Functional Affordance Archetypes: a New Perspective for Examining the Impact of IT Use on Desirable Outcomes

Research-in-Progress

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Abstract

IT usage is generally viewed as a key indicator of adoption success and a prerequisite for deriving benefits. Yet, while IT usage can provide a good measure of adoption success, it does not necessarily yield desirable outcomes, i.e., the individual benefits expected by its designers. This paper investigates how IT use leads to its desirable outcomes based on a functional affordance (FA) perspective (Markus and Silver 2008). Specifically, we define perceived functional affordances (PFA) as an IT’s afforded possibilities for action as perceived by an individual user. Further, by following Eisenhardt’s (1989) approach of theory building from multiple cases, we develop a PFA typology and introduce four PFA archetypes: i.e. Facilitator, Guardian Angel, Imposer, and Inhibitor. Subsequently, we intend to use these archetypes to explain under what conditions the PFA of an e-health system can be transformed into usage that is conducive to the attainment of its desirable outcomes.

Keywords: IS usage, Functional affordance archetypes, Asthma self management performance
Introduction

The usage of IT artifacts is generally thought to be a prerequisite for deriving their benefits, and as such to provide a key indicator of IT implementation and adoption success (DeLone and McLean 1992; Lucas 1978; Petter et al. 2008). Yet, while the usage of IT can serve as an appropriate measure of IT adoption and success, such usage may not necessarily yield desirable outcomes, i.e., the user benefits that the designers of an IT expect, such as “improved decision-making” for a decision support system, or “improved quality of care” for e-Health technologies. The present study investigates the conditions in which the use of an IT leads or does not lead to its desirable outcomes based on a functional affordance (FA) perspective (Markus and Silver 2008). Specifically, applying the FA concept at the individual level of analysis and conceptualizing it based on users’ perceptions, we start by defining the concept of perceived functional affordances (PFA) as an IT’s afforded possibilities for action, i.e., an IT’s capabilities and constraints, as perceived by an individual user. We then examine how PFA influence the way individuals use IT, and hence play a major role in determining whether or not desirable outcomes will be realized from their use. By studying the usage of a portal designed to help asthma patients better self manage their asthma, we identified four PFA archetypes and our preliminary analysis found that how patient-users perceived affordances of the portal affected their usage of the portal and ultimately their self-management performance. In the future steps of this research in progress, we will adopt a multiple case-study approach (Eisenhardt 1989) to examine how and under what conditions patient-users’ PFA of an asthma self-management portal can lead to high- (versus low-) asthma self-management performance.

Literature Review

As can be seen from the examples provided in Table 1, past research has observed mixed results concerning the link between IT usage and desirable outcomes, such as individual performance or user satisfaction (Burton-Jones and Straub 2006; Petter et al. 2008). Based on extant literature, two plausible explanations can be provided for these results: 1- Poor conceptualization and operationalization of the usage construct (Burton-Jones and Straub 2006; DeLone and McLean 2003; Petter et al. 2008) 2- The emergent nature of the outcomes of using IT (Barley 1986; DeSanctis and Poole 1994; Markus and Robey 1988; Orlikowski 1992). Following the second perspective, we examine the emergent nature of IT usage as an explanation of why IT usage may not yield their desirable outcomes. In such cases, the outcomes of IT usage are thought to be formed through the social and organizational context of usage, or the interaction between human, IT and institutional properties (DeSanctis and Poole 1994; Orlikowski 1992).

<table>
<thead>
<tr>
<th>Link between usage and the desirable outcome</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly positive</td>
<td>Burton-Jones and Straub (2006), Doll and Torkzadeh (1998)</td>
</tr>
<tr>
<td>Positive</td>
<td>Chiu et al. (2007), Halawi et al. (2007)</td>
</tr>
<tr>
<td>Negative</td>
<td>Szaina (1993)</td>
</tr>
</tbody>
</table>

Consistent with the latter view, the concept of functional affordances views IT as socio-technical artifacts and functional affordances as bridges between these artifacts and the people who use them. In other

1 Other explanations are also possible, such as poor quality of design.
words, the concept of functional affordance “...approaches the study of IT effects from a broader social or behavioral standpoint, inquiring about second-order effects or why system effects may differ across contexts” (Markus and Silver 2008, p. 627). Moreover, as they can adequately capture how individuals perceive the capabilities and constraints of IT artifacts, the notion of functional affordances can provide a powerful lens to help explain how the desirable outcomes of usage might be achieved (or not).

