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Title of the article: USING HERMENEUTICS TO UNCOVER ANOMALIES FOR NON-ADOPTION OF BEHAVIOR CHANGE SUPPORT SYSTEMS <u>http://aisel.aisnet.org/pacis2014/110/</u>

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2014

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Recommended Citation

Karppinen, Pasi; Lehto, Tuomas; Oinas-Kukkonen, Harri; Pätiälä, Timo; and Saarelma, Osmo, "USING HERMENEUTICS TO UNCOVER ANOMALIES FOR NON-ADOPTION OF BEHAVIOR CHANGE SUPPORT SYSTEMS" (2014). PACIS 2014 Proceedings. Paper 110. http://aisel.aisnet.org/pacis2014/110

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USING HERMENEUTICS TO UNCOVER ANOMALIES FOR NON-ADOPTION OF BEHAVIOR CHANGE SUPPORT SYSTEMS

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Abstract

Technologies cannot help improve personal health if individuals do not use them. Information systems discipline has a strong heritage of technology adoption research. This case study introduces a behavior change support system (BCSS) aimed at improving health and well-being. Hermeneutics is used as a methodological approach to analyze open-ended responses from participants who had had an electronic health check but did not activate the following electronic health coaching. The data consist of textual feedback from a total of 2543 respondents. This article investigates the anomalies related to consumers' non-adoption of a BCSS. The research question addressed in this study is: What can anomalies reveal about BCSS acceptance? According to our findings, a positive attitude toward the system does not automatically increase acceptance. Usefulness of the electronic health value. Credibility of the system, usability, and technical issues are also important for BCSS acceptance. This study brings new insights to the research fields of technological acceptance and persuasive technology; additionally, it provides a valuable example of a hermeneutics methodology and how new knowledge can be retrieved studying anomalies.

Keywords: Behavior change support systems, hermeneutics, persuasive technology, technology acceptance

1 INTRODUCTION

Calls to action regarding the global burden of lifestyle-related diseases are occurring. According to the World Health Organization (WHO 2010), lifestyle-related noncommunicable diseases (such as cardiovascular disease, diabetes, and cancer) are the leading global causes of death, causing more deaths than all other causes combined. Important behavioral risk factors, including tobacco use, physical inactivity, and unhealthy diet, are responsible for about 80% of coronary heart disease and cerebrovascular disease. Evidently, the lifestyle that people adopt directly influences their health and well-being.

The potential of information technologies to facilitate enduring change in individuals' health and well-being activities has recently gained significant research and policy attention. According to Payton and colleagues (2011), there has been a shift from being passive patients to active consumers of health information, healthcare devices, and monitoring systems. By providing consumers with access to their personal health information, we could begin to influence how people manage their health and well-being. Regarding consumer health IT, Oinas-Kukkonen (2013) proposed a related generic concept—behavior change support system (BCSS). BCSSs highlight autogenous and voluntary approaches in which people use information technologies to change their own attitudes or behaviors through building upon their own motivation or goals.

More than a decade ago, Eysenbach (2000) proposed that the foremost challenge in developing comprehensive systems for consumers of health informatics is the modest knowledge of how individuals interact, process, and use health information. Even today, Eysenbach's arguments seem to be valid. Technology acceptance is one of the most studied areas in the information systems (IS) discipline (Venkatesh et al. 2003), and in recent years it has extended to areas such as consumer IS (Venkatesh et al. 2012) and even consumer health information technology (Or & Karsh 2009; Or et al. 2011; Agarwal et al. 2013). Clearly, information technologies do not have the capability to facilitate self-monitoring and self-management or improve consumers' health outcomes if the consumers do not use them.

Predominant constructs in explaining and predicting technology acceptance have been ease of use and perceived usefulness (Venkatesh et al. 2003). However, according to Agarwal et al. (2013) "Studies of consumer health information technology acceptance have limited their focus to patient demographics and health variables or general perceptions of the technology (e.g., ease of use and usefulness)." Further, Benbasat and Barki (2007) pointed out that there is no clear understanding about what actually makes a given technology be perceived as useful.

The objective of this study is to investigate expressions related to consumers' non-adoption of personalized electronic health (eHealth) coaching. In their systematic literature review, Williams et al. (2009) found that a quantitative approach has dominated diffusion and adoption research within the IS/IT field. They added that because of the prevalence of positivist studies, there is evidence that researchers tend to neglect other paradigms, such as interpretive and descriptive/theoretical approaches. In this article, hermeneutics is used as a methodological approach to study textual data gathered from the users of an eHealth check that could be seen as the "welcome doormat" to a comprehensive BCSS aimed to enhance individual's health and well-being. The research question addressed in this study is: what can anomalies reveal about BCSS acceptance?

This research brings valuable insights for both consumer health information technology and methodologies used in IS. In interpretive research the objective of validity is not to verify a correct answer but to convince the reader that a believable story is told (Trauth & Jessup 2000; Stahl 2014;). This is a story of a research case that did not overlook data but attempted to use it and understand the anomalies it revealed. The approach has been highly influenced by the works of Sarker and Lee (2006), Cole and Avison (2007), and Stahl (2014).

This paper is structured as follows: The next section describes the research context and data collection. Section 3 describes the methodology used, Section 4 presents the study's results, and Section 5 includes the discussion. The final section of this paper draws conclusions.

