bit under the table, because we were told that we should not anticipate events."* (Mun1 corona team administrator). They were a closely knit group, with a common understanding of the situation, doing what was needed, even though that meant making decisions 'above their paygrade' meaning that they would normally defer to a senior individual or group.

As stated by Turner (1969), communitas is a condition of anti-structure and from these findings we posit that anti-structure is reinforced through communitas. Drawing on Turner (1967) and Tagliaventi (2019), it is clear that the actors in liminality were driven by a common goal, even if this entailed going beyond their level of authority. Their work hours exceeded by far the regular 37.5 hours Norwegian work week, but instead of keeping within the rules of the Working Environment Act they decided it was more important to have a working digital CTS. Overall, we demonstrate above how rule breaking and executive decision-making formed a part of the interplay between communitas and anti-structure in the process of innovation.

4.2.3 Communitas and disobeying orders

In this section the interplay between communitas, anti-structure and innovation is shown using the example of how Mun1 corona team in June 2020 refused to follow an order to terminate their work because the pandemic 'supposedly' was over. The digital CTS still needed work, new integrations were about to be developed, which would be a tremendous help for the contact tracers. Finally, the corona

team was certain that a new wave would come sooner rather than later: *“In June, we were told to dissolve the corona team, because the worst was over, but we continued to work throughout the summer, we worked under the radar, we did not let anyone stop us.”* (Mun1 corona team administrator). For over six months, they had worked closely together, and mirroring Turner et al.’s (1995) depiction of communitas, they had become a communion of equals who shared a common and mutual meaning of the situation. Hence, at the time when they were told to discontinue their work, they vigorously supported each other in the decision to disobey the order and rather continue the CTS digital development. Mun1 corona team’s decision to continue the digitalization process was a contributing factor to the municipality being ready when a new wave of infections rolled in across the municipality in the fall of 2020: *“We would never have made it [survived] without a digital CTS.”* (Mun1 contact tracer). Overall, this demonstrates how the corona team’s mutual agreement to disregard an order to terminate their digitalization work, represents an example of the interplay between communitas and anti-structure that had a positive influence on the innovation process.

4.2.4 Communitas and breaking down organizational silos

In this sub-section the interplay between communitas and anti-structure and innovation is shown using the example of how an interdisciplinary *“agile group within line hierarchy”* (Mun1 corona team administrator), with a common understanding of the situation, influenced the digitalization process. The corona team’s interdisciplinarity, with representatives from different units in the municipality is quite controversial in light of the typical silo-thinking in Norwegian municipalities. The corona team became an ‘organizational hub’ across the municipality’s organizational structure. As Mun1 corona team administrator said, *“People could come to us; we became the hub in the middle”* (Mun1 corona team administrator). The interdisciplinary digitalization process stretched beyond the municipalities as development of FiksCT, including integrations towards national registries, entailed collaboration with representatives from other municipalities and national agencies. An initial challenge with the digital CTS, however, was the lack of integration with other local municipal management systems. As the number of infections increased so did the municipality management’s need for statistics. They needed statistics related to the number of COVID-19 infected, number of isolated and individuals in quarantine. However, members of the municipal management did not seem to realize that there was no technology to streamline reporting. As Mun1 corona team administrator said in a resigned voice, *“The crisis management team needed data. We needed a mandate, but from whom? To whom should we talk? To whom should we report?”* (Mun1 corona team administrator). Mun2 IT administrator expressed the same frustration over the useless systems they had available: *“The systems we had were not good enough but there is no understanding of that. Some even thought that we developed a system because we enjoy developing.”* (Mun2 IT administrator).

The interdisciplinary organization of the corona team made it possible for the team to quickly create an overview of to where the various aggregated data should be sent. Then they developed functionality that facilitated transfer of aggregated data from FiksCT to other management systems in the municipality. Overall, this demonstrates how a team with a shared common goal changed organizational structures and continued a needed digitalization, hence how the interplay between communitas and anti-structure positively influenced the innovation process.

5 Discussion, conclusion, and limitations

In this section we identify and discuss our main conceptual and practical contributions and three areas for future research as well as some limitations of the study.

Drawing on our case study of the digitalization of a CTS, we show how the pandemic manifested as pragmatic, tactical and existential tensions influencing work practices and routines. Then we theorize a generative shift in practice by linking communitas and anti-structure to the innovation of a digital CTS during the pandemic and refer to four different examples, see table 3 below. In doing so, we further our understanding of how the crisis characterizing the pandemic manifested on the ground, influencing the liminal innovation (Orlikowski and Scott, 2021). Finally, we identify how four resolutions to tensions

emerged from the interplay between *communitas* and anti-structure: *egalitarianism*, *autonomy*, *disobedience*, and *silo breaking*. Although the four resolutions may give the impression that anti-structure followed *communitas*, we posit that the interplay between *communitas* and anti-structure went both ways, there was a two-way causality. They were initiated in parallel in liminality. *Egalitarianism* describes how members of *communitas*' competence, experience and knowledge was seen as more important than the hierarchical level each member belonged to. *Communitas* facilitated an organizational innovation where hierarchical status was set aside and all members of *communitas* were considered more or less equal. *Autonomy* represents *communitas* members' decision making above their hierarchical paygrade for the purpose of developing a tailored CTS to help keep the infection rates down. That brings us to: *Disobedience*, which describes how members of *communitas* found it necessary to disregard orders to continue development of integrations that were necessary for the municipality's infection control work. Finally, *Silo breaking* represents a *communitas* that created an interdisciplinarity across the municipality facilitating knowledge of how to further innovate and integrate the digital CTS and other municipal systems.