Theoretical Background

The origins of the notion of affordance can be found in ecological psychology where it has been used to describe the relationship of animals or human beings with objects (Gibson 1966). In this view, affordances primarily refer to the possibilities of action provided by the environment (Gibson 1966). For example, a child perceives that a closet can afford her hiding. Further, the “…affordance of an object refers to both the attributes of the object and the actor.” (Gaver 1991, p.79), and as such cannot be the same for all actors. For example a group support system may afford the opportunity to surface ideas anonymously to a group that desires to make consensus-based decisions. But the same system may afford nothing to a group with an autocratic leader (Markus and Silver 2008).

Numerous efforts have been made in the IS and HCI literatures to more clearly define affordances and exploit their full potential (Kaptelinin and Nardi 2012). For example, Norman (1988) introduced affordances to HCI and described them as perceived or actual properties of objects, which determine how they can be used. Later, Gaver (1991) defined affordances as perceived possibilities for action that objects provide, and which depend on people’s needs. Depending on the relationship between the availability of perceptual information for an affordance and the actual existence of that affordance, Gaver (1991) labeled affordances as visible, hidden, and false. In the IS literature a more recent effort is Van Osch, W. and Mendelson, O. (2011) who proposed a typology of affordances based on the interactions between developers, users and artifacts. Their analysis found three sets of affordances, i.e. 1-designed affordances which are perceived and recognized by developers only and might not necessarily be recognized and enacted by users. 2- Improvised affordances which are recognized by users during usage 3- emergent affordances which are neither expected by developers nor improvised by users during usage.

One of the underleveraged views of affordances in IS research is that of Markus and Silver (2008). They introduced the concept of functional affordance (FA) and defined it as “…the possibilities for goal oriented action afforded to specified user groups by technical objects” (p. 622). They suggested that functional affordances provide an appropriate construct for studying IT effects as it encourages the adoption of a non-deterministic view of IT impacts, making IT properties unlikely to be viewed as the only cause of change. In the present study, we further specify Markus and Silver’s (2008) concept of FA and define perceived functional affordances (PFA) as individuals’ perceptions of an IT’s afforded possibilities for action. It is important to note that FAs as defined by Markus and Silver (2008) are not necessarily perceived. According to Markus and Silver (2008), FA “refers to potential usage of an IT artifact” (p. 622). Therefore the usage potentials exist for any user who has the objective and the capability of taking advantage of the IT artifact, even though the user may not be aware of that usage potential. For example, a smart phone can provide the opportunity of taking photos to a user who is capable of, and willing to take pictures, even though s/he may not perceive this functionality. In this research we limit our PFA concept to only those FAs that are perceived by each individual user. Our key premise is that when users interact with an IT, they develop a mental image of its capabilities and constraints (i.e. its PFA), and then act based on that image. As such, their PFA influence their actions, which in turn determine the outcome(s) they ultimately derive from their usage of that IT. Thus, PFA can either facilitate or inhibit the occurrence of desirable outcomes.

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2 The concept of “functional affordance” is different from the Gibsonian account of the “affordance” concept, as the latter does not depend on users’ objectives and needs. According to Gibson (1986), the affordance of an object does not change even if the needs of the user change.

3 Confirmed by M.S. Silver in a personal communication with one of the authors.
Research Design and Method

Based on Eisenhardt's (1989) approach of building theory from case studies, we followed an inductive strategy to develop a typology of PFA. In future steps, we will continue to use the inductive approach to develop research propositions to explain how and under what conditions IT use can lead to high versus low levels of desirable outcomes. Subsequently, we will adopt a deductive approach to verify the emerging patterns by examining other cases (Patton 2002). We elected to use such a strategy in view of a lack of prior theory and research regarding the role of affordances as determinants of IT usage outcomes. Our contextual focus is a user-centric self-management IT that was designed to promote asthma self-management for asthma patients. The system is a portal that provides “tailored asthma education”, “patient access to their asthma electronic health record", and "communication with a health care provider". It was developed by the McGill Clinical and Health Informatics research group in order to assess its potential benefits for asthma patients and has been used by 30 asthma patients (aged between 18 and 60 years) and a supervising nurse for a period of six months. The nurse communicated with the patients and gave them feedback about their health.

