EXPLORATION OF HEALTHCARE INFORMATION SYSTEM USERS’ LIFEWORLD: AN EMPIRICAL STUDY INFORMED BY HEIDEGGER’S PHENOMENOLOGY

Yu Zhang
Monash University, Melbourne, Australia, angela.zhang@monash.edu

Shijia Gao
Monash University, Melbourne, Australia, Caddie.Gao@monash.edu

Frada Burstein
Monash University, Melbourne, Australia, frada.burstein@monash.edu

Follow this and additional works at: http://aisel.aisnet.org/ecis2017_rp

Recommended Citation
http://aisel.aisnet.org/ecis2017_rp/5
EXPLORATION OF HEALTHCARE INFORMATION SYSTEM USERS’ LIFEWORLD: AN EMPIRICAL STUDY INFORMED BY HEIDEGGER’S PHENOMENOLOGY

Research paper

Zhang, Yu, Monash University, Melbourne, Australia, angela.zhang@monash.edu
Gao, Shijia, Monash University, Melbourne, Australia, caddie.gao@monash.edu
Burstein, Frada, Monash University, Melbourne, Australia, frada.burstein@monash.edu

Abstract

As information technology (IT) and information systems (IS) have become increasingly important in healthcare sector, researches have shown that the healthcare context is highly complex and the users in this context have many unique characteristics as compared to those in business contexts. These findings are scattered in the existing healthcare information systems (HIS) studies as “challenges” to and “deviations” from the classic IS acceptance theories; a holistic understanding of the HIS user’s lifeworld is yet to be achieved. Aimed at filling this gap, we conducted an empirical research in the clinical context informed by Heidegger’s phenomenology. Our purpose was to achieve a holistic understanding of the clinical users’ lifeworld and how they make sense of their encounters with HIS. Arguing against the Cartesian tradition in IS research, we developed an existential framework of IS users based on Heidegger’s concept of “Being-in-the-world” and used this framework as a conceptual instrument to inform our research design. By phenomenologically analysing the interview data with four doctors, we have illustrated how this existential framework can enable a holistic understanding of IS users’ lifeworld and their sense-making of their experiences with IS. We hope our exploratory work can inspire more empirical Heideggerian IS research endeavours.

Keywords: Heidegger, Phenomenology, Healthcare, Clinician, User, IS acceptance.

1 Introduction

In a digitised era when information technology (IT) and information systems (IS) have entered almost every aspect of the modern life (Gartner, 2014), the healthcare sector has now felt it an imperative to leverage the power of IT and IS to reduce medical errors, cut medical cost, and improve patient care process under the ever increasing cost/benefit pressures (Berner and La Londe, 2007; Haux, 2006; LeRouge et al., 2007; Miller et al., 2015). Different types of healthcare information systems (HIS) have been developed and implemented to support various health care activities. The large investment into HIS projects, however, does not always produce an encouraging result. Many studies show that the uptake and success rate of HIS has been low (Heeks, 2006; Kaplan and Harris-Salamone, 2009; LeRouge et al., 2007; Spil et al., 2009).

Investigations into this problem are mainly based on the general IS acceptance theories, i.e. Technology Acceptance Model (TAM) (Davis, 1989; Davis et al., 1989) and its more complicated variant the Unified Theory of Adoption and Use of Technology (UTAUT) (Venkatesh et al., 2003). However, these empirical studies of HIS suggest that the general models are challenged in the healthcare context due to their inability to accommodate all the complexities of this context and the unique characteristics of clinical users (Bhattacherjee and Hikmet, 2007; Chau and Hu, 2002; Spil et al., 2009; Walter and Lopez, 2008). For example, the co-existence of a medical professional hierarchy and an administrative hierarchy in a healthcare organisation makes it very difficult to fit the clinical users into the typical IS
user roles such as operational users and managers (Chiasson and Davidson, 2004). Perceived threat is found to have the equally important influence on HIS acceptance as perceived usefulness since some clinicians are worried about losing their control over certain specialised resources when medical knowledge is codified in HIS (Berg, 2001; Chau and Hu, 2002; Jensen and Aanestad, 2007; Shibl et al., 2013; Walter and Lopez, 2008). A clinical workflow usually includes ordering different tests, synthesis of information from multiple sources, communication and cooperation with other medical professionals as well as trying out with different courses of treatment, which is much more complex than most business processes (Bhattacherjee and Hikmet, 2007; Kaplan and Harris-Salamone, 2009; Krabbé et al., 1996). And the workflow usually involves using different HIS.

However, these findings are scattered in studies of various HIS as deviations from or challenges to the classic IS acceptance theories and can hardly form a holistic understanding of the clinical users’ lifeworld. Aiming at fulfilling this gap, we set out to holistically explore the clinical user’s lifeworld, i.e. to find an answer to the question “what is it like for a clinician to be engaged with HIS in a clinical context?” Clinicians in this research are defined as “medical practitioners who spend most of their total weekly working hours engaged in clinical practice (that is, in diagnosis and/or treatment of patients including recommending preventive action)” (AIHW, 2014, p. 75).