2 **RESEARCH SETTING**

2.1 Research context

The BCSS under investigation has been developed by Duodecim Medical Publications Ltd. The BCSS consists of consecutive parts: i) the eHealth check and ii) eHealth coaching. This nonclinical system is based on the best available information regarding a health-enhancing lifestyle and the impact of lifestyle on the quality of life, life expectancy, and the possibilities of acquiring healthier habits. The estimates for life expectancy and disease risks are based on several studies conducted by two authoritative national institutes. Modifiable lifestyle factors taken into account include nutrition, physical exercise, alcohol consumption, smoking, sleep habits, and stress. In addition, respondents' blood pressure, blood cholesterol values, and parents' IHD morbidity are included in the estimation algorithms.

The eHealth check is not meant to diagnose a disease or to predict falling ill with a particular disease; its estimates are statistical averages for a given age and gender group with a defined health behavioral pattern (e.g., Figure 1). The advice given by the program is meant to support individual's health and well-being. Individuals who are concerned about their health and general well-being are encouraged to consult a medical practitioner.



Figure 1. Screenshot from one of the lifestyle estimates provided by the electronic health check

After completion of the eHealth check, the individual is expected to activate eHealth coaching by selecting appropriate coaching "modules." eHealth coaching provides personalized exercises, suggestions, and feedback on a regular basis via e-mail and a web interface. The coaching programs are based on evidence-based, cognitive, behavioral exercises, and the content of the programs have been developed by professionals from respective areas of health and well-being.

2.2 Data collection

The participants in this data set were users who had performed the eHealth check but did not activate eHealth coaching (dark gray area in Figure 2).



Figure 2. Overview of the behavior change support system

BCSS was introduced as part of a lifestyle television series, which was broadcast on a national channel during the fall of 2012. Participants were recruited through an e-mail invitation to an online survey in November 2012. Data were collected over a period of seven days, using an online survey

software tool (Webropol). The survey consisted of demographic questions, seven-point Likert scale items, and open-ended questions. Data in this study consist of the textual responses of 2543 participants who gave feedback to either or both of the two open-ended questions in the survey (optional): 1. "*Please provide a reason / reasons why you are not interested in activating the virtual health coaching*" and/or 2. "*Please provide open feedback regarding the system*."

The data do not include the answers from the users who actually participated in the electronic coaching; consequently, this does not allow comparisons of the demographics between the groups. Three-quarters (77.0%) of the non-adoption respondents were females, and more than two-thirds (71.7%) were over 50-years old. The majority of the respondents were either employed (45.5%) or pensioners (38.1%), and less than three-quarters (22.6%) of the subjects had a university degree.

There is a potential bias that could come from the data even though empirical studies are not fully conclusive. Or and Karsh (2009) reviewed 185 articles related to consumer health IT acceptance, and their findings revealed that age did not yield consistent influence on adoption intention. From 39 studies, 19 indicated that a higher age is more likely to be linked to rejection than acceptance (only one study). According to Or and Karsh (2009), gender was the second most studied variable, but in the majority of studies (84%), it did not have a significant effect on acceptance. Or and Karsh (2009) pointed out that higher education had an effect on increasing consumer health IT acceptance in 68% of the studies.

Despite the vast amount of data, this research is not a positivist study. The methodological approach is hermeneutics, which requires, among other things, transparency and positioning of the researcher. The analysis of the data was carried out mostly by the first author. He is the "I" in the following descriptions. This active voice was inspired by Cole and Avison's (2007) and Sarker and Lee's (2006) hermeneutic studies. Also, Stahl (2014) encouraged considering different views of interpretive research and portrayed researchers as storytellers who construct arguments to help their audience understand a particular point. The reason for this unfamiliar choice was that a first-person narrative describes best and transparently the chain of logic behind the ontological and epistemological choices, which can be seen as unorthodox in light of the original research setting.

3 METHODOLOGY

Ontologically, hermeneutics is leaning to a social construct of reality, which is gained through language, consciousness, and shared meaning (Cole & Avison 2007). Butler (1998) referred to Gadamer's (1975) ontological theory of understanding when he underlined that understanding itself is realized in language and the realization of understanding is interpretation. In other words, all understanding is interpretation and all interpretation takes place in the medium of language (Butler 1998).

Seeing reality as socially constructed can be thought as one of the main characteristics of interpretivism (e.g., Klein and Myers 1999). Participants' text is an interpretation of their initial motives, and researcher's conclusions from these texts are interpretations as well (Walsham 1995; Stahl 2014). In addition, a researcher can only interpret the meaning of some perspective, a certain standpoint, or a situational context, and according to Patton (1994 p. 115), these ideas have become commonplace in contemporary social science and are now fundamental in qualitative inquiry. How then can research that does not claim to describe a given reality objectively raise claims to truth (Stahl 2014)? Stahl (2014) took this question to its extremes and claimed that the fundamentals of interpretivism do not necessarily require an empirical basis of research. This study is part of a hermeneutic constructivist tradition (more on different approaches, e.g., Butler 1998; Cole & Avison 2007), and empirical data played a vital role when choosing appropriate methodology by its unexpected anomalies.