Our research design is a multiple-case approach where each individual user, i.e., asthma patient, is treated as a case. While a total 16 cases will eventually be studied in this work, the present paper provides results that are based on a completed analysis of four cases. The primary source of our data is semi-structured interviews of around one hour each with patients (participants) who have used the portal for a period of six months. To do so, we developed an interview protocol which contains a series of open-ended questions that allow the participant to describe their usage of the portal, their perceptions of the portal’s capabilities and constraints, as well as their asthma self-management. In this research, the unit of analysis is the interaction of each user with a function of the system.

Analysis

Each interview was transcribed and the transcripts were codified according to the study concepts. The initial concepts were “perceived functional affordances”, “self management performance”, “technology features”, “IS usage”, “users’ desires”, and “users’ attitudes towards the system”. Then we inductively looked for new concepts and relationships between concepts. N’vivo (ver. 9) was used to facilitate the coding process. As we were interested in creating a typology of functional affordances across all cases, we organized all transcripts into a single file to facilitate the comparison of codes through the data. A constant comparison of data, codes and categories was central during this process, and yielded a typology of PFA. The primary unit of analysis was the interaction between a user and an IT function. However, we aggregated the function level PFAs to create a PFA for the whole system. The aggregation was done based on the frequency of identified PFAs for each individual user.

Results

The analysis of the interview transcripts yielded the inductive identification of four PFA archetypes. PFA is a relational concept that is dependent on both users and IT properties. That is, different individuals see the capabilities and constraints of an IT artifact differently. This phenomenon was well observed in the interview data: although all participants were using the same IT artifact, i.e. the Asthma Portal, each perceived the portal’s capabilities and constraints in unique ways. For example, one of the main features of the portal, labeled "Asthma Target", is part of the portal’s electronic health record system which tracks and monitors the patients’ asthma health. Depending on the patient-users’ answers to a series of questions about their symptoms, it gives them feedback on their health status. Yet, participants' perceptions of the Asthma Target were very diverse. Some participants perceived it as something which “rewards them if they take care of themselves”. Others perceived it as something which “reassures them that they are healthy”. Still others perceived it as something which “helps them to keep track of their symptoms”. The diversity of how the participants perceived the portal’s affordances encouraged us look for similarities and differences between the affordances, yielding the four archetypes explained below.
A Typology of Perceived Functional Affordances

As shown in Figure 1, based on how patients perceived their relationship with the portal, four PFA archetypes emerged from the interview data which were labeled Facilitator, Inhibitor, Guardian Angel, and Imposer. The interview data indicated that participants always seemed to assign a role to themselves and a role to the portal as they used it. That is, some patients saw themselves as actors (i.e. someone who does the action) and the portal as a tool. On the other hand, others saw the portal as an actor and themselves as subjects who undergo its actions. Participants who had the former perspective saw themselves as using the IT to achieve their objectives. Those who held the latter perspective tended to see the IT artifact as something that did something for them or against them. As depicted in Figure 1, viewing these two perspectives as the axes of a 2X2 table yields four PFA archetypes.

![Figure 1. Four PFA Archetypes Based on the Actor and the Alignment Between IT and User Goals](image)

PFA as Facilitator

We labeled the first PFA category "Facilitator". Some participants perceived themselves as actors who performed an action by means of an IT artifact. In this view, IT was seen as a tool which facilitated users' activities. For example, one participant referred to the “action plan” feature of the portal (a personalized program provided by the participant's doctor to manage their asthma) as something that could be used as a reference guide: “I used it [the action plan] as a reference guide simply because I didn’t have it written at home at the time. So I just referred to it if I needed to see based on my signs and symptoms and my values of my peak flow testing [if my asthma is well controlled]” (Participant A)

In this case, the participant perceived himself as the one managing his asthma and the portal as a tool which facilitated this action. Thus, for this participant, “seeking guidance” can be viewed as the IT’s afforded action and the IT as a “Facilitator” of that action. Moreover, the Facilitator archetype refers to a type of relationship where users perceive the IT as allowing them to perform an action that is in line with their goals and desires. Thus, in the above example, the participant was willing to use the action plan of the portal as a reference guide and the IT allowed him to do so.

