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**Service Experience Design for Healthy Living Support:
*Comparing an In-House with an eHealth Solution***

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Abstract

Extensive lifestyle interventions towards healthy living can help prevent, stabilize or even reverse some of the most common diseases facing our aging population (cardiovascular diseases, diabetes, obesity, some cancers and even dementia). One promising application can be found in 'secondary prevention', which starts from the moment of diagnosis and is aimed at prevention or reversal of disease progression. Several studies have shown that patients who make the largest lifestyle progress gain most (long term) health benefits. An important challenge is to motivate patients to a high degree of compliance with the lifestyle guidelines. In this paper we use principles from Service Experience Design and motivation theories for designing and evaluating (e)Health lifestyle interventions. A two-tier design approach is most sensible: First use generic motivational factors (like cognition/health insights, asking explicit commitments or generating fast results). Next use service experience factors to optimize details. The eHealth solution generates quite different experience benefits compared with the in-house solution. On the one hand this indicates that they may be used to serve different patient segments. On the other hand, our analysis suggests ways in which in-house and eHealth elements may be combined. We argue, that the level of trust a patient gains in prevention or therapy programs can be increased substantially by this combination. Some innovative examples for ICT-based eHealth approaches are mentioned for illustration.

Keywords: eHealth, lifestyle intervention, health, experience design, motivation, design research, service design

1 Introduction

Extensive lifestyle interventions towards Healthy Living can help reverse or prevent some of the most common diseases facing our aging population: cardiovascular diseases (Ornish, Brown, Scherwitz, & al., 1990; Ornish, Scherwitz, Billings, & al., 1998), diabetes (Anderson, 1986; Tuomilehto, Lindstrom, Eriksson, Valle, & . 2001), obesity (Nicholson, Sklar, Barnard, Gore, & al, 1999; Shintani, Hughes, Beckham, & O'Connor, 1991) , some cancers (Youngman and Campbell 1992; Hildenbrand, Hildenbrand, Bradford et al. 1995; O'Keefe, Kidd, Espitalier-Noel et al. 1999; Chan and Giovannucci 2001; Ornish, Weidner, Fair et al. 2005 Pierce, Natarajan, Caan et al. 2009b) and even dementia (Clarke, Smith, Jobst, Refsum, & al, 1998; Grant, 2001). One promising area is 'secondary prevention', which starts from the moment of diagnosis and is aimed at prevention or reversal of disease progression.

In this paper we take the successful in-house lifestyle program from the Ornish group (Ornish, 2008) as the base line format. Since the 1980's their program has shown that a) people are willing and capable of making extensive lifestyle changes when sufficiently supported, and b) significant health progress can be achieved with this program. This progress is achieved in relation to cardiovascular disease and hypertension (Ornish et al., 1990; Ornish et al., 1998), diabetes and obesity and some common cancers (Ornish, 2008), of which prostate cancer has seen most rigorous clinical tests and publications (Ornish, Lin et al., 2008; Ornish, Magbanua et al., 2008; Ornish, Weidner, Fair, & . 2005).

One of the important findings from these studies is that to reach maximum health benefits, large lifestyle changes are essential: a low-fat, wholefood, vegan diet, daily exercise and stress management (like yoga or meditation) and active use of social support (via a buddy or support group). Patients who make the largest lifestyle improvements gain most health benefits (Ornish, Scherwitz et al. 1998; Fuhrman 2005; Ornish, Weidner et al. 2005; Campbell and Campbell-II 2006; Ornish 2008). Hence, the degree of compliance with the lifestyle guidelines is an important predictor for positive health outcomes.

This degree of compliance is an important question for most outsiders to the program, like insurance companies, governments, family physicians and specialists (Campbell & Campbell-II, 2006; Fuhrman, 2005; Ornish, 2008). There is often doubt as to whether it is sensible to refer patients to this type of program, since those patients are not expected to be willing and capable of making extensive lifestyle changes. Hence, motivation is an important factor: motivation to start and motivation to follow it through. This in fact results in a multi-sided trust issue: a) The patient's compliance is an expression of his trust in the prevention program as well as in the competence of his care takers. b) The care takers themselves demand a level of trust with regard to the effectiveness of the intervention, which depends significantly on the patients discipline and stamina to stick to a health program. We argue that some ICT supported direct interaction as well as the easy access to relevant virtual communities (Leimeister, Schweizer, Leimeister, & Krcmar, 2008; Schweizer, Leimeister, & Krcmar, 2006) might form a success factor.