Hermeneutics originated as a method for interpreting ancient texts, and hermeneutics has been defined as the theory of the interpretation of meaning (Butler 1998; Cole & Avison 2007). The struggle of a text's correct understanding led to the realization that a "true" representation of a text is not possible (Stahl 2014). Neither reader nor author holds enough background information to ensure total overlap

of meaning. According to Stahl (2014), much of this current development of hermeneutics is credited to Gadamer, who established that hermeneutics must incorporate the cyclical relationship between prior knowledge and understanding of a text, which then influences the knowledge of the reader. Logic of validation within hermeneutical tradition is best characterized by a hermeneutic circle. Cole and Avison (2007) described a hermeneutic circle as going through different analytical stages from deconstruction (as understanding) to analysis (to explanation) to interpretation (as understanding differently) and so on (Figure 3). All new information is relative to what was understood before.



Figure 3. A hermeneutic framework for practical research according to Cole & Avison (2007)

3.1 First hermeneutic cycle

As Cole and Avison (2007) outlined, a researcher's pre-understanding is the starting point of a hermeneutic study and the first interpretive framework. A researcher's prejudices become the foundation of the research process (Cole & Avison 2007). When I first glanced at the collected textual feedback from the open question "*Please provide open feedback regarding the system*," my reaction was that I had the wrong data set. It contained vast amounts of positive feedback that felt illogical. As a researcher in the IS field, my assumptions were that the data would consist merely of direct criticism toward the usefulness and usability of the system. "Ease of use" and "usefulness" are seen as the key constructs affecting behavioral intention for using the technology in an organizational setting (Venkatesh et al. 2003), as a consumer (Venkatesh et al. 2012), and even as a consumer of health information technology (Or et al. 2011).

There were also strict criticisms in the collected data, and I decided to make a preliminary categorization to get a clearer picture of the reasons for non-adoption. I had a notion of saturation after I had coded 208 responses; the last new category was discovered after 119 responses. From this small sample I formed five categories, and unexpectedly the most mentioned reason for non-adoption related to the test's credibility (50). Responses that related to personal reasons were the second largest category (38). Technical problems were found 27 times. From 15 responses it was clear that the reasons for not participating were caused by other issues than using the BCSS itself. In conclusion, there was a total of 78 un-categorizable answers of which the majority were positive feedback.

After this confusing finding, hermeneutics felt as the only appropriate approach. Hermeneutic methods make use of the anomaly as gaining a better understanding of the information in context (Trauth & Jessup 2000; Cole & Avison 2007). It aims to transcend existing notions about some phenomena by actively challenging the perceptions of current knowledge (Cole & Avison 2007). In other words, I wanted to make sense of the data as Sarker & Lee (2012) did in their hermeneutics study.

Technological acceptance has been studied substantially in IS; moreover, the areas of BCSS and persuasive technology (e.g., Oinas-Kukkonen & Harjumaa 2009; Oinas-Kukkonen 2013; Lehto & Oinas-Kukkonen 2014) have gained interest in academia during recent years, and therefore there was no need to build a new theory (and thus I decided not to use a grounded theory approach). The study by Trauth & Jessup (2000) demonstrated how interpretive analysis could produce different understandings of the same evidence and new information not found in the positivist analysis.

Hermeneutic interpretation is not to replace but rather to strengthen and complement positivist research in the field (e.g., Lee & Dennis 2012).

There are no explicit guidelines in hermeneutics about how to conduct the actual textual analysis, and some researchers use analyzing procedures from other methodologies, for instance, discourse analysis (Dickey et al. 2007) or open coding from grounded theory (Tingling & Parent 2004). I used theories as lenses to form codes and taxonomies. According to Miles and Huberman (1994), coding and indexing are the most widely used practices in qualitative data analysis. I used NVivo 10 software in the process to manage codes and categories, but I did not utilize any automated classification tools. Table 1 shows an example how taxonomies were formed and linked to the major categories.

	TF : (1
Feedback examples	Taxonomies generated
I made the test and I got my personal report. I still don't understand	Had not noticed -> Unintentional
what "coaching" are you talking about in this survey? I want to activate	-> Effort -> IT
the coaching, from which I heard now for the first time. It wasn't	
mentioned in the health report mail.	
I haven't watched the TV-series, so I don't know well enough of what	TV-show -> Uninformed
this is all about. Health and well-being are close to my heart anyway.	-> Context
When I moved away from home, my lifestyle changed, and it took me	
a while before I understood to try what things suit me best. Now that I	Independently -> Self-efficacy
sleep, eat, and exercise better than before, I feel better and have more	-> "I could, but I won't" -> Self
energy. I believe that when taking care of myself, I'm able to influence	
the future.	
In the test there were a lot of questions to which you simply cannot	Test instruments -> Credibility
give one right answer, and in some sections the options that I had to	-> Affect
choose from were totally rubbish.	
It was very nice and I'll bet that many will get help from this to start	Positive -> Un-categorizable
changing their lifestyle for the better.	

Table 1.Examples of indexing and forming taxonomies

The existence of socially constructed entities depends on people, but these entities outlive and transcend the individuals who are sustaining them at any point in time (Butler 1998; Sarker & Lee 2006; Cole & Avison 2007). In other words, respondents do not "own" the meaning of the text, and texts can be interpreted independently. The given responses were separated from the user information and merged as a single data source. In this study, participants could give several reasons for rejecting electronic coaching. I did not try to determine an individual's one true reason for non-adoption.

Coding of the collected data revealed large amounts of positive feedback (n=741). Technology acceptance models do not explicitly have a positive attitude construct (Davis 1989; Venkatesh et al. 2003, 2012;). Why did I have this prejudice in my mind then? Davis (1989) used this wording when he described the TAM model: "A system high in perceived usefulness, in turn, is one for which a user believes in the existence of a positive use-performance relationship." I had implicitly taken for granted that non-adopters would automatically feel angry, frustrated, or at least disappointed for using the system. For me, this discovery was the same as how Cole and Avison (2007) described it, switching the hand holding a toothbrush when cleaning my teeth, where previously automated actions require conscious effort.

