Negative Emotions Induced by Work-Related Information Technology Use in Hospital Nursing

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There is a lack of research into the implications of information technology-related issues for nurses' experiences and well-being at work. However, negative work experiences can generate negative emotions, which, in turn, can negatively affect well-being. Despite this, research has not systematically addressed negative emotions generated by work-related information technology use in hospital nursing. Drawing on data collected through focus groups and interviews with a total of 15 ward nurses, this paper identifies the discrete negative emotions that emerge from work-related information technology use in hospital nursing and maps the identified emotions onto the perceptions associated with and triggering them. The analysis was qualitative and included process, emotion, and causation coding alongside extensive memo writing. We identified six primary negative emotions: frustration, moral distress, alienation, psychological distress, anxiety, and perplexity. All of the identified emotions can be associated with four types of experiences of feeling hindered: mental effort, inability to carry out a task, doing extra or unnecessary work, and failing to complete a task successfully. The framework we present may support healthcare organizations in identifying potentially harmful information technology-related configurations in their infrastructure and implementing appropriate measures to foster nurses' well-being at work.

KEY WORDS: Emotions, Hospital nursing staff, Information communication technology, Nursing informatics, Occupational health

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Although Information Technology (IT) deployment aims to improve the safety, efficiency, and quality of care,[1,2] IT can both facilitate and hinder nursing practice.[1,3] Nurses have reported various issues connected with their daily work-related use of IT,[4–6] and as increasing evidence for an association between IT use and nurse burnout emerges,[7] it is urgent to examine the different ways in which work-related IT use can impede nurses' well-being at work. Indeed, nurses' well-being at work is critical to the safe delivery of high-quality care.[8] As nursing inherently is a stressful and burnout-prone profession,[9] it is essential that we endeavor to identify the negative impacts of IT-related stressors in nurses' daily work and strive to limit them as much as possible.[4]

Well-being at work can be seen as emerging from a predominantly positive experience of work.[10,11] Indeed, experience lies at the core of mental well-being.[11] It consists of both cognitive and emotional (affective) aspects.[11] The cognitive dimension of experience encompasses individuals' perceptions of their environment and their interpretations of these perceptions. The emotional dimension is grounded in their affective responses to these perceptions and interpretations[12]: positive experiences, by generating positive emotions, foster well-being.* In contrast, negative experiences, by generating negative emotions, can be detrimental to well-being.[11] Empirical evidence suggests that negative emotions are associated with occupational stress[14] and nurse burnout.[15] Identifying and removing or counteracting sources of negative emotions at work is, therefore, an important step in fostering employee well-being.

Despite its undeniable benefits, IT use in healthcare has been found to cause problems in nurses' daily work.[4–6] These problems have frequently been investigated from a patient safety perspective[16] or from a practice perspective.[17,18] A first problem mentioned in the literature is the tension between the amount of time spent on documentation (typically seen as increasing) and the amount of time spent on direct patient care (typically perceived as decreasing).[3,17,19] Increased workload is another commonly reported problem. It has been attributed to a variety of factors, including technical issues,[17] the need to enter data multiple times,[16] and uninterpretable or missing information in the EHR,[20] for

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*Mental well-being is commonly understood as comprising both hedonic and eudaimonic components. The hedonic dimension of mental well-being is often referred to as subjective well-being.[13]

example, when "upstream" workers fail to document in a timely manner.[20] Such issues typically require nurses to troubleshoot systems on top of their routine nursing activities[17] or to make phone calls to track down information.[20] Nurses furthermore report being frequently hindered or slowed down in their work due to technical issues.[3,16,20,21] Data retrieval can prove challenging: nurses may encounter difficulties in locating information in the systems they use[16,19]; they may be unable to access information (when a system is down, for instance)[16,20] or may struggle to understand a patient's status based on the available information.[16,20]