Our preliminary analysis shows participant A essentially viewed the portal as a facilitator of asthma management (i.e. his dominant PFA archetype was “Facilitator”), had a positive attitude toward it, and was willing to continue using it if such an opportunity was available. As noted earlier, users perceived the portal as a facilitator when they saw themselves as actors. Perceiving the portal as a facilitator conveys the message that the patient is willing to take responsibility for managing his asthma. It is important to note that, in the case of chronic diseases like asthma, patients usually play a very important role in managing their disease and achieving outcomes: “The patient should be an active partner, applying his or her knowledge continuously to the care process ... the patient’s success in meeting the responsibilities will determine the outcome for the patient” (Hollman and Lorig 2004, p. 119).
PFA as Inhibitor

A second category of PFA that we labeled “Inhibitor” are similar to the “Facilitator” archetype in that users perceived themselves as actors and the IT artifact as a tool. However, in this case they felt that the IT did not allow them to perform the actions they wanted to execute. For example, one of the participants saw the portal as an inhibitor of some of her possible self-management actions. That is, in order to prevent misinterpretation of her data, she liked to give to the portal and the health care team additional information about her asthma condition. However, in her view, the portal did not provide her with enough space to express herself. Thus, “giving extra information about her asthma condition” was a system constraint (Leonardi 2011) for her and the portal was acting like an “inhibitor” of that action. “There was no place in the Portal so that a person could chart their conditions that were secondary to the asthma. Like yes, I have severe asthma but I have severe asthma because it’s allergy season...And there was nowhere in the Portal that allowed you that space to explain yes, I'm having more asthma attacks but here’s the reason”(Participant B)

Participant B perceived the portal as an inhibitor (i.e. the dominant archetype) because she tended to see it as a constraint that did not provide her the affordances she wanted to have. For example she could not enter her medication usage correctly because the portal’s medication list did not include her medications. Thus, after a while she reduced her usage of the portal and was not willing to continue using it anymore.

Moreover, one of the other participants was not a typical asthma patient and was using a medication which was not included in the portal's database. While he was willing to enter the amount of his medications, the portal was refusing to accept one of them. This was basically a limitation for the participant, since he could not enter the correct values of his medication into the system. Thus, “entering the value of one of his medications” was a constraint of the system for this participant and the system was acting like an “inhibitor” of that action. “I wanted to use it as a tracking tool and it wasn’t able to do that for me. It kept saying despite the fact that I was doing nebulae treatments of a mixed medication... it kept telling me I was in the green zone and that my medication use wasn’t overloaded... and I'm looking at it going yeah, okay; no, I should be in the red” (Participant A)

PFA as Guardian Angel

The third archetype was labeled “Guardian Angel”. In this case, users perceive the IT as an actor and themselves as subjects who undergo an action. For example, one participant perceived the portal as an object that reminded him of his medications: “... it helped me to keep track of, and like a reminder to use my medication because we have a tendency as human beings when we feel good we don’t take what we think helps us to make us feel good” (Participant C)

Referring to the portal, he also described it as if it was someone who helped him with his disease. “... it’s like somebody is looking in on you. It’s like when you’re sick and you’re a kid and your mother comes to look in on you. She’s not going to make you any better, but if she looks in on you at night before you go to sleep you feel better. So someone’s looking in. That’s what I feel.” (Participant C)

Thus, for this participant, “reminding the patients of their medications” and “looking after the patient” were afforded actions, which suggests that the system acted like a “Guardian Angel”. When users' perceptions of IT capabilities were aligned with their desires and goals, they tended to see the system as a “Guardian Angel”. That is, the system basically did some actions for them that they liked, approved of or appreciated.

One of the counterintuitive findings of our study was that the participant who perceived the IT artifact as a “Guardian Angel” tended to do poorly in his asthma self-management. When asked about the portal’s affordances, participant C who used the portal mainly to email the nurse and check his Asthma Target stated that the portal reminded him to take his medication, and it monitored what he inputted. In his view, the portal was the action initiator and he had to respond to those actions. He also wanted to provide good information to the portal because he wanted “the people who are looking after [him] to know as much about [him] as they need to know” (participant C). Although he was using the portal according to the designers’ recommendations, and he was using it frequently, his asthma self-management was not successful. This may be explained by the fact that, as noted above, patients’ active participation in their treatment process is a key factor for successfully managing chronic diseases. Participant C who perceived
the portal as a guardian angel was likely to be very dependent on the health care providers, and therefore not actively managing his asthma.