3.2 Second hermeneutic cycle

According to the principles of the hermeneutic circle, development of an interpretation is an iterative process where the understanding of the whole takes place through the meaning of the separate parts and the meaning of separate parts is determined by the whole (Patton 1994 p. 114; Sarker & Lee 2006). It is fairly common in hermeneutic research tradition that themes and categories change during iterations, and researchers could even gather more data between the circles (e.g., Sarker & Lee 2006). I gained new data that I ironically was not initially aware of. The survey question "*Please provide a reason / reasons why you are not interested in activating the electronic health coaching*" offered ten different alternatives, from which one was an open-ended "*Other reason*." This survey question gave

light to why the previous data fit so poorly to my pre-understanding. It also revealed that I was truly dealing with anomalies. "*Other reason*" had the most answers (760), but the next three most selected answers can all be interpreted to be under the umbrella of usefulness, as can be seen from Table 2.

Options for reasons for not activating eHealth coaching	Number of responses
I do not have time to participate in eHealth coaching.	388
I do not believe that eHealth coaching is useful to me.	484
I do not need any coaching.	397
I do not think that I can achieve the results that I am aiming for via eHealth coaching.	425
I did not activate eHealth coaching because of the technical difficulties.	229
eHealth coaching does not sound interesting.	231
Nobody important to me takes part in eHealth coaching.	111
I did not know about eHealth coaching.	282
I am afraid that my health information is used wrongly.	99
Other reason	760

Table 2.Options in a survey question: "Please provide a reason / reasons why you are not
interested in activating the electronic health coaching"

I had to decide whether to stop my research process at this point and start again with a more conventional positivist approach or to continue with the current methodology and analyze the new data as I did previously. When I went through this textual material, I discovered that there were some contradictions between respondents' answers (Table 3). Despite the new data, it was impossible to pinpoint one true reason for each individual not activating eHealth coaching.

Other reason	Open feedback
I live abroad	I have healthy living habits. I don't drink alcohol, and I've used decades of different health foods, I've exercised throughout my life, I'm wealthy. Why does the eHealth check gives me only 81 years of expected lifetime? My father is already 90-years old and smoked for 60 years. My mother died of Parkinson's at 85-years old. Previous test gave lifetime expectancy of 92 years??? This is why I don't trust your vague tests that are inconsistent and don't take into account essential matters, for example, I eat omega-3 capsules daily and you don't ask anything about that, only about eating fish. Isn't it the same thing? If I select "I don't eat fish." the lifetime expectancy slumps. You don't take any diatary supplements
	into account, like vitamins D,C, B etc Genetics affects, according to medicine, about 70% to lifetime expectancy.
Bad timing	On the previous page there was a question if I'm going to activate eHealth coaching later. I didn't notice this opportunity at all when I did my test.

Table 3.Example responses to open-ended questions

I decided to code the second set of data in a similar manner as the first set. The most obvious differences to the previous data set were the scarcity of feedback and the absence of positive feedback. Additionally, a large number of responses related to personal reasons, like motivation or life situation, were evident.

3.3 Third hermeneutic cycle

During the coding process, I sent lists of taxonomies and categories to the second and third authors for evaluation and commenting. After finishing the coding process, I made a joint analysis of the formed taxonomies with the second author. As previously stated, prejudices are critical components in the anticipation of meaning and are grounded in our world and in our lived experience (Cole & Avison 2007). Prejudices are passed on in the language and in our generation's experience of the world (Cole & Avison 2007). If we had not been sensitive to this viewpoint, we could have ended up ironing out all the anomalies and recycling only the shared prejudices. In hermeneutics, it is not uncommon that only one author does the analysis (e.g., Cole & Avison 2007), but I found the joint effort a very productive way to build fusion of separate interpretations.

I did the final abstraction of categories during the writing process of this article. Communicating the process of fusion acts as another stage of interpretation, and weaving this story involves decision making regarding elements of emphasis (Cole & Avison 2007). The results of this study are based on collaborative work, and it is impossible to differentiate our findings.

I used the idea introduced by Benbasat and Zmud (2003) of the IT artifact to present our results. They emphasized that the core of IS research should focus on the IT artifact, the practices and capabilities involved developing and using it. In this study, the IT artifact was the initial eHealth check that can be seen as the "welcome doormat" to a comprehensive BCSS. I combined the findings of four distinct categories, IT, Affect, Self, and Context, where each category is one step further from the IT artifact as presented in Figure 4. In the following section, categories are presented from the innermost layer outward.



Figure 4. Categories, subcategories, and the number of responses. Figure modified from Benbasat and Zmud (2003)

4 **RESULTS**

4.1 IT

Category "IT" includes responses in which BCSS was described to have direct impact for not activating eHealth coaching. Subcategories and examples of responses are collected in Table 4. The subcategory "Effort" was named after Venkatesh et al.'s (2003) construct that measures the degree of ease associated with the use of the system. After the participants did the eHealth check, they had the opportunity to activate eHealth coaching. The "In or out" category has answers where participants were puzzled as to whether they were part of the electronic coaching or not. Most of them first thought of not participating when they received the survey. The subcategory "Mistake" refers to the users who perceived that they made a mistake in the process but could not fix the problem. Lastly in this subcategory, there was a group of respondents who felt they did not have sufficient skills to activate the coaching.