In spite of their potentially significant impact on nurses' experience of and well-being at work, the problems nurses encounter with routine IT use have seldom been addressed from an emotional or well-being perspective. Mentions of negative emotions induced by nurses' use of IT in their daily work (and the triggers of such emotions) are scattered across papers and studies addressing IT use in nursing. For instance, studies often mention frustration as a negative emotion emerging from hospital nurses' use of IT in their daily work. Colligan et al[22] and Yen et al[23] both measure frustration as a component of cognitive workload, which has been associated with burnout.[23] Although Colligan et al's findings are unclear regarding the association between IT use and frustration, Yen et al[23] found that stress arising from EHR use is connected with hospital nurses' frustration with the system. In addition to frustration, Califf et al[3] mention alienation and uncertainty when discussing hospital nurses' experience of technostress. Alienation is attributed to IT support speaking a "different language" than nurses, whereas uncertainty is associated with nurses' lack of familiarity with IT. In addition, Bristol et al[18] and Califf et al[3] found that hospital nurses can experience moral distress in connection with IT use due to their use of workarounds[18] and their inability to comfort patients because of IT-related demands.[3] Similarly, McBride et al[2] found that nurses can experience "dissonance" when they feel unable to perform to the best of their ability due to IT-related issues. Finally, Vehko et al's[24] findings suggest that IT use contributes to nurses' psychological distress, which they attribute to inadequate system reliability (ie, downtime and slow response times) and inadequate communication support. Rathert et al[20] moreover found that nurses and physicians felt pressure to keep the EHR updated.

However, to our knowledge, no study has deliberately sought to identify and map the negative emotions nurses may experience in connection with work-related IT use. Consequently, we do not yet have a firm grasp of the impact of IT-related issues on nurses themselves, on their experience at work, and on how they feel during work. The current paper addresses this question by looking into hospital nurses' negative work experiences attributed to work-related IT use. It identifies the negative emotions that hospital nurses experience in connection with work-related IT use and maps these emotions onto the perceptions (ie, cognitive appraisals) that trigger them. In doing so, this study aims to provide a view of the concrete ways in which work-related IT use can compromise hospital nurses' well-being at work.

This paper contributes to the nursing informatics literature in two main ways. First, it provides a look into the negative emotions that hospital nurses experience at work in connection with work-related IT use. Second, it integrates these emotions and their triggers into a coherent framework. This knowledge may help healthcare organizations identify potentially harmful IT-related configurations in their infrastructure and implement appropriate measures to foster nurses' well-being at work.

METHODS
Study Setting
Uppsala University Hospital employs about 8300 people, 2500 of whom are RNs. Uppsala University Hospital has reached an advanced level of digitalization, using commercial off-the-shelf computerized systems to support most healthcare processes. A full, hospital-wide EHR system has been in use for over a decade. This EHR covers, among other things, the care plans that clinicians use to prepare and document patient care and a medication module supporting prescribing and administration.

Beyond the EHR, a variety of clinical and administrative systems are in use at Uppsala University Hospital. Each system uses a different combination of systems, but regardless of their unit, staff members must use several systems to fulfill their everyday clinical and administrative responsibilities. Different vendors have provided these systems. Consequently, they are not interoperable, which means that one system can seldom use data from another system. The systems also all have a different look-and-feel and lack a standardized graphic profile or logic. For example, they use different labels for similar things. Furthermore, when it comes to maintenance, the systems are managed by different teams of administrators.

Staff do not regularly receive instructor-led education when learning new IT systems. Instead, most training is handled through video-based introductions offered on an in-house e-learning platform, which staff members often do not have time to use.

Participants
Participants were RNs from different surgery and children's hospital departments (see Table 1). Overall, 15 RNs—13 women and 2 men—participated in the study. The data collection sessions were spread across 3 years, with the first focus group taking place in 2017 and the last interview in spring

Table 1. Overview of Participants

Data Collection Session	Ward	No. of Participants (RNs)	Age Range, y
Focus group 1	Surgery ward	6 (5 women, 1 man)	25–33
Focus group 2	Pediatric oncology ward and neonatal ward	3 (2 women, 1 man)	43–46
Interviews 1-6	Surgery wards	6 (5 women, 1 man)	22–39
		Total: 15 (12 women, 3 men)	

2020. The focus group participants and the three first interviewees were recruited by one nurse manager and one nurse (from the same hospital), both members of the project's reference group. The three last interviewees were recruited directly by the researcher following a presentation of the study at the ward.