On our journey of looking for a conceptual instrument to guide our research, we have found that the classic IS acceptance theories are not suitable due to their underlying worldview. These theories provide a generic model where the living human user is reduced to certain attributes and treated as variables in a causal relationship. According to Riemer and Johnston (2014), this abstract and instrumental view of the user has its root in what is commonly known as the Cartesian worldview. Conditioned by this worldview, the IS user is conceived as a mental entity characterised by certain attributes, which co-varies with the value of properties of the material entity, i.e. the IS (Riemer and Johnston, 2014). With this predominant variance logic, the ultimate concern of these theories is to predict and/or control IS outcome by manipulating relevant variables, including the various user variables. It leaves very little room for inquiries that are aimed at understanding the user’s holistic experience with IS and how they actually make sense of it because it is too “messy” to be fit into a “clean” model. Riemer and Johnston (2014) argue that even with more and more complicated models, the IS acceptance theories such as TAM (Davis, 1989; Davis et al., 1989) and UTAUT (Venkatesh et al., 2003) still have practical difficulties in accommodating the “messy” real world including the “irrational users”, consistent with which Chau and Hu’s (2002) empirical study of 400 physicians shows that none of the dominant IS adoption models can account for more than half of the variances.

Thus we are compelled to find an alternative worldview that would allow us to make inquiries about the user’s holistic experience with IS in their lifeworld, which have largely been marginalised under the Cartesian tradition of IS research. Inspired by Riemer and Johnston (2014), we find this alternative worldview in Heidegger’s phenomenology, which started from criticising the Cartesian dualism. By drawing on Heidegger’s concept of equipment, Riemer and Johnston (2014) make an effort to retell the story of IT adoption as the process of appropriating a new IT artefact into the holism of practice, equipment and social identities. In order to develop a conceptual instrument that is suitable for our research purpose, we extend their interpretation of “equipment” to an interpretation of Heidegger’s (1962) “Being-in-the-world” by explicitly spelling out all the constitutive aspects of human existence, i.e. social identity, materiality, spatiality, relationality and temporality. “Equipment” indicates only one constitutive aspect of human’s basic state, i.e. how the nonhuman objects in the world are encountered by humans in everyday practice – what we call materiality. While focusing on “equipment” is adequate for the purpose of reinterpreting IT adoption, which is essentially a process of user encountering IT artefact, it is not sufficient to reveal a holistic lifeworld of an IS user. Other existential aspects like relationality, spatiality and temporality are just as important to constitute the holistic lifeworld of a user, only within which “equipment” becomes intelligible and can be made sense of.

Heideggerian IS research has been around for more than two decades and has taken on different flavours. Before Riemer and Johnston (2011, 2014), one stream of such endeavours is seen in the system development methodology field, where Heidegger’s emphasis on context is applied to inform artificial intelligence research, contextual design methodology, participatory design, and ontological design.
methods (Winograd, 1995). More humanistic perspectives informed by Heideggerian theories can be found in reinterpretation of the human-IS/IT relationship with concepts such as hospitality, improvisation, situatedness, and socio-materiality (Brigham and Introna, 2006; Ciborra, 1999; Ciborra and Willcocks, 2006; Introna and Ilharco, 2004; McLeod and Doolin, 2012; Orlikowski, 2007, 2009; Orlikowski and Scott, 2008). These studies, including Riemer and Johnston (2011, 2014), however, still stay on a conceptual level by and large. Inspired by research agendas that have been proposed by these conceptual studies, we have made an effort to apply the Heideggerian approach in an empirical research.

Methodologically speaking, since our research intends to holistically understand a human actor’s lifeworld and his/her sense making of his/her own experience, phenomenology is the most suitable for conducting this research. Although the interpretative methodology has been extensively discussed and advocated by many pioneers in IS discipline (Butler, 1998; Ciborra, 1998; Klein and Myers, 1999; Orlikowski and Baroudi, 1991; Sarker et al., 2013; Walsham, 1995a, 1995b, 2006), and phenomenology in particular, has been conceptually debated for more than 30 years (Boland Jr, 1986; Mingers, 2001, 2004; Myers, 1997), the majority of empirical studies in IS discipline still adopt a positivist approach (Chen and Hirschheim, 2004; Palvia et al., 2015). In this context, we believe our empirical exploration with phenomenology is a valuable endeavour.

The remaining of this paper firstly develops an existential framework as the conceptual instrument for our empirical study based on Heidegger’s concept of “Being-in-the-world”, followed by a description of the research design that is informed by this conceptual instrument. Then we discuss the findings of this empirical research to show how Heidegger’s worldview has facilitated a holistic understanding of the clinical user’s lifeworld and their sense making of their experience with HIS. Finally we discussed the implications of the research outcome and some future research avenues.

2 Development of a conceptual instrument

In order to develop a conceptual instrument to inform our empirical research of the clinical users’ lifeworld and their experience with HIS, we start with a high-level sketch of Heidegger’s phenomenology, especially its central concept “Being-in-the-world”.

2.1 Heidegger’s “Being-in-the-world”

Heidegger’ phenomenology asks the question of how any object of human experience presents itself to us (Blattner, 2006). Unlike an object in the Cartesian worldview which exists independently from us human subjects, a phenomenon in Heidegger’s phenomenology is a thing that concerns us in one way or another already; we do not care about whether a physical object really exists by itself or not. In the Cartesian worldview, there is always an ontological chasm between the material world and the immaterial human mind; whereas in Heidegger’s phenomenology, there is always only one world where we humans reside as our home and encounter various non-human objects. Heidegger’s inquiry starts from the question of being. The remainder of this section spells out the five constitutive aspects of human existence.