According to the feedback, there were technical issues that affected the use of the BCSS. Several participants did not receive their personal health reports by e-mail as promised, and many could not activate the electronic coaching because of technical reasons. The "Facilitating conditions" subcategory included responses that relate to used technical equipment or other general technical malfunction that was not explicitly related to the BCSS at hand. Lastly in this subcategory was a group of participants who did not initially want to activate electronic coaching but later had second thoughts and then could not activate the coaching.

Subcategory 1	Subcategory 2	Example
Effort (232)	In or out? (97)	Er?? I think that I activated coaching, at least I was meant to do it and I've been wondering, why I haven't heard anything from there. I
		expected to have exercise and nutrition guidance.

	Mistake (90)	When I made the test I didn't notice how to join to coaching. Afterwards
		I couldn't activate coaching, because my e-mail was already in use. I
		would have wanted to participate.
	Skills (45)	Using a computer is still quite hard for me. I would like to activate the
		coaching.
Technical	Technical	It was promised that I would get an e-mail of some sort after the test.
issues (210)	problems (149)	Feedback was in the kind of form that it didn't open, so I don't have a
		clue what you've sent me. I'M TOTALLY LOST.
	Facilitating	My computer does not function 100% because I have a mobile Internet
	conditions (31)	connection.
	Second thought	System announced that my e-mail was already in use and didn't accept
	(30)	my participation. I did the test the day before and didn't think of joining
		then. But surely one can change his mind!!??

Table 4.Examples of the "IT" category

4.2 Affect

In the 'Affect' category reasons for non-adoption are related to the cognitive and emotional responses of the eHealth check's use. It is close to the 'IT' category since participants justify their decisions by their BCSS use experience. Credibility is one of the most important issues for criticism in the "Affect" category, as seen in Table 5. Many complained that the health check instruments were unreliable, and it was often stated that critical measuring parts were missing and these would have had an effect on the outcome. It was often argued that one could not give personal answers sufficiently, so that essential parts of everyday life were not taken into account. Several respondents questioned the estimation of life expectancy provided by the eHealth check. Some criticized the underlying health postulates of the test.

There were a vast number of responses that expressed the affective reaction of the participants. Most of the responses indicated that many people used the initial eHealth check as sufficient proof or confirmation of their healthy behavior. For several participants, the health check result was an eye opener that was enough to nudge them toward the behavioral change process. There were also some alarming tones where participants became depressed after receiving their discouraging results. There were only a few respondents who were not affected in any way by the system and therefore rejected the coaching.

Subcategory 1	Subcategory 2	Example
Credibility	Unreliable	In questions related to nutrition, the size of the respondent was not
(369)	instruments	taken into account, e.g., a small female cannot eat six slices of rye
	(186)	bread, no matter how healthy it is.
	Lack of	In the nutrition part there should have been asked special diets.
	personalization	Because I'm lacto-ovo vegetarian, I don't eat fish. I use oils to get
	(86)	Omega 3, 6, and 9.
	Unreliable	The test lost its credibility when it gave the life expectancy of 69 years,
	results (71)	even though I'm not overweight, don't drink or smoke, and hardly ever
		get stressed.
	Overall	The part related to nutrition was too one-sided. Is it so, that one
	credibility (57)	survives until an elderly age only by eating fresh fruit and vegetables?
		That's bogus, I say
Affective	Reinforcing	Good concept overall, nothing new to me though. I've done the
reaction (294)	(131)	necessary changes years ago, where this coaching is heading to. I did
		the test just out of curiosity.
	Eye opener	The test was good. It makes you reflect on your own lifestyle and
	(120)	makes you think how to improve it.
	Depressing (23)	When my claimed lifetime expectancy is shorter, than for instance my
		mom or both of my grandmothers, it makes me almost feel sick
		mentally, even though I live healthy in my opinion.
	No reaction (13)	It didn't wake any interest whatsoever.

4.3 Self

One of the surprises during the reading process was how often respondents found a reason for not adopting electronic coaching from themselves. The "Self" category is further divided into three subcategories as shown in Table 6. The "I could but I won't" subcategory is related to the individuals who would potentially have the required resources to participate in the coaching but for one reason or another were not willing to participate. Most of the respondents in this category considered themselves healthy. Another large subcategory is "Self-efficacy," which refers to individuals who felt capable of achieving their behavioral change goals without coaching. The last group of this subcategory consists of the "Rebels" who did not worry about the consequences of their unhealthy living habits.

The category "I would but I can't" is concerned with those who found some personal trait, capacity, or external condition that was a barrier for their participation. The most common personal traits mentioned were laziness, lack of self-discipline, and stress. This is rather unfortunate because one of the key themes of the coaching program is mental well-being and stress relief. Many respondents referred to their personal capabilities, usually health issues, for not activating the coaching. Most of them assumed that they would need to do physical exercise, although there were various training programs that did not include exercising at all. Some of the elderly respondents commented openly that it was too late for them to start training. Also, external conditions of a person's private life were often mentioned as a reason for rejecting the coaching. Various (sometimes heartfelt) external reasons surfaced from the text, such as being a caregiver or the death of a loved one. Interestingly, the lack of money was mentioned occasionally even though the coaching itself was totally free of charge. However, some responses highlighted that money is needed for healthy living as well.