Data Collection

The Swedish Ethical Review Authority approved the study before the recruitment of participants (EPN 2017/XXX). The initial purpose of the study was to explore nurses' negative experiences of work-related IT use. As the analysis of the data progressed, this purpose evolved into the creation of a framework presenting nurses' negative emotions connected with IT use and the key perceptions associated with them. Two focus groups (FG1 and FG2) and six interviews (P1-P6) were carried out. The first focus group lasted 90 minutes and was moderated by the first author, a junior researcher, together with the third author, a senior researcher with an extensive experience with qualitative data collection; the second focus group was about an hour long and was facilitated by the first author. Interviews lasted between 40 and 60 minutes. All but one (P3), which was facilitated by the third author, were conducted by the first author. In both the focus groups and the interviews, participants were primarily asked to recount negative and positive experiences involving their daily work-related IT use. The data collection sessions did not focus on any specific system, and participants were encouraged to mention any system they felt was relevant to their everyday work. The variety of systems addressed included clinical systems such as the EHR, medical devices such as electrocardiographs, communication systems such as e-mail and the transportation ordering system, and administrative systems such as the shift scheduling system and the system for reporting equipment malfunctions. The focus groups were intended to enable a large number of experiences to be gathered. Participants were first invited to bring up any positive or negative, small or more significant IT-related episode from their daily work life. In a second phase, they were asked to reflect on the consequences of these experiences for them. As the authors saw a significant overlap between the experiences mentioned by the participants in both focus groups, we decided not to conduct additional group sessions. Instead, interviews were conducted to collect more in-depth information. Questions addressed their perceptions and emotions associated with positive and negative work episodes involving IT, as well as IT's role in their enjoyment of their work. Follow-up questions were informed by the background knowledge acquired during the focus groups. The recurrence of experiential elements across interviewees suggested that some degree of data saturation had been reached after six interviews. Consequently, the authors decided to end data collection at that point. All focus groups and interviews were audio-recorded and transcribed verbatim.

Data Analysis

The collected data were analyzed qualitatively using an iterative process comprising data segmentation and coding. The data were segmented through a bottom-up approach (ie, from the data to categories) using a qualitative data analysis tool. Each unit of meaning could be coded with more than one label. Following this segmentation of the data, units of meaning associated with ward nurses' negative IT-related experiences were exported into an Excel spreadsheet for the coding process. The main coding methods used throughout the coding process (as defined by Saldaña[25]) were in-vivo coding (to describe the condensed meaning[s] within each segment), process coding (to describe perceptions), emotion coding (to describe emotions), and causation coding (to describe the connection[s] between the identified perceptions and emotions). Fokkinga's[26] "negative emotion typology," the dictionary at Merriam-Webster.com,[27–29] and scientific papers from the nursing field were used throughout the emotion coding process to support the identification, labeling, and categorization of the different emotions (see Table 2 for specific references).

We took several measures to ensure the trustworthiness[31] of our study. The use of different coding methods for different experiential aspects (ie, perceptions and emotions) and the use of external references throughout the emotion coding process aimed at strengthening the credibility of the study. Table 2 presents the specific definitions for the emotion terms used in this study to facilitate the reader's ability to assess the transferability of our findings to their own research or work setting. Furthermore, the first author resorted to extensive memo writing throughout data analysis to ensure dependability.

RESULTS

We found that hospital nurses' negative experiences using work-related IT at work were associated with frustration, moral

Table 2. Definitions of the Different Emotion Terms Used in This Paper

Emotion Term	Definition Used in This Paper	Source(s)
Alienation	Feeling separated or disconnected from or abandoned by others	27
Anxiety	Feeling that something bad may happen due to the perceived existence of a risk	26
Frustration	Agitation emerging from finding one's progress towards task completion blocked	26
Moral distress	Guilt emerging from a perception of one's work performance falling short of best practices due to constraints	30
Perplexity	Lack of understanding or certainty	28,29
Psychological distress	Feeling of being or becoming unable to cope with demands (the term *psychological distress* is used instead of *distress* to facilitate distinction vs *moral distress*)	26

The sources that contributed to these specific definitions are provided in the right-hand column.

distress, alienation, psychological distress, anxiety, and perplexity. These negative emotions were all connected with nurses' experiences of encountering hindrances to the accomplishment of their work. Figure 1 presents an overview of our findings and shows how the different types of hindrances experienced are connected with specific emotional responses. Note that several emotional responses can take place simultaneously.