Dasein: Self-interpreting – Social identity (practice)

According to Heidegger (1962), “Being” – Sein in German – is something existentially fundamental to all entities and something that makes entities intelligible. There are two basic ways of being: the human way of being, which Heidegger calls Dasein, and the nonhuman way of being. Dasein is self-interpreting – it manifests its understanding of what it is essential to be Dasein by its activities (Dreyfus, 1991).
Heidegger uses the term “Being-in-the-world” to describe the basic state of Dasein’s way of being. He uses the compound expression to indicate that it is a unitary phenomenon and must be seen as a whole (Heidegger, 1962, p. 78 [53]). This basic constitution of Dasein is not something that can be broken up and then pieced together, but it does imply three dimensions: “in-the-world” or the “worldhood”, “Being-in” or the “inhood”, and the “Being-with”, i.e. the “who” item in the structure of Being-in-the-world, as Heidegger (1962, pp. 78-79 [53]) puts it.

The “worldhood” - Materiality

The “worldhood” reveals how Dasein encounters the non-human entities – “equipment” – in its everyday practice (Heidegger, 1962). Equipment always exists as an “in-order-to”, a means for a practice (Blattner, 2006). The being of equipment is that it is always available for us to use as it is encountered in our everyday pragmatic dealings with the world, which Heidegger (1962) calls “readiness-to-hand” (p. 98 [69]). It is grasped with practical “know-how” instead of cognitive knowledge, so equipment is always encountered as if it were transparent. What we concern ourselves primarily with in our everyday dealings is the work that the tools are used for instead of the tools themselves (Heidegger, 1962, p. 99 [69]). When tools malfunction, temporarily or permanently break down, we notice them because they are not available anymore – they become “unreadiness-to-hand” and when they are put under intellectual inspection, they become “presence-at-hand” (Heidegger, 1962).

Equipment has no plural form; it refers to a totality of all tools that are entangled with each other to provide the necessary utility for social practices:

“Taken strictly, there ‘is’ no such thing as an equipment. To the Being of any equipment there always belongs a totality of equipment, in which it can be this equipment that it is.”
(Heidegger, 1962, p. 97 [68]).

This totality of equipment is ultimately for the sake of Dasein, i.e. all tools are linked with each other through human’s practice and ultimately form the structure of the world for Dasein to reside (Heidegger, 1962, p. 120 [187]). Equipment is constitutive of Dasein’s being and at the same time is intelligible only against Dasein’s being.

The “inhood” - Spatiality

The “inhood” as in “Being-in-the-world” does not mean spatial inclusion like “in” a location; rather, it has an existential meaning of involvement, as in “being in love”, “being in a good mood” or “being in business”, which can be thought of as a metaphorical derivation from the physical inclusion (Dreyfus, 1991). Spatiality is constitutive for Dasein (Heidegger, 1962, p. 134 [101]) in the sense that equipment has its place and this place belongs to a region that is set up and arranged in such a way that it allows the totality of equipment environmentally available to us. This space is opened up as a shared world in which equipment can be encountered and can have a certain degree of accessibility – a certain closeness or farness (Dreyfus, 1991).

The “Being-with” - Relationality

By asking the “who” question of Being-in-the-world, Heidegger (1962) has found the “Others” – other human beings – that Dasein encounters in the world. As Dreyfus (1991) puts it, “…since one’s role…makes no sense without other roles…we cannot even make sense of a non-social Dasein” (p. 148). In this sense, Dasein is always already in a shared social world:

---

1 Page numbers in the square brackets indicate the page numbers in the equivalent German edition (Sein und Zeit), as shown in the outer margins of the text in this English edition.
“By reason of this with-like [mitaften] Being-in-the-world, the world is always the one that I share with Others. The world of Dasein is a with-world [Mitwelt]. Being-in is Being-with Others.” (Heidegger, 1962, p. 155 [118])

“The existential-temporal “Being-in-the-world” - Temporality

Heidegger’s existential-temporal interpretation of “Being-in-the-world” reveals three interrelated horizons of temporality: past, present and future (Heidegger, 1962). They do not come in a succession as is ordinarily understood; they are essentially one unity, with which the continuity of the everyday time can be explained. That is to say, the “now” experienced in engaged everyday life makes sense because it is always already intrinsically bound up with our anticipation of the future and interpretation of the past. So in this sense Heidegger says that temporality is the structural unity of Dasein’s existence (Blattner, 2004), that it makes sense of Dasein’s way of making sense (Dreyfus, 1991) – human beings always understand their everyday practice in this three-in-one existential-temporal unity, without which the human’s way of being would become unintelligible. That is to say, the existential-temporal dimension permeates all the other four aspects in the existential framework.

In summary, by replacing the self-sufficient objects with care-laden phenomena, Heidegger has reformulated the question of being with his ontological phenomenology. The Cartesian dualism is thus resolved in the basic state of human existence – “Being-in-the-world” – Dasein’s lifeworld is the one holism that concerns us only, which can be described from five constitutive aspects: social identity/practice, materiality, spatiality, relationality and temporality. The five aspects are entangled together to form a primordial, familiar home for us humans to reside and within which to make sense of all our experiences.

2.2 An existential framework of IS users

Based on our interpretation of Heidegger’s “Being-in-the-world”, we have developed an existential framework for the purpose of holistically understanding IS user’s lifeworld and their sense making of IS in this lifeworld (Table 1).