A recent development in the field is the rise of tele-coached lifestyle interventions (Stull, Snyder, & Demark-Wahnefried, 2007; Vale, Jelinek, Best, Dart, & al, 2003). Some patients indicate that they find tele-coaching more convenient than in-house

coaching (Demark-Wahnefried, Clipp, Lipkus, Lobach, & al, 2007; Pinto, Friedman, Marcus, Kelley, & al, 2002; Stull et al., 2007). One of the advantages of tele-coaching is that patients are not required to travel, and can schedule a coaching session at a time of their convenience. A disadvantage of tele-coaching may be that there is less attachment to the program and that it may be lower in group support and 'lock-in'. An important question is how sufficient motivational support can be incorporated in tele-coaching programs, so that they promote maximum adherence to the intervention guidelines.

Hence our *Research Objective* is to determine which service elements can be used to enhance the motivational support for patients in eHealth lifestyle intervention programs. Several lessons can be learned from previous tele-coaching interventions, which we will connect to theories on Service Experience Design and motivation, using a design research approach.

This leads to our main *Research Question*: How to use principles from Service Experience Design and motivation theories for designing and evaluating (e)Health lifestyle interventions that patients are most likely to find motivating to embrace?

In the next sections we will first draw motivational lessons from existing theory and intervention studies (section 2). Next, using design research methodology, a first version eHealth service concept and case implementation will be described (section 3). And in section 4, we will compare it with the existing in-house concept of the Ornish group (Ornish, 2008), using the motivational criteria we found from existing literature in section 2. In the conclusion (section 5) we will draw several conclusions on the feasibility of eHealth lifestyle interventions for secondary prevention.

2 Theory

Our aim is to help improve the design of eHealth lifestyle interventions that motivate people to make extensive lifestyle changes. In this section we draw lessons from a wide range of lifestyle intervention programs. And we use two areas of theory. First we use motivation theories to explicate factors for increasing patient motivation. Next, we address service experience design theories. Experience design theory provides us with the service components that can be used for creating motivating service experiences.

2.1 Motivation and Healthy Living Interventions

There are various theories on motivation (Bandura, 1997; Deci, 1972; Fishbein & Ajzen, 1975; Maslow, 1943; Reiss, 2004; Yair, 2000). They do not form one coherent theory but rather provide multiple perspectives on the matter. In this research, we used these theories for sensitization purposes: we extract lessons on increasing motivation and compliance from existing lifestyle intervention studies, and we use motivation theories and concepts to explain the motivation aspects which have been used.

As a first note, an important distinction in most theories is intrinsic versus extrinsic motivation. Intrinsic motivation comes from needs or activities that one wants as a desirable thing in itself, like enjoying sports (feeling fit, living hopefully longer). By contrast, extrinsic motivation comes from outside the performer. For example money earned by winning a sports match. While external motivations can be used to teach people desired behaviors, which can even persist after the rewards disappear, intrinsic motivations like the joy of feeling good or of mastering a behavior tend to increase the achievements more and be more self-propelling in the long run (Deci & Ryan, 1985).

Before we list the main aspects of motivation and lifestyle intervention that we found, we must explain three key points about this topic. Firstly, we must realize that a diagnosis of a serious condition like heart disease or cancer has a significant impact on basic intrinsic motivational needs like physical, social and existential integrity (Alderfer, 1969; Maslow, 1943).

Secondly, many people are confused and unaware about what they can do in terms of health behaviors to improve their risk profile and well-being (Campbell & Campbell-II, 2006; Fuhrman, 2005; Ornish, 2008; Paffenbarger & Olsen, 1996; Plant, 2007a, 2007b; Robbins, 2007). In other words: several significant findings from the health sciences of the past two decades have not reached the general public, nor standard health practices yet. In terms of motivation to change, this is a serious drawback. The intrinsic motivation to change is strongly dependent on a) the beliefs and cognitions that there are factors that one can control and b) the belief in self-efficacy: 'I can be effective in reaching these goals'. Hence, an important element of any lifestyle program must be to educate participants on a) what can and cannot be expected from lifestyle interventions to achieve health benefits and b) where the fastest and biggest gains can be made.

Thirdly, lifestyle intervention programs vary widely in terms of the degree of change (behavioral and health outcomes) they invoke. And in many studies, participants fall back into less healthy habits after the intervention has ended (Demark-Wahnefried et al., 2007; Stull et al., 2007). For example, weight reduction programs can be notorious for having a weight loss followed by renewed weight gain. Fortunately, in some other programs the majority of participants continue to improve their health after the end of the intervention or at least stay on a very healthy level (Fuhrman, 2005; Ornish et al., 1998; Vale et al., 2003). Thus even afterwards their weight continues to go down, smoking and drinking are further reduced in the years that follow, physical exercise goes up and the amount of medications goes down (Ornish, 2008; Vale et al., 2003).