Frustration

The term frustration is used here to describe "negative agitation that arises when one's path towards achieving a goal is blocked."[26] We found frustration to be an immediate reaction when experiencing a hindrance, and it was associated with four different perceptions. The first perception was

mental effort, namely, experiencing the need to invest an unnecessary amount of concentration into a task. Mental effort was associated with (and triggered by) perceptions of certain activities as being difficult, such as learning to use a system, having to work in different ways in different systems, having to remember multiple passwords, and having to recall exact search terms when using a search feature. The second perception was being unable to carry out a task. Participants attributed this perception to experiencing technical issues (such as a system being unavailable), social factors (eg, a physician not having entered a prescription into the system), or not knowing how to fix an issue or carry out a task in a system. For instance, one participant explained struggling with admitting patients from other hospitals:
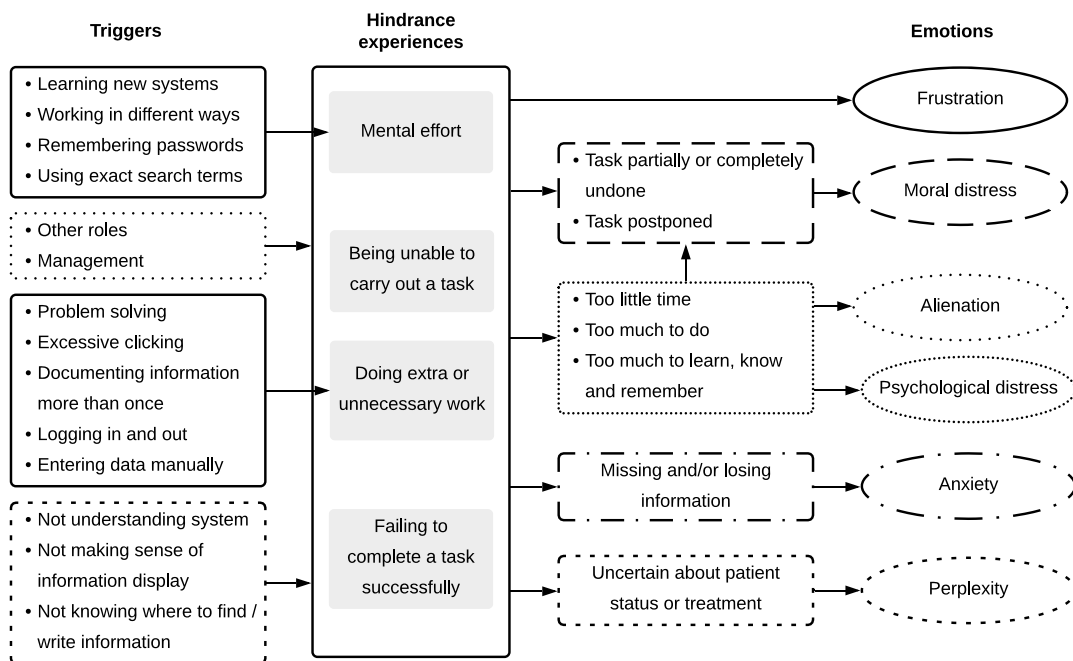

FIGURE 1. Hospital nurses' negative perceptions and emotions in connection with work-related IT use. Perceptions in rectangular boxes and emotional responses to the right within ellipses.

I think it happens about once a month that we need to admit a patient [from another hospital], but [if I do not get help], it turns into a real challenge.… Because we do not really know how we need to [to do it] …. There are so many checkboxes you need to check. And I cannot know everything. (Moa)

The third perception nurses associated with their experience of being hindered in their IT-supported tasks was that of facing extra and unnecessary work. Extra work is created when problems arise that are not part of the routine task flow. For instance, in most cases, nurses managed to overcome their inability to accomplish a task by putting in extra work, such as asking colleagues for help, restarting a device, or other workarounds. Extra work should be differentiated from unnecessary work, which refers to routine workflow elements that are perceived as superfluous: examples include excessive clicking, documenting the same information in more than one location or system, or repeatedly having to log in and out. Finally, the fourth perception was failing to complete a task, namely, going through the sequence of steps required to carry out a task but winding up with an unsuccessful outcome. In our data, participants' failure stories were often connected to failing to find the information they needed.