Many respondents commented that when they had to make a decision, they postponed it to a more appropriate time. In this "Bad timing" category there were many who had not yet decided whether to participate. Others in this subcategory said directly that they did not have enough time and were unwilling to commit to the program.

Subcategory 1	Subcategory 2	Example
"I could, but I won't" (405)	Healthy (187)	The test was nice to do even though I'm fine with myself and my life and I live healthy and I'm a positive person. The only thing I could change in my life is to sleep longer, but in my opinion I sleep enough, after all I'm a pensioner, and I can take a nap if I need to. And life is WONDERFUL!
	Self-efficacy (177)	I also know the changes I'd need to do and how to make those, so I like to proceed at my own pace with more flexibility.
	Rebels (41)	It seems alright, but I wouldn't like to give up a few bad habitsWhy be too strict. Carefree years are better than years full of rules and plans.
"I would, but I can't" (402)	Personal traits (200)	For several years, I have tried to drastically change my lifestyle, but it always falls apart on my own laziness and lack of self-discipline. Stressful work drains all the energy, taking care of own health suffers.
	Personal capacity (118)	I have such a bad injury in my back that I've had to give up walking, which I loved to do. It also increased my weight to top figures.
	External conditions (84)	The cause itself is good, but I'm bitter that I can't change the hardest issue in my life, my husband's illness. It affects my life so that I can't move or participate outside of our home as much as I'd like to.
Timing (140)	Bad timing (97)	I did the test with an interested mind and it's possible that at some point I'll join the coaching. Health issues interest me also because of my working history.
	Lack of time (43)	I don't want to commit myself to a program that I might not be able to carry out due to my busy work schedule.

Table 6.Examples of the "Self" category

4.4 Context

In this study, the "Context" category refers to the actual physical health coaching and activities closely related to it, not to the eHealth check itself. Responses were fairly broad in this category; as an example, several participants were annoyed by the TV series that promoted the eHealth check and coaching. Respondents were mostly offended by the celebrities that were chosen to take part in the program and the overly informal tone of language used in the shows. Clearly the system designer cannot determine where and how the system is presented; however, it is important to emphasize the need for detailed information. Users cannot necessarily make the distinction between a system's features and its context. In this study some of the users had clearly misunderstood what eHealth coaching was all about and explained for an example that they were too shy to participate in a TV show and did not want to jeopardize their privacy. Generally, many users in the "Context" category would have wanted to know more about actual coaching before making the final decision on participants, but even though there were no "strings attached," some users felt that the decision had to be made spontaneously and left out the eHealth coaching as a consequence. Examples of different responses in this category can be seen in Table 7.

Category	Example
Context (516)	Why are there celebrities in the show? It eats credibility.
	I wish there would be more places to exercise like schools could be open in the evening.
	I have to search more information what are the obligations of participation and does it cost.

Table 7.Examples of the "Context" category

5 **DISCUSSION**

The hermeneutic circle in this study was initiated from the notion that the collected data did not make sense. The catalysis for our study was the unexpected vast amount of positive feedback in the data that was collected from users who declined to use eHealth coaching. In the context of this study, there is a clear indication that a positive attitude toward the technology in use is not enough to trigger the actual adoption process. Positive feedback could be understood from the viewpoint of the users who had everything under control or were capable of making behavioral change without help. Those, who received a positive reinforcement from the eHealth check or an inspirational nudge for a lifestyle change did not necessarily feel the need to activate eHealth coaching. If a user does not perceive the system useful, it does not automatically mean that he/she has negative attitudes toward the system. According to Schwarz and Chin (2007), people may perceive usefulness in the development of the self rather than by the instrumental value. This assumption seems very plausible in the consumer health technology context based on our findings.

Personal traits and capabilities play an important role in the decision-making process regarding system adoption. As we discovered from the data, there is an important divide between two archetypes of users: "I could use, but I won't" and "I would use, but I can't." Based on our findings, we cannot claim that either healthiness or severe illness is associated with decreased acceptance (Or and Karsh [2009] found a similar discrepancy). We suggest that both ends are present. Those who had excellent health did not see the need for the system, but on the other hand, severe health problems were experienced as unbridgeable obstacles for participation. This is an important finding when considering the perceived usefulness of the system. In the consumer health IT area, the same construct could be kept within two distinctive groups of users that need to be addressed differently. In this research case there were individuals who became discouraged because of the eHealth check results; this is not purposeful persuasion and raises moral concerns.

Usefulness could also be seen as unobtrusiveness. Unobtrusiveness is operationalized as a contextual construct that reflects whether the system fits with the user's environment and routines in which the system is being used. Prior research has shown that individual performance relies on the fit between

technology and its users (Goodhue & Thompson 1995). Unobtrusiveness is one of the postulates behind persuasive systems as well as ease of use and usefulness (Oinas-Kukkonen & Harjumaa 2009).

According to our results, non-credibility is one of the major reasons for rejecting a BCSS. Credibility is not part of traditional technology acceptance models (Davis 1989; Venkatesh et al. 2003), but in the Persuasive Systems Design (PSD) model, it is one of the key categories of persuasion (Oinas-Kukkonen & Harjumaa 2009). Our results suggest that one of the possible ways to gain better credibility is to increase the personalization of the system. However, there were a lot of responses in the data, which indicate that people have unrealistic expectations, and the system should basically cover every aspect of one's life in order to provide output that is sufficiently reliable. It is not clear how much perceived non-credibility is actually affected by the system and how much is caused by emotional discomfort. One of the PSD models postulates that individuals like their views about the world to be organized and consistent (Oinas-Kukkonen & Harjumaa 2009), and it is possible that subjects undermine BCSS's credibility in order to maintain their cognitive consistency (Cialdini et al. 1981).