<table>
<thead>
<tr>
<th>Conception of Being</th>
<th>Existential Dimensions</th>
<th>Interpretation</th>
<th>Implications for understanding IS users’ lifeworld</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Dasein’s way of being</em></td>
<td>Social identity/practice</td>
<td>To be human is to be self-interpreting; one is what one does.</td>
<td>Users’ social identity/practice that defines who they are, e.g. everyday activities, responsibilities, decisions, etc.</td>
</tr>
<tr>
<td>Worldhood</td>
<td>Materiality</td>
<td>Things in the world are proximally and for the most part encountered as a totality of equipment, i.e. something available for us to use.</td>
<td>Users’ everyday encounters with the totality of equipment, to which IS belong.</td>
</tr>
<tr>
<td>Inhood</td>
<td>Spatiality</td>
<td>We dwell in a familiar world where the equipmental totality is made environmentally available to us.</td>
<td>Users’ existential spaces where the equipmental totality including the IS are made available.</td>
</tr>
<tr>
<td>Being-with</td>
<td>Relationality</td>
<td>We always exist for the sake of others; we are always ready for dealing with other people.</td>
<td>Users’ social relationship with people who are essential to define their social identity.</td>
</tr>
<tr>
<td>Temporality</td>
<td>Temporality</td>
<td>The past, present and future are intrinsically bound up in one unity that structures Dasein’s existence.</td>
<td>Users’ temporal sense making of their experience with IS within the unity of their past, present and future.</td>
</tr>
</tbody>
</table>

*Table 1. An existential framework of IS user informed by Heidegger’s “Being-in-the-world”*
To holistically understand IS users in a specific context, we should firstly ask questions about their typical everyday activities to reveal what a user’s social identity is and what practice this identity entails in that context. Questions about IS and how they use these IS in their everyday practice should then be linked to their social identity and practice. The users’ encounters with IS should also be understood in their different existential spaces which make different equipmental totalities environmentally available to them. Questions about the important others who existentially define the users’ social identity, e.g. students in the case of educational users, patients in the case of clinical users, should also be asked because these people help shape their lifeworld and would in turn influence their experience with IS. Finally, we should be aware that the temporal dimension is embedded in all the other four existential aspects: the user’s social identity is evolving, so are their existential spaces, the IS totality made available in these spaces, and their identity-defining social relationships. By uncovering the five existential aspects and their entanglement with each other, we can constitute a holistic picture of the user’s lifeworld, within which a holistic understanding of the user’s experiences with IS and their sense making of such experiences can be rendered.

3 Research design

Informed by Heidegger’s phenomenology, we designed our research as a phenomenological study. A phenomenological study investigates people’s lived experience and how they make sense of such experiences in their lifeworld (Leedy and Ormrod, 2013; Van Manen, 2014), which is exactly what we intend to do in our research. Compared to other interpretative research methods, a phenomenological research has a special interest in uncovering the latent meaning structure of a phenomenon that defines what it is by identifying common themes among individuals (Van Manen, 2014; Williamson and Johanson, 2013). This section discusses the design of our research as a phenomenological study in terms of the development of research questions, data collection and data analysis.

3.1 Development of research questions

Inspired by the interpretative phenomenological approach (Smith et al., 2009), we have chosen to formulate our primary research question as: “What is it like for a clinician to be engaged with HIS in a clinical context?” Different from those research questions that one would normally see in IS studies, “what is it like for somebody to be” is a very typical phenomenological way of inquiry. We ask our primary question in this way in hoping that it is most likely to facilitate an open-ended exploration and a rich narrative emerging from the exploration to help us achieve a holistic understanding of the clinical user’s lifeworld and their sense making of their experiences with HIS in such a lifeworld.

Starting from the primary research question, we further break it down into three sub-questions, all of which are typical phenomenological inquiries and elaborations of “What is it like” type of question:

With the first sub-question, i.e. “What are the characteristics of a clinical context that constitute a HIS user’s lifeworld?”, we intend to reveal a typical clinical user’s lifeworld by investigating the five existential aspects based on the existential framework that we have developed in section 2. Findings to this question would serve as the basis for interpreting the users’ experiences with HIS and their sense making of such experiences.

With the second sub-question, i.e. “What are the clinical user’s experiences of dealing with HIS in their clinical lifeworld?”, we intend to further explore how HIS are encountered in a clinical user’s lifeworld, i.e. to understand the materiality of their lifeworld. This understanding is possible only when it is put within the user’s holistic lifeworld that is spelled out by the first sub-question.

With the third sub-question, i.e. “How does a clinician understand their engagement with HIS in their clinical lifeworld?”, we intend to show how a clinician’s lifeworld, i.e. the holism of five existential aspects, shapes the user’s sense-making of HIS as part of their lifeworld. Again, this understanding is only possible when it is placed in the entanglement of all the five existential aspects of the user’s lifeworld.
3.2 Data collection

As the research questions are typical phenomenological inquiries, we have chosen interview as the main data collection technique because it allows us to gather experiential narrative materials, such as personal stories and anecdotes, and to develop a richer and fuller understanding of a phenomenon (Van Manen, 2014). More specifically, we chose semi-structured interview as it can help us to keep a clear focus on the research questions throughout the entire interview process while allow the participants the maximum freedom to tell their story.