Moral Distress

The term moral distress here refers to "a feeling of unease or guilt arising from nurses' negative self-assessment of their work performance." Our participants pointed to two different scenarios that can be associated with moral distress. The first one is tasks left undone. Nurses could be prevented from completing a task, such as signing prescriptions in the EHR, which results in prescriptions not being properly recorded. Nurses could also choose to skip a task (typically IT-related, such as filling in the patient status overview in the EHR) in order to stay on schedule. The second scenario is when tasks were done in a way that nurses felt fell short of best practices. It is important to note that both skipping tasks and compromising on task execution were associated with nurses' perception of being pressed for time. In both cases, participants gave IT-related tasks a lower priority than bedside ones. For instance, several participants reported minimizing or postponing documentation in the EHR to save time for bedside activities. Similarly, the amount of time spent reviewing patients' written documentation at the beginning of a shift could also be minimized. Although nurses saw such minimizing as necessary, it nevertheless seemed to make them uneasy. One participant explained:

It is, of course, not good for me to only see the latest notes, the latest 24 hours. You do not actually get a full picture. You want to know how they were when they checked in…. So that's something that we need to improve…but it's hard, because we are so pressed for time. (Moa)

Alienation

The term alienation is used here to describe "a feeling of isolation and disconnect from others." We identified alienation in our participants' statements when they at least partly blamed the actions or inaction of others for creating excess work and making additional demands on their time and cognitive resources. These "others" can be divided into two main groups. The first one comprises nurses' direct co-workers on the floor, especially physicians and nurse assistants. Participants felt that the people in these roles did not contribute to patient documentation in the EHR as much as they should and that physicians too often relied on nurses to help them with documentation. The second group is management, responsible for making decisions regarding IT design, deployment, and maintenance within the hospital. First, nurses perceived a regrettable lack of adequate IT training opportunities connected with the deployment of new systems. Second, they felt that management relied on them too much to compensate for IT shortcomings (eg, the lack of information transfer between systems) and that management also overlooked the strain they experienced due to the unnecessary work resulting from IT systems. Nurses were left to wonder about decisions made by management—for instance, a change in a system or the assignment of an IT-related task to nurses—and sometimes felt that such decisions were not well-reasoned and disregarded their needs. One example was the task of copying the admission sheet filled out by patients into the EHR. This task was assigned to nurses, even though, according to one participant, it could just as well be carried out by a nurse assistant:

I do not think this is something a nurse needs to do. A nurse assistant could do it. Because it actually does not have anything to do with my competence.… But a nurse is supposed to do it, which I think is quite strange, because you actually just have to write what the patient has written. (Sara)

Psychological Distress

Psychological distress is understood here as "a feeling of being under pressure." It arises from nurses' perception that IT-supported work places high demands on them, pushing them to the limits of what they can handle. Three types of perceived demands were identified. First, participants felt that additional and unnecessary work created an excessive workload and that they were expected to do too much. Second, nurses felt that this high workload, along with the occasional need to wait before being able to carry out a task, placed high demands on their time. On busy days, these time demands exceeded their capacity in a very tangible manner, requiring them to work overtime. For instance, several participants reported completing patient documentation in the EHR after the end of their shift. Finally, nurses expressed experiencing (excessively) high cognitive demands: that they

were required to learn, remember, or know too much about the IT systems. One participant compared having to describe technical issues with IT support by phone as like speaking Greek.