Our research data suggest that when regarding information systems targeted for BCSS consumers, attention should be paid to technical functionalities of the system. Numerous responses in our data indicate how technological issues directly affected the actual use. The study of Or and Karsh (2012) revealed that technical issues have not been seriously taken into account when studying the acceptance of consumer health IT. What we want to underline is that in nearly all technology acceptance studies, subjects have had user experience of the system, and what is in fact investigated is whether they are inclined to continue using the system in the future or not. Our target group consisted literally of non-adopters from which a notable number had the behavioral intention to adopt the technology—but not the technological means. For example, the UTAUT and UTAUT2 models by Venkatesh et al. (2003, 2012) implicitly presumes that the studied system is working properly and only facilitating conditions are measured.

In technology acceptance models "ease of use" is usually described as an attribute that has an effect on behavioral intention (Venkatesh et al. 2003; Venkatesh et al. 2012). In our case the problems with usability directly affected actual use and not so much through users' behavioral intention. Based on our data, there were hundreds of people left outside of eHealth coaching because they did not know how to activate it.

In conclusion, we found several issues not familiar to conventional technology acceptance research. What they clearly present is that non-adopters are not a homogeneous group. Table 8 summarizes the key anomalies that we consider as the most valuable findings of our study.

Category	Anomalies
IT	Technical and usability problems can directly affect actual use.
Affect	Perceived non-credibility of a BCSS can be caused by emotional discomfort.
Self	Non-adopters consist of two distinct subject groups.
Context	Users have challenges in differentiating the BCSS from its surrounding context.
Un-categorizable	A positive attitude toward the BCSS does not automatically improve its acceptance.

Table 8.Key anomalies of BCSS non-adoption

6 CONCLUSION

This study examined consumers' insights about a BCSS. It adds to the body of knowledge on understanding the factors contributing to successful engagement with consumer health IT. BCSSs are at the heart of persuasive technology research, and these systems could bring several advantages to users. However, these benefits cannot be achieved if the systems fail to engage and retain the users. From a practical perspective, it is beneficial to recognize reasons leading to the non-adoption of a system. This type of knowledge will be valuable in guiding the design and development processes of BCSSs. However, there is a need to shift the focus from traditional approaches when striving for

effective consumer health applications and engaging user experiences. To this end, persuasive systems design (Oinas-Kukkonen & Harjumaa 2009) is one of the promising paths to follow.

One of the contributions this paper offers is its methodological approach illustrating the variety of different ways to conduct research in the IS field. There is only a relatively modest amount of papers where hermeneutical approaches have been applied as Sarker & Lee (2006) and Lee & Dennis (2012) argued. The greatest benefit that hermeneutics offers is the freedom to pursue anomalous findings (Cole & Avison 2007). We believe that our paper provides valuable insights to hermeneutics research in IS, and it offers interesting findings for health BCSS designers as well. Similarly to Cole and Avison (2007), the aim of this study was to produce description of the phenomena and its constituent parts rather than an explanation of how those parts are connected.

There are no detailed and explicit guidelines for the hermeneutics method (Tingling & Parent 2004), and the interpretation does not attribute equal significance to each word or a "random sample" of the words (Sarker & Lee 2006). In this study, theories were used as lenses to explain data, not to verify them or build a new one. As Lee (1994) and Stahl (2014) argued, hermeneutics as emphasizing understanding is suited for the social sciences that aim to understand human activity, not to predict it.

When reflecting on the earlier described ontological view of hermeneutics, it is more understandable that hermeneutics does not seek to provide procedural and replicable techniques (Sarker & Lee 2006). In interpretive research, the objective of reliability considers the extent to which the observational procedure yields consistent findings, whereas the reliability of positivist research is confirmatory to achieve the same results across repeated studies (Trauth & Jessup 2000). Cole and Avison (2007) referred to Heidegger, who challenged the emphasis on existential understanding, and to Gadamer, who argued that "lived experiences" are viewed relative to an individual's time and place and therefore not as constant elements able to be objectively translated. One can question if it is even reasonable for qualitative research to pursue replication. However, I sincerely believe this study is meaningful to positivist quantitative researchers who hopefully will be newly inspired to re-evaluate their survey instruments even in such a thoroughly studied area as technological acceptance. Regarding future research efforts in the area of BCSS is actually successful in changing the intended behaviors.

As Stahl (2014) aptly put it: "Researchers are storytellers who construct arguments to help their audience understand a particular point. This in turn is useful for the audience because the research narratives help them navigate their personal, social, and organizational lives." Such an idea can feel heretical from the objectivist and positivist perspective, but instead of arguing whether this particular research is true, it might be more helpful to ask whether it contributed to understanding and whether this understanding proved to be relevant (Stahl 2014). According to Stahl's (2014) evaluation criteria for interpretivist IS research, one of the main issues is to highlight unexpected findings that force readers to reflect their assumptions. Thus, I wanted this article to be an anomaly itself so that you, dear reader, hopefully have the feeling of holding a toothbrush in your opposite hand.