Guided by the suggestions for a phenomenological semi-structured interview (Smith et al., 2009), we developed the interview questions around the three research sub-questions. Since there was almost no empirical phenomenological study done in the IS discipline, there were no specific “examples” to be borrowed for developing our interview questions. Thus we constructed the interview questions for each of the three sub-questions from scratch by mapping them to one or more aspects of the existential framework (Appendix 1). Following the general guidelines laid out in Smith et al. (2009) for all phenomenological interviews and inspired by phenomenological studies in other disciplines, we have tried to ask the questions in a phenomenological way, e.g. instead of asking “What do you do at work?”, we asked: “Can you please describe a typical day at work?”, in order to elicit a richer account from the participants. Some prompts were prepared for questions that might be difficult for the participants to understand or where a tangential reply was expected. Then all the interview questions were organised into an Interview Protocol.

A purposive sampling strategy was firstly used to recruit participants via the authors’ professional links. Candidates needed to be a clinician as defined in section 1, and s/he must have experience of using one or more HIS in his/her clinical work. Snowball sampling strategy was used later to recruit more participants by reference and nomination from the participants who had already been interviewed. A total of four doctors from four different medical organisations in Melbourne, Australia were recruited for this research at last.

All the four participants were interviewed in person once and each interview lasted 30-60 minutes. The interview process was guided by the Interview Protocol in a non-prescriptive way. During the interview process, we often needed to adjust the way a certain question should be asked and/or when it should be asked, if it still needed to be asked at all, depending on our judgement about how the participant was responding. All the four interviews were audio recorded and transcribed verbatim for later data analysis.

3.3 Data analysis

The aim of data analysis in this research was to illustrate how a clinician’s lifeworld – the holism of all the five existential aspects – shapes his/her experiences with HIS and his/her sense making of such experiences by comparing the four participants’ different lifeworlds and experiences. Another aim of data analysis was to uncover the common themes of the participants’ experiences of dealing with HIS. Each participant’s interview transcript was thematically analysed with two cycles of coding. We did the first cycle of coding in NVivo 11 by assigning open codes – words, phrases, or short sentences – to similar chunks of data for condensation or interpretation. Some codes were then grouped up or broken down to establish some initial clusters. More than one code sometimes was assigned to the same chunk of data if it could potentially be interpreted from different angles. This allowed more flexibility for extracting themes in the second cycle of coding. In the second cycle of coding, all the initial codes were examined and then a list of themes were extracted from them. This process required creative thinking and involved a lot of going back and forth between the data, codes and the research questions. It was done mostly by hand on paper.

4 Research findings

The research findings are presented in a narrative form. Firstly the four participants’ clinical lifeworlds are reconstructed and compared based on the existential framework. Then their experiences with HIS
and their sense making of such experiences are interpreted within their own lifeworld to illustrate how they are shaped by their lifeworld holism. Some common themes have also emerged as the telling aspects of the phenomenon in question, i.e. a clinical user encountering HIS. The four participants are referred to as P1, P2, P3, and P4 in the remainder of this section.

4.1 The four participants’ lifeworlds

We firstly describe the four participants’ clinical lifeworlds individually with a rich narrative. Then we use Table 2 to compare their lifeworlds based on the existential framework presented in Table 1.

P1 is a 50-year-old female General Practitioner (GP) who currently works at a university clinic. In her 25 years’ career as a GP, she has worked in three clinics and her job involves seeing patients, diagnosing their illnesses, treating them herself or referring them to a specialist depending on the problem. P1 works 9 to 5, seeing about 20 patients a day, three days a week. Most of the patients she sees now are university students. Occasionally she needs to talk to nurses or another doctor at the clinic, but for most of the time she works alone in her consultation room. Referral letters are an important means for her to communicate with external specialist doctors about patient care. P1 now uses one medical system at work to access patient medical information, check test results, enter clinical notes, order tests, and write referral letters.

P2 is a male specialist doctor in his 40’s who now works as a fulltime employee at a public hospital and also runs private sessions in two other hospitals. He has been a medical oncologist for more than 20 years in Australia. His job is to provide drug treatments for solid tumours, administration of chemotherapy or oral targeted therapy, hormonal therapy, and sometimes palliative care as well. He sees patients with cancer and determines different treatment plans depending on their age, cope-ability and the stage of their cancer. P2’s typical day at work usually starts at 7:30 am and finishes at 6 pm, which involves multiple work scenarios: having clinic consultations in outpatients, doing ward rounds in inpatients, discussing difficult cases at multi-disciplinary clinical meetings, and other administrative meetings and paper work. These are done either in the public hospital or in his “private rooms” at other hospitals. As part of his work, he exchanges referral letters with internal and external doctors, including both GPs and specialist doctors. In his clinical work, he needs to use more than eight different medical applications for patient admission and discharging, accessing patient medical information, writing clinical notes, checking test results, receiving and writing referral letters, and guiding patients around.

P3 is a male doctor in his 50’s, who currently works at a public hospital as a specialist consultant and a department leader. He also runs his own private practice two times or so per week. With his first half of medical career as a surgeon and the second half as a consultant, P3 has been practicing medicine for more than 30 years. His job as a surgeon mainly involved gynaecological cancer surgery and that as a consultant mainly involves gynaecological cancer prevention, benign gynaecology and surgical support for difficult obstetric cases. His “typical” day at work is quite varied, which involves complicated surgeries in operating theatres, consultations in outpatients, discussing difficult cases at multidisciplinary meetings, management, research and teaching clinics, and a number of external commitments in various clinical societies and services. Also as an integral part of his work, he needs to exchange correspondence with GPs and other specialist doctors via referral letters. P3 currently uses four different medical software in his clinical work for patient administration, test results and clinical history lookup, and clinical research purposes. But he still has to handwrite most of the clinical notes.