It is common for nurses to encounter multiple hindrances during a single shift, and we associated the accumulation of smaller and bigger frustrations with psychological distress. The following quote is a good illustration of this phenomenon, showing how mental effort, repeated log-ins, waiting on the system, and being prevented from accessing a computer can happen in quick succession:

> *You need to remember what you need to make a note of, what you need to look up… Sometimes I should count how many times I sit down at the computer in a day [laughs]. It is many, many, many, many, many times you need to log in, something that takes the system at least 50 seconds…. And if you go away, the next time you come, someone else is sitting there. (Tanja)*

Anxiety

Here, we use the term anxiety to describe "concern related to a perceived risk to patient safety": the perception that patient safety is being jeopardized. One recurring concern across our data was missing patient information in the EHR or misinterpreting the information that was present. Indeed, nurses were unable to view some patient information that was essential to them. For example, the operation planning system does not include patient allergy information, which caused nurses to feel anxious about the possibility of overlooked allergies. In addition, because nurses typically needed to navigate through multiple system locations to gather all the information they needed about a patient, they worried about overlooking information:

> *We read physicians' admission notes, and they can be missing a great deal. It has happened that I've completely missed that patients also have a medical history. "I have actually only gotten the surgical history,"—you notice after a while. So, it's very unsettling, all of a sudden you notice that, "this is a complicated patient." (Anna, FG1)*

A different, albeit related, concern was losing and/or distorting information in the documentation process. This anxiety was connected with nurses having to transfer data from one system or system location to another manually—in some cases, even using paper-based notes as an intermediary step. This was, for example, required when a patient from the ICU was handed over to a ward nurse.

Perplexity

Perplexity is understood here as "a lack of certainty or understanding." Perplexity could both result from experiencing a hindrance (eg, missing information in the EHR could lead nurses to be uncertain about what to do with a patient) and could also trigger hindrances: that is, be a hindrance in and of itself. For example, nurses' uncertainty as to which system or system location to use to document or find patient information was a recurring issue that hindered them in their work. Indeed, this type of hindrance typically required nurses to perform extra work, such as spending extra time browsing through a patient's record or asking a colleague for help. Perplexity could also trigger a hindrance when nurses struggled with making sense of how information was presented on certain screens or how to identify which piece of information out of the many items displayed they were meant to use. These issues were associated with mental effort and extra work, such as a nurse restructuring a patient's record in the EHR:

> *I got a patient last week from another ward and was like, "God, how confusing, here you cannot understand who the patient is from reading [the record]," because it was completely unstructured. So then I sat there and made it look nice, like how we want it to be. (Camilla)*

A lack of understanding of the logic behind a system's functionality (such as the labels used in the system, the types of interactions it allows, certain prompts, etc) could also be an issue, resulting in nurses being unable to carry out tasks and having to engage in problem-solving activities (such as asking a colleague for help or calling the support desk), or clicking additional times. Effective and efficient system use could thus be seen as depending on "secrets"—workarounds that nurses had to learn from other nurses or accidentally discover on their own.

DISCUSSION

Although issues that nurses encounter when using work-related IT are well documented, the implications for their emotional experiences at work have not received much attention. However, negative emotions generated by negative experiences at work are detrimental to well-being. Hence, it is important to identify and map nurses' negative emotions connected with work-related IT use. Our study shows that work-related IT use contributes to nurses' experience of several negative emotions at work and that these negative emotions emerge from nurses' perception of IT hindering them in their work. To our knowledge, this is the first study that provides a coherent framework mapping the discrete negative emotions hospital nurses experience at work connected with work-related IT use, along with their associated perceptions. This knowledge can help organizations locate and eliminate or counteract IT-related stressors associated with their technical and organizational IT infrastructure.

Our first research question centered on the emotions associated with nurses' negative work experiences involving work-related IT use. We identified six main negative emotions: frustration, moral distress, alienation, psychological distress, anxiety, and perplexity. Multiple studies investigating IT

use in nursing have mentioned frustration,[3,22,23] and we therefore expected to find it in our research. At least three previous studies[2,3,18] mention moral distress, and thus this emotion could also be expected. The presence of psychological distress, perplexity, and alienation was more interesting, since fewer studies[3,20,24] seem to have noticed one or more of these emotional responses in hospital nurses. Our findings suggest that these negative emotions may merit more attention when studying the impact of IT use on nurses' well-being at work. Moreover, the overlap between our findings and the existing literature means that our findings should be readily transferable to other hospital settings. One emotion that we identified and that does not seem to have been discussed in the recent literature on IT use in hospital nursing is (patient-oriented) anxiety. This suggests that not all IT-related aspects potentially contributing to decreased well-being among hospital nurses have been sufficiently addressed in previous research.