**PFA as Imposer**

The fourth archetype was labeled “Imposer” which is similar to the “Guardian Angel” archetype since they both refer to situations where users perceived the IT artifact as an actor. However, in cases of PFA as "Imposer", users perceived the portal as doing an action against them. For example, one of the respondents perceived the portal as an entity that treated him like a kid and told him what to do and what not to do. « It's like taking a child by the hand, and saying - Look, you're not able to feel yourself. We'll show you ... we will tell you that you are fine. Because you responded to this question, or to that question » (participant D)

In the above example, the participant perceived the portal as an entity which acted against his desire of being independent in taking care of himself. Thus, “Treating the patient as a kid” was the portal’s afforded action and the respondent perceived it as acting like an “imposer” of this action.

When participant D perceived the portal as an imposer (the dominant archetype), he tended to see it as an actor that acted against his will. Hence, he reacted to it or tried to stop using it. For example, he described it as something which “tells you what to do and what not to do, as if I am not able to feel myself”. Reacting to this image, he did not want to use the portal. In fact, he once had stopped using it for a while and the service providers had blocked his access to the portal.

As each IT artifact usually has many affordances, individuals can perceive it in terms of more than one archetype. For example, participant A perceived the portal as being both a facilitator and an inhibitor while participant D saw the portal as being both a guardian angel and an imposer. However, the interview data showed that most participants viewed one of the four archetypes as being dominant, and this perception eventually determined how they interacted with the portal. For example, while participant A mostly referred to the portal as a facilitator, participant D referred to it mostly as an imposer. The selection of the dominant archetype for each case was basically subjective and dependent on how frequently the archetype appeared in the transcripts.

**Extending PFAs: Who/What is the Source of Action**

It is important to note that, past definitions of affordances have invariably viewed users as actors and the object (e.g. the IT artifact) as a thing that users act upon. For example, a door handle affords pulling (Norman 1988), i.e., users perceive themselves as actors who pull the door handle, or a group support system affords anonymous voting to a group of users (Markus and Silver 2008), i.e., users are actors who vote anonymously by using the group support system. Our analysis strongly suggest that people's perceptions of an IT's affordances go beyond existing definitions which only consider the user as the one who performs the action. As suggested by our analysis, in many cases, individuals tend to see the IT artifact as the actor as well (e.g. a health record system which provides feedback to its users). We believe that this is mainly due the fact that past research has not clearly distinguished between the IT artifact and other objects. From the perspective of many individuals, IT have the capability to perform actions on their own (even if they have been programmed to do so). Hence, users sometimes assign the source of actions to the IT artifact and perceive it as something that acts for or against their will. Such a characteristic is less likely to be seen in static objects, such as chairs or closets, given that they do not act or react automatically. This view is also consistent with social response theory (Moon 2000; Nass et al. 1997) according to which people tend to treat computers as social actors although they know that computers do not possess feelings or “selves”.

Among the four identified archetypes, the Facilitator seems to reflect the dominant view of affordances in extant literature, as it assigns the source of actions to users. This archetype is also consistent with the idea of reflectivity and intentionality of human actors (Pickering, 1993). In this view, people with specific goals, desires or needs interact with IT materiality. Thus, they perceive functionalities of an IT artifact based on what they plan to do with it or based on what they desire or need to do. According to Hutchby (2001), “people come to materiality with diverse goals, they perceive a technology as affording distinct possibilities for action” (cited in Leonardi 2011, p. 153). While the Inhibitor archetype also assigns the source of action to the user, here users are basically incapable of performing their desired actions because
the IT artifact inhibits them. Thus, the Inhibitor archetype can be viewed as reflecting the constraints of the IT artifact. In contrast to these two archetypes, the Guardian Angel and Imposer archetypes assign the source of the action to the IT artifact and represent PFA types that the affordance literature has so far left unconsidered. There also exist related literature which partially informs the agency of artifacts. For example, Actor Network Theory (Latour 2005) assumes a “generalized symmetry” between humans and an object. It proposes a flat ontology where all actors and entities are placed at the same level of agency. In addition, Knappett and Malafouris (2008) also discuss material agency and emphasize what the material does to humans rather than how humans deal with things. The “Guardian Angel” and “Imposer” archetypes highlight the fact that individual users can perceive artifacts as agents who have free will to act inline or against their desires. The agency of the artifacts can be a real agency due to the automatized nature of IT or it can be a perceived agency, which might not be necessarily real. As such, our research aims to extend existing definitions of functional affordances by specifying “who/what is perceived as the source of action” by defining PFA as perceived possibilities of action provided by the IT artifact to individual users. The action possibilities can be perceived to be performed either by the user or by the IT artifact.