P4 is a male young junior doctor, who is currently on rotation in a private hospital. He is now in his second year out of university. Before he came to this hospital, he has rotated through some public hospitals as well. His job on rotation now involves helping out in the ward and acting as an assistant for the consultants, such as taking notes during ward rounds with consultants, ordering scans, looking up test results, typing referral letters, typing discharge summaries and prescriptions, doing routine investigations with patients, and organising patient reviews, etc. P4 uses two systems now in the private hospital to check pathology and scan results. Otherwise all patient records including referral letters, discharge summaries, etc. are still on hardcopy. In the public hospital that he worked in last year, he
was mainly using a patient administration system (PAS) for entering discharge summaries and prescriptions, and another system to look up all the test results.

<table>
<thead>
<tr>
<th>Commonality</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Identity (practice)</strong></td>
<td><strong>P1</strong></td>
</tr>
<tr>
<td><strong>Spatiality</strong></td>
<td>University clinic</td>
</tr>
<tr>
<td>Diversity of work environment.</td>
<td></td>
</tr>
<tr>
<td><strong>Materiality</strong></td>
<td>1 all-in-one HIS; Electronic medical records; Electronic patient administration system (PAS).</td>
</tr>
<tr>
<td>Certain totality of HIS as part of the equipment.</td>
<td></td>
</tr>
<tr>
<td><strong>Relationality</strong></td>
<td>Young patients with minor illnesses; Referrals to and from specialist doctors.</td>
</tr>
<tr>
<td>Dealing with patients; Work with the clinical community via referrals.</td>
<td></td>
</tr>
<tr>
<td><strong>Temporality</strong></td>
<td>Senior doctor (consultant) with 25 years’ experience</td>
</tr>
<tr>
<td>Professional hierarchy and medical career.</td>
<td></td>
</tr>
</tbody>
</table>

*Table 2:* A comparison of participants’ lifeworld based on the existential framework

The social identity of a clinician intrinsically entails diagnosis and treatment of patients, which is the defining characteristic of a clinician’s lifeworld. But the clinical practice differs for each participant depending on their specialties, which is reflected in the complexity of their clinical tasks and the criticality of the clinical decisions they need to make.

Each participant works in one or more different environments. GP mainly works in clinics, whereas a specialist usually works as an employee in a hospital and at the same time also has his/her private practice in a “private room”. In the same hospital, specialists often need to work in both inpatients and outpatients where they perform different clinical activities.

Different clinical environments, e.g., different hospitals, private rooms, inpatients and outpatients, provide different totalities of HIS for clinicians to use. For example, P2 uses two different medical records systems in the public hospital and in his private room, and even in the same public hospital there are different systems in the inpatients and outpatients for medical records. The row of Materiality in Table 2 shows different HIS totalities available for each of the four participants.

With regard to Relationality, on one hand, clinicians exist for the sake of the patients, but the four participants are seeing different types of patients with different needs depending on their specific professional identities. On the other hand, in the current Australia’s health system, clinicians are highly specialised and clinicians must work with the whole clinical community to deliver an effective treatment and continuous patient care. Thus “referral” – a recommendation for further care or services (AIHW, 2015) – has become an integral part of a clinician’s everyday practice.
Finally, all the four aspects of a clinician’s lifeworld are temporally structured, i.e. they are entangled with the clinician’s past-present-future unity. Although the existential temporality is different from time in ordinary sense, to facilitate the following discussions, we use the length of the participants’ professional experience and their position in the medical hierarchy as a crude referential point for their temporal interpretation of their encounters with HIS.

4.2 Reflections of experiences with HIS

There are three common themes emerging from the four participants’ reflections of their experiences with HIS: (1) The best experience of using HIS is having easy and fast access to patient medical information. (2) There are various bad experiences of using HIS but the worst is having to work between different applications. (3) All good experiences are alike; each bad experience is bad in its own way.

As the essence of being a clinician, diagnosing and treating patients involves making clinical decisions and fulfilling various clinical tasks which requires access to patients’ medical information. As part of the equipment in a clinician’s lifeworld, HIS are always expected to be available (ready-to-hand) to the clinician because they are constitutive of the clinician’s professional identity. Thus it is very understandable why the best experience of using HIS is having easy and fast access to patients’ medical information. A clinician’s specific expectation of the HIS is also shaped by his/her specific clinical lifeworld. For example, P1, a GP who needs to see 20 patients a day and is slow in typing, prefers a system with simple user interface that allows her to “spend probably two minutes at the end of each consultation writing some notes”, whereas P2, who sees patients with cancer and deals with cases with a life-death stake, appreciates a system providing instantaneous and ubiquitous access to medical information that allows him to find out about the patient “anywhere in the hospital”.

In line with the being of equipment, i.e. it always exists as a totality of all tools that provide certain utility for Dasein’ social practice, HIS also exist as a totality of all the different applications that a clinician needs to use to accomplish his/her clinical jobs. This is indicated in the most hated experience of the clinicians’ encounters with HIS, i.e. having to work with multiple systems that usually do not talk to each other. For example, P2 has to open more than eight applications before he can see a patient, including two versions of medical records system, oncology database, pathology system, radiology system, online Pharmaceutical Benefit Scheme, the Whiteboard system, PAS, and a dictation app for writing referrals. When perceived as a constitutive aspect of a clinician’s identity, HIS are always experienced as a whole instead of separate systems because the missing of any single utility may threaten to fail his/her clinical practice. This also helps to explain why for some participants, undesirable though it is, the co-existence of a hospital-wide system and a departmental system is something that has to be lived with: “…we find PAS not to be reliable or is as complete as our database.” (P2).