Acknowledgements

This research is part of OASIS research group of Martti Ahtisaari Institute, University of Oulu. This study was supported by the SalWe Research Program for Mind and Body (Tekes – The Finnish Funding Agency for Technology and Innovation grant 1104/10).

References

- Agarwal, R., Anderson, C., Zarate, J., and Ward, C. (2013). If We Offer it, Will They Accept? Factors Affecting Patient Use Intentions of Personal Health Records and Secure Messaging. Journal of Medical Internet Research. 15 (2).
- Benbasat, I. and Barki, H. (2007). Quo vadis TAM? Journal of the Association for Information Systems. 8 (4).

- Benbasat, I., and Zmud, R. W. (1998). The Identity Crisis within the IS Discipline: Defining and Communicating the Discipline's Core Properties. MIS Quarterly. 27 (2), 183-194.
- Butler, T. (1998). Towards a Hermeneutic Method For Interpretive Research In Information Systems. Journal of Information Technology. 13 (4), 285-300.
- Cialdini, R. B., Petty, R. E., & Cacioppo, J. T. (1981). Attitude and attitude change. Annual review of psychology, 32 (1), 357-404.
- Cole, M., and Avison, D. (2007). The potential of hermeneutics in information systems research. European Journal of Information Systems, 16 (6), 820-833.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS quarterly, 13 (3), 319-340.
- Dickey, M. H., Burnett, G., Chudoba, K. M. and Kazmer, M. M. (2007). Do you read me? Perspective making and perspective taking in chat communities. Journal of the Association for Information Systems, 8 (1), 47-70.
- Eysenbach, G. (2000). Consumer Health Informatics. BMJ 320, 1713–1716.
- Goodhue, D. L., and Thompson, R. L. (1995). Task-Technology Fit and Individual Performance. MIS Quarterly, 19 (2), 213-236.
- Klein, H. K., and Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. MIS quarterly, 23 (1), 67-93.
- Lee, A. S. (1994). Electronic mail as a medium for rich communication: An empirical investigation using hermeneutic interpretation. MIS quarterly, 18 (2), 143-157.
- Lee, A. S., & Dennis, A. R. (2012). A hermeneutic interpretation of a controlled laboratory experiment: a case study of decision-making with a group support system. Information Systems Journal, 22 (1), 3-27.
- Lehto, T. & Oinas-Kukkonen, H. (2014). Explaining and Predicting Perceived Effectiveness and Use Continuance Intention of a Behavior Change Support System. Behavior & Information Technology.
- Miles, M.B. and Huberman, A.M. (1994). Qualitative Data Analysis: An Expanded Sourcebook. 2nd Edition. Sage Publications, Thousand Oaks, California.
- Oinas-Kukkonen, H., & Harjumaa, M. (2009). Persuasive Systems Design: Key Issues, Process Model, and System Features. Communications of the Association for Information Systems, 24.
- Oinas-Kukkonen, H. (2013). A Foundation for the Study of Behavior Change Support Systems. Personal and Ubiquitous Computing, 17 (6), 1223-1235.
- Or, C.K.L, Karsh, B.-T., Severtson, D.J., Burke, L.J., Brown, R.L. and Brennan, P.F. (2011). Factors Affecting Home Care Patients' Acceptance of a Web-Based Interactive Self-Management Technology. Journal of the American Medical Informatics Association. 18 (1), 51-59.
- Or, C. K. L. and Karsh, B.-T. (2009). A Systematic Review of Patient Acceptance of Consumer Health Information Technology. Journal of the American Medical Informatics Association. 16 (4), 550-560.
- Patton, M. Q. (2005). Qualitative research. John Wiley & Sons, Ltd. Thousand Oaks, California.
- Payton, F. C., Pare, G., Le Rouge, C. M., and Reddy, M. (2011). Health Care IT: Process, People, Patients and Interdisciplinary Considerations. Journal of the Association for Information Systems, 12 (2), I-XIII.
- Sarker, S. and Lee, A. S. (2006). Does the use of computer-based BPC tools contribute to redesign effectiveness? Insights from a hermeneutic study. Engineering Management, IEEE Transactions on, 53 (1), 130-145.
- Schwarz, A. and Chin, W. (2007). Looking Forward: Toward an Understanding of the Nature and Definition of IT Acceptance. Journal of the Association for Information Systems. 8 (4), 231-U7.
- Stahl, B. C. (2014). Interpretive accounts and fairy tales: a critical polemic against the empiricist bias in interpretive IS research. European Journal of Information Systems, 23 (1), 1-11.
- Tingling, P., & Parent, M. (2004). An exploration of enterprise technology selection and evaluation. The Journal of Strategic Information Systems, 13 (4), 329-354.
- Trauth, E. M., & Jessup, L. M. (2000). Understanding computer-mediated discussions: positivist and interpretive analyses of group support system use. MIS Quarterly, 24 (1), 43-79.

- Venkatesh, V., Thong, J. Y. L., and Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. MIS Quarterly, 36 (1), 157-178.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward A Unified View. MIS Quarterly. 27(3), 425-478.
- Walsham, G. (2006). Doing interpretive research. European journal of information systems, 15 (3), 320-330.
- Williams, M. D., Dwivedi, Y. K., Lal, B. and Schwarz, A. (2009). Contemporary Trends and Issues in IT Adoption and Diffusion Research. Journal of Information Technology, 24, 1-10.
- World Health Organization. Global status report on noncommunicable diseases 2010, http://www.who.int/nmh/publications/ncd_report2010/en/.