As discussed earlier, our interviews with the patient-users partly informed us about the idea that identifying the dominant PFA archetype for each individual user can help us explain why users interact with IT in certain ways, and why IT use may not ultimately lead to its desirable outcomes. To explore this phenomenon in greater detail we propose to conduct a bi-polar multiple case analysis (Eisenhardt 1989) to inductively develop research propositions, and then to deductively confirm or disconfirm them.

Next Steps: Study the Influence of PFA Archetypes on IT Usage and Outcomes

To answer our primary research question, i.e., how and under what conditions the usage of a self-management portal leads to high (vs. low) self-management performance, we will follow Eisenhardt’s (1989) approach by first categorizing our cases as low or high in terms of health self-management. To do so, we will rely on participants’ health status data (e.g. the number of emergency visits to hospitals before, during, and after usage (RAMQ 4)) and the nurse’s evaluation of participants’ self-management performance. We expect the analysis of cases to yield a set of preliminary propositions which, in the next steps of the research, will be either confirmed or disconfirmed based on other cases. Our objective will be to compare patients with high levels of self-management skills and performance to patients with low levels of self-management skills and performance (measured after using the portal for 6-months) in order to understand how and under what conditions PFA led to high (versus low) self-management performance.

To do so, the interview transcripts and the usage data will be synthesized into individual case histories. These histories will include narrative, selected quotes from the participants, as well as tables that summarize their portal usage, performance, and other key facts. We will also create a table to summarize the usage, self-management performance, and PFAs of each participant. This will provide a general view of the cases, and will help us identify bi-polar cases (e.g. low versus high self-management performance), which will then be compared to generate a theory. The case histories will be used for both within-case and cross-case analyses (Miles and Huberman 1994). The next step of the analysis will be to develop propositions by looking for patterns and relationships between the existing and emerging concepts across the cases, and then by deductively looking for replications across other cases. Following Eisenhardt (1989), we will compare the patterns and relationships between concepts in bi-polar cases (i.e. high versus low self-management performance) to develop initial propositions and then to replicate them across other pairs of cases. These steps are still in progress.

Discussion and Conclusion

The four archetypes proposed above provide a new lens that can help researchers better explain human-IT interactions. While the four archetypes that emerged in this research came from a healthcare context, we think that they are likely to apply well to other contexts of human–IT interactions. For example, in the case of social media usage, e.g. Facebook, users’ perceptions of this IT can be categorized into the four

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4 Regie de l’Assurance Maladie du Quebec (Quebec Health Insurance Plan)
archetypes proposed here. A user can perceive Facebook primarily as a tool to communicate with her friends (Facilitator); or as something that threatens her privacy by stealing her private information (Imposer); or as something that provides emotional support (Guardian Angel); or as something that does not let her to login to someone else's page without knowing that person's password (Inhibitor). The proposed archetypes can help explain why users might continue using an IT, or react to it by discontinuing its usage, or create workarounds to reach their goals. Our data suggests that participants' perceptions of the portal's functional affordances in terms of the four archetypes played an important role in determining how they used the portal and the asthma self-management outcomes that they achieved. Our preliminary analysis found that, in self-management of health contexts, increased usage of the IT artifact did not necessarily mean a desirable outcome was achieved (from a health perspective). For example, a participant who viewed the portal mostly as a Guardian Angel used it frequently, but was less likely to take responsibility in self-controlling his disease. While this finding might not be generalizable to all types of IT, i.e. not all IT that are perceived as a Guardian Angel will result in undesirable outcomes, the role of archetypes in contributing to usage outcomes can provide a new perspective with which to examine human-IT interactions in contexts other than health care as well. In the next steps of this research we intend to interview the nurse and also use health care data not only to identify cases with high or low level of self-management, but also for triangulation purposes. We also intend to analyze the remaining 12 cases by following the same methodological approach in order to explore propositions regarding the relationship between the four archetypes, IT usage, and the achievement of desirable outcomes.

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