What may be the reasons for these differences in long-term success? The remarks from the program practitioners as well as motivation theories point to two reasons. The first is cognition, resulting in the improved self-efficacy mentioned above: people are no longer confused about how they can improve their health, and they experience that they are making effective improvements within one or two weeks' time. The second reason is that strong intrinsic motivations are stimulated early and increasingly throughout the program: not just Reiss's basic desires of enjoying food and physical activity, but also independence, power, social contact and reinforcement, and even tranquility and honour (=loyalty to group values). People start enjoying the new lifestyle because they:

- feel better and can do more (Fuhrman, 2005)
- start enjoying their new eating and exercising habits (Paffenbarger & Olsen, 1996)
- feel better about themselves (Fuhrman, 2005)
- have adopted taking good care of themselves as a value in itself (Robbins, 2007)
- feel they can cope better with life and find life more rewarding (Daubenmier, Weidner, Marlin, Crutchfield, & S. Dunn-Emke, 2006)

- feel they become better persons socially (Paffenbarger & Olsen, 1996)

In a way it is a partly new self-actualization and identity, which they prefer over their previous situation. These types of changes are more rewarding than losing weight by resisting all cakes, cookies and chips for three months by using will power; even though some will power is always useful.

Based on this assumption, the question then becomes how an intervention can be designed in such a way that it empowers participants to strongly improve their health habits and to enjoy those changes, intrinsically. And even though there can be important contributions from external rewards and reinforcements, it is crucial to stimulate intrinsic motivation in the short and long term.

Table 1: Lessons for designing interventions and the underlying motivation factors

Lessons for designing lifestyle interventions	Motivation aspects used from theory
1. Use the motivation 'peak' around moment of diagnosis to start changes (Stull et al., 2007)	(Urgent) intrinsic need to restore physical and existential integrity (Alderfer, 1969; Maslow, 1943) and sense of self-control (Bandura, 1997; Vroom, 1964).
2. Explain rationale behind lifestyle guidelines and manage for compliance and progress (Fuhrman, 2005; McDougall & McDougall, 1995; Vale et al., 2003)	Beliefs and self-efficacy (Bandura, 1997; Deci & Ryan, 1985): show participants what they can (not) control, and how.
3. Ask for explicit commitment to comply during a trial period (e.g. 1 month) and promise that by then they can decide based on results (Campbell & Campbell-II, 2006; Fuhrman, 2005; Plant, 2007b)	This commitment often appeals to the need for social contact (e.g. see grandchildren grow up) and loyalty/honor towards family, one's body or to the care provider (Reiss, 2004). The promise is to gain intrinsic joy and quality of life rewards (Alderfer, 1969).
4. Generate fast results (by making fast, extensive changes) (Campbell & Campbell-II, 2006; Fuhrman, 2005)]	Reinforce self-efficacy and support intrinsic joy of feeling better (Reiss, 2004).
5. Use social support, peer pressure, plus reinforcement from authoritative health care sources (Demark-Wahnefried et al., 2007; McDougall & McDougall, 1995; Ornish, 2008).	This is extrinsic reinforcement for behaviors and for deepening insights into health self-efficacy. Plus it stimulates social contacts and friendship along the way (Reiss, 2004).
6. Make it fun, easy and rewarding (McDougall & McDougall, 1995; Ornish, 2008).	Create intrinsic rewards as soon as possible (not just a fight against disease markers).
7. Abundance and fun in food and exercise (no 'torture' or 'will power')* (Fuhrman, 2005; Ornish, 2008; Plant, 2007b).	The intrinsic needs for food and physical activity must be used for intrinsic joy, to foster a sustainable growth in healthful behavior.

* In practice this means that participants are stimulated to eat as much as possible from the healthiest food choices (vegetables and fruits) so people feel pleasantly full and satisfied after meals, and gain vitality as well. Regarding exercise (fitness as well as stress management), fun, choice and consistency are initially

<p>8. Build self-esteem and healthy attitudes and habits in the relations between health, food, fitness and feeling well: foster care and love for oneself (Ornish, 2008; Servan-Schreiber, 2008).</p>	<p>Important intrinsic motivations for the long run are enjoying ones days more, coping better with life and feeling better about oneself, when supported by active, healthy living.</p>
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In Table 1 we list the main lessons for designing lifestyle interventions that we encountered in the intervention literature, together with the motivation factors involved. They