Interplay of <i>communitas</i> and anti-structure	Influencing innovation	Example
Egalitarianism	Worked to change the organizational structure	Competence before status: <i>"Competence, knowledge, and experience is more important than where you are placed in the hierarchy ... everyone must be heard and taken seriously."</i> (Mun2 corona team administrator)
Autonomy	Worked overtime to build a tailored CTS	Make digital CTS: <i>"F*ck it! Now we just must get something working and then we just must take the consequences [afterwards]. Not everyone is comfortable with it, but in an acute crisis, this is important. Someone must act. Then perhaps the bureaucratic aspects are set aside."</i> (Mun2 contact tracer)
Disobedience	Continued development "under the radar"	Continued a 'dead' project: <i>"In June [2020], we were told to dissolve the corona team, because the worst was over, but we continued to work throughout the summer, we worked under the radar, we did not let anyone stop us."</i> (Mun1 corona team administrator)
Silo breaking	Interdisciplinarity led to understanding of what needs to be integrated	Organizational structural changes and further integrations between CTS and municipality systems: <i>"People could come to us; we became the hub in the middle."</i> (Mun1 corona team administrator).

Table 3. *Interplay of communitas and anti-structure in relation to innovations*

As stated by Turner (1969), *communitas* is a condition of anti-structure and drawing on our research we argue that anti-structure is reinforced through *communitas*. Our findings summarized in table 3 details that a sense of togetherness, where involved actors share a common and mutual meaning of a situation, emerged, concurring with Turner (1979).

By using concepts available from liminality theory to examine and describe how tensions are resolved, our work builds on and broadens Orlikowski and Scott (2021). We identify how the interplay between *communitas* and anti-structure, and the emerging resolutions to tensions of egalitarianism, autonomy, disobedience, and silo breaking can contribute to resolving pragmatic, tactical and existential tensions

(Table 4), and thus work as a positive force for innovation. We respond to Orlikowski and Scott's (2021) call for research by demonstrating how a liminal innovation led to a digital CTS, which was important for the corona clinics in their work to reduce the spread of COVID-19. From a managerial perspective, we emphasize the importance for both senior and junior staff in organizations who work in liminality, to be aware of how the four resolutions to tensions highlight the importance of interdisciplinarity and flattening of hierarchical structures to facilitate rapid decision making and implementation during liminal innovation. As interpretive scholars we advise managers to consider that they may experience potential organizational changes and new social constellations during liminal innovation, but that these changes may not be permanent, only temporary during liminality. Table 4 is a preliminary theorization, which represents an augmentation of Orlikowski and Scott (2021) that we will advance in our future work.

Tensions	Resolutions to tensions
Pragmatic tensions	Egalitarianism
Tactical tensions	Egalitarianism, Silo breaking
Existential tensions	Disobedience, Autonomy

Table 4. Association between tensions and resolutions to tensions

There are several aspects of liminal innovation we have not been able to address in this paper, which would be interesting for future research. Firstly, is there a difference between how involved actors in liminality and actors in 'normal times utilize what they have at hand, and work to find solutions to challenges and problems? Secondly, and echoing Ciborra's (2002) conceptualization of bricolage and moods in IS development, was liminal innovation, and the interplay between communitas and anti-structure improvised? Third, also proposed by Orlikowski and Scott (2021), it would be interesting to study potential permanent creative changes due to liminal innovation, potential changes when municipalities return to a new or an old normal, a study of the phase van Genneep and Turner called reaggregation (Turner, 1985, 1979), post-liminality.

Finally, we highlight some of this paper's limitations. This paper focuses on pandemic induced tensions on a micro-level in municipalities and has therefore not discussed macro-level pandemic induced tensions between local municipalities and national authorities. FiksCT is one out of two most used digital CTS in Norway, however this paper does not encompass a discussion of similarities and differences between the digitalization of the two digital CTS. Between January and September 2021, and between late October 2021 and March 2022, COVID-19 restrictions allowed for online interviews only. As these were periods with high infection rates some information may have been lost because we were not there nor could conduct interviews in person. This paper is based on a longitudinal study in two municipalities in Norway, and we do not know if this case is special due to the Norwegian culture and existing egalitarianism, or if something similar could happen in other countries.

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