As discussed in section 2.1, when a nonhuman object shows up to us as equipment, it is “ready-to-hand” as if it were transparent; when it stops working as it is supposed to, it becomes “unready-to-hand” and thus noticeable. The third theme can be understood in the light of this: when HIS function well as it should be, the participants take it for granted and hence only use general and limited expressions like “good” and “great” to describe their experiences; whereas when HIS frustrate their job, they feel a strong threat to their identity of being a clinician and therefore tend to use more varied and personalised expressions, such as “(brain)... scrambled”, “exhausting”, “tiring”, “terrible”, “annoying”, “stressful”, “unprofessional”, “bane of my life”, “struggling”, “distressed”, “worrying”, and “frustrating”, etc. to describe their experiences.

A clinical user’s reflection of his/her experiences with HIS can only be made sense of within the holism of his/her clinical lifeworld. In our research, P2 and P4 hold almost opposing views about one medical records system that both of them have used. This system is used in the ward of the public hospital where P2 works, into which all patient records are scanned by the Medical Records department at the end of the admission. For P2, this causes a delay and is “a huge limitation” of the current system because “if they come back to my clinic within a couple of days of discharge, I have access to no information because it’s gone off the ward but hasn’t been scanned into the system yet”. In contrast, P4, who used the same system when he was rotating in this hospital, finds it an advantage instead of a lim-
Itation because “there’s no delay…all the notes are scanned in…it’s got everything you want”. This difference becomes understandable when it is placed against their different clinical lifeworlds: during his two years’ experience as a resident doctor (temporality), P4 probably has never encountered such a situation as a patient being readmitted within a few days of discharge (clinical practice), and compared to the almost completely paper-based private hospital where he is now working (spatiality and materiality), of course the scanned system is a big advantage over a thick stack of paper files.

4.3 Sense making of HIS

To the interview question, “Overall, how would you describe the meaning of the system in your work?” the four participants gave different answers. Having good HIS is most important to P1 as it has become one of her criteria to choose a job. For P2, HIS have become an inseparable part of his clinical work because everything is now on computer and he is “completely and utterly reliant on the system now”. For P3, HIS are an important support for work, especially for research. Whereas for P4, the system is just a convenience for his work.

This difference, again, can be understood against their different clinical lifeworlds. When comparing the materiality aspect of the four participants’ lifeworlds as presented in Table 2, we see different stages of HIS evolution – from almost completely paper-based in P4’s case, to half paper-based and half computer-based in P3’s case, to almost completely computer-based but not integrated in P2’s case, finally to completely digitised and integrated in P1’s case. Based on this perception, it can be seen that the more one’s clinical practice is entangled with computer-based HIS, the more indispensable they would become to his/her clinical lifeworld. And this process of evolution is irreversible in the sense that once a workflow has been digitised, it would sooner or later be taken as granted and going back to the former state would become unimaginable. This shows that the materiality aspect in the clinical lifeworld not only constitutes the clinician’s identity but also continuously claims its place in this lifeworld by changing the medical practice, which would further change the spatial and relational aspects of this lifeworld. This is also a good illustration of how the holism of the clinical lifeworld dynamically shapes the clinical user’s sense making of HIS.

The existential-temporal dimension, which permeates all the other four aspects in the existential framework as presented in Table 1, is also apparent in the four participants’ reflection of their experiences with HIS, e.g.

P1: “…it’s a very good system. I’ve used other systems and I’m very happy with this one.”

P2: “I’ve got a remote token, so I can actually dial in (from home)…You couldn’t do that in the past.”

P3: “(They are) four different systems. There is a plan to deal with this.”

P4: “I think it would be amazing to have one record that we can access across all hospitals.”

It is always within the past-present-future unity that the participants make sense of their clinical lifeworld and their experiences with HIS in this lifeworld. Only within this existential-temporal structure, has the clinicians’ understanding of HIS become intelligible.

5 Implications and conclusion

By conducting an empirical study informed by Heidegger’s concept of “Being-in-the-world” in the healthcare context, our research has achieved a holistic understanding of the clinical users’ lifeworld and showed how a clinical user’s encounters with HIS can be made sense of in the holism of this lifeworld. The lifeworlds of the four participants have presented a fuller and richer picture of the clinical context as compared to those scattered in the existing HIS studies as deviations from the classic IT acceptance theories as is discussed in section 1. The findings of this research have revealed the complexities of the clinical context and the unique characteristics of the clinical users with a holistic and immersive narrative. We hope this would help to fill some knowledge gap in terms of our understanding of the healthcare context.
As an exploratory research, our findings may not be generalisable. However, our work has illustrated the practical feasibility of employing Heidegger’s phenomenology in an empirical study in terms of formulation of research questions, research design and data analysis. As the existential framework presented in Table 1 is developed based on Heidegger’s ontological phenomenology and thus is rooted in the fundamental structure of human existence, it could also inform research in other empirical contexts with a similar focus, i.e. aiming at a holistic understanding of the users’ lifeworld and how they make sense of their encounters with IS in this lifeworld. We hope our research can motivate more empirical endeavours with a Heideggerian perspective to phenomenologically explore IS phenomena. We believe such attempts would in turn help to discover new research questions and/or rectify some assumptions in the classic IS acceptance theories.