When we look at the six identified emotions as a whole, it is important to emphasize that they are closely intertwined. Indeed, they can all be brought back to the same group of four types of hindrances. Consequently, any attempt to reduce the occurrence of one negative emotion (eg, frustration) may simultaneously lead to a decrease in the experience of other negative emotions as well (such as psychological distress). That being said, certain emotions seem more closely intertwined than others. For example, our analysis suggests a connection between feelings of perplexity and alienation, where perplexity—for example, not understanding why certain IT-related tasks were assigned specifically to nurses—contributes to nurses' perception of a disconnect with management. This connection between perplexity and alienation is also visible in Califf et al's[3] findings, where, as in our data, nurses are found to struggle to communicate with IT support.

It is also interesting to reflect on the emotions that we did not find. Here, we must specify that we focused on emotions that allowed us to identify different types of negative experiences, and therefore we did not analyze negative emotions common to most or even all experiences, such as dissatisfaction. We also endeavored to focus on the emotion(s) we perceived as central to each recorded segment and discarded related, "secondary" emotions. For example, sadness could be associated with some of the segments also coded as moral distress, but the latter was identified as the stronger of the two emotions and thus chosen for analysis.

Our second research question centered on the perceptions associated with the identified emotions. Of particular interest are those perceptions that can be considered as triggering the experience of hindrances. These triggers are shown in the leftmost column in Figure 1. Different activities associated with perceptions of high mental effort and additional or unnecessary work are presented in this figure,

including the need to remember multiple passwords or click multiple times. Different situations associated with perplexity are also mentioned, such as not understanding the functionality or logic of a system. This highlights the particular status of perplexity in our results. In addition to being an emotional outcome of experiencing a hindrance, it can indeed also trigger a hindrance. Finally, other staff roles and management are also listed as triggers, since nurses saw their actions or inaction were as contributing to their experience of hindrances. Several of the triggers we found are mentioned in the existing literature on IT use in hospital nursing, including extra and unnecessary work prompted by IT use, such as troubleshooting[17] and repetitive data entry.[16] Mental effort (eg, due to having to remember multiple passwords) as a source of perceived hindrance may be associated with high cognitive workload, which has been identified as an outcome of IT use in previous studies.[22,23] Similarly, some studies have hinted at perplexity as a trigger for negative experiences, such as mentions of difficulty finding information[16,19] and in making sense of patient statuses.[16,20] Again, this overlap with previous research suggests that our findings are highly transferable and shows that many of the negative IT-related work experiences our participants shared with us are experienced by other nurses in different hospital settings as well.

Our findings have several implications for practice. First, they suggest that management, often criticized for not involving nursing staff sufficiently in the design and deployment of IT in healthcare (eg, Staggers et al[6]), should work harder to foster a shared understanding of IT-related practices among clinicians, physicians, nurses, and nurse assistants, in particular. Moreover, management needs to keep track of the workload that IT-related activities create for each role so as to avoid overburdening nurses and reducing the disconnect they feel towards management. Finally, our results suggest that working to reduce nurses' perplexity related to IT use may significantly contribute to fostering their well-being at work.

Future work should investigate the extent to which the identified negative emotions resulting from IT use affect hospital nurses' overall well-being at work. It could also be valuable to measure and compare the frequency and intensity of the identified negative emotions between age groups. Positive emotions connected with nurses' work-related use of IT need to be investigated as well; this will be the focus of an upcoming paper.

Limitations

We did not measure the frequency of the identified triggers and the intensity of the identified emotions. This means that our results describe negative emotional impacts from IT use that can affect nurses' well-being at work, but they do not quantify this impact in any way. Furthermore, similar terms may be used

to describe different emotions, and the same emotion may be described using different terms across studies. Therefore, it is important to recall the definitions we have provided for each emotion term used in our work when relating our findings to those of other studies. Finally, as it is hard for people to put words on their IT-related emotional experiences, researchers are left with room for interpretation when analyzing the data. Because two of our data collection sessions were focus groups, "group think" may also have affected the nature of the group's experiences and how they were discussed.

Acknowledgments

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