By spelling out the five existential aspects of an IS user’s world based on Heidegger’s concept of “Be-ing-in-the-world”, we try to complement the mainstream system/artefact orientation in IS research. It has long been taken for granted that system and/or IT artefact should be the main point of interest in IS/IT research. It is to some extent understandable because the ultimate goal of any IT/IS project is to deliver a satisfactory system and/or IT artefact. These theories, such as TAM (Davis, 1989; Davis et al., 1989) and UTAUT (Venkatesh et al., 2003), reduce the user to certain user attributes and treat them as variables in a causal model. Informed by Heidegger’s phenomenological worldview, whose starting point and final concern is about the human existence, we start from understanding the user’s holistic lifeworld, which provides a referential holism for making sense of their encounters with IS as well as the role of IS as equipment in fulfilling their identity. However, this doesn’t mean that we try to draw an ontological divide between the user and the system. Consistent with the ontological stand of Heidegger’s phenomenology, we treat the user’s holistic experience in relation to IS rather than the user as a self-sufficient entity as our main subject of inquiry. Our primary research question for the empirical research, i.e. “What is it like for a clinician to be engaged with HIS in a clinical context?” encompasses both the user and the system. As Heidegger started by asking about Dasein’s way of being, we started by asking about the user’s holistic lifeworld from the five existential aspects before proceeding to ask about how they make sense of their experiences with IS in this lifeworld. By doing this, we situate the actual use of IS in the users’ lifeworld, which would eventually provide us with a richer and deeper insight into what the users are really looking for in terms of the IS totality.

As one of the future research avenues, this existential framework could be integrated into the various user-centric design methodologies, such as scenario-based usability engineering (Rosson and Carroll, 2002) and story-telling (Swap et al., 2001; Wende et al., 2014), by potentially transforming the traditional user requirements engineering techniques in order to facilitate designs that are based on a holistic and in-depth understanding of the targeted users.
References


## Appendix 1: Development of interview questions

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Interview Questions and Prompts</th>
<th>Existential Dimensions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Can you please tell me your age group? (Judge gender by observation)</td>
<td>N/A</td>
<td>Demographic characteristics. A routine question.</td>
</tr>
<tr>
<td>What are the characteristics of a clinical context that constitute a HIS user’s lifeworld?</td>
<td>Can you please tell me your education background?</td>
<td>Temporality</td>
<td>Education background is part of a person’s past. For a clinician, it would also be the start of his/her professional career path.</td>
</tr>
<tr>
<td></td>
<td>Can you please tell me about your work experience?</td>
<td>Temporality</td>
<td>Work experience is part of a person’s past career path.</td>
</tr>
<tr>
<td></td>
<td>Can you please tell me the type of organisation you are working for and what is your job in the organisation?</td>
<td>Social identity, Spatiality</td>
<td>Organisation provides a social environment for a person to work in, and his/her job defines his professional identity.</td>
</tr>
<tr>
<td></td>
<td>Can you please describe a typical day at work? (Prompts: What do you do in your job typically? How long do you need to work a day? Who do you need to meet or talk to? Where do you need to go? How do you feel about your work? Etc.)</td>
<td>Social identity, Spatiality, Relationality</td>
<td>The description of a typical day at work, with proper prompts, usually would cover the “what”, “who”, “when”, “where” and “how” aspects of a person’s lifeworld.</td>
</tr>
<tr>
<td></td>
<td>How would you describe your work environment?</td>
<td>Spatiality</td>
<td>Work settings further define a person’s work space.</td>
</tr>
<tr>
<td></td>
<td>What kind of information system(s) do you use at work? What are they used for?</td>
<td>Materiality</td>
<td>What HIS are used. The answer was expected to reveal all the HIS a participant is using at work.</td>
</tr>
<tr>
<td>What are a clinician’s experiences of dealing with HIS in a clinical lifeworld?</td>
<td>Can you please tell me how you use the system in your job? (Prompts: What information is input into and output from the system? How does it get input and output? What steps are involved in using the system? Who enters the data? Etc.)</td>
<td>Materiality</td>
<td>How these HIS are used. A demonstration of system use would be best if the participant agrees.</td>
</tr>
<tr>
<td></td>
<td>How would you describe your experience of using the system? (Prompts: Can you give an example? Can you be more specific on that? What is your best and worst experience of using the system? Has the system ever frustrated your work? Can you describe such an incident? How did you feel at that time? What did you do when this happened? Etc.)</td>
<td>Materiality</td>
<td>The participant’s experiences of using HIS. The prompts were designed to elicit both positive and negative personal stories from the participant so that both the “readiness-to-hand” and the “unreadiness-to-hand” of the equipment would be covered (refer to Section 2.1).</td>
</tr>
<tr>
<td>How does a clinician understand their engagement with the HIS in their clinical lifeworld?</td>
<td>Overall, how would you describe the meaning of the system in your work? (Prompts: What is the place of the system in your work? Has it made your work different? If yes, in what way? If not, why?)</td>
<td>Materiality through the lens of the lifeworld</td>
<td>The participant’s reflection of the meaning of HIS in his/her clinical lifeworld. Prompts were prepared because this question was abstract.</td>
</tr>
<tr>
<td></td>
<td>If there is no such system(s) in your work, would you still be able to perform your clinical work? How different would your clinical work be without this system?</td>
<td>Materiality through the lens of the lifeworld</td>
<td>This question follows the previous question with a comparison of two different scenarios in order to push the participant to explore the meaning of HIS a bit deeper.</td>
</tr>
</tbody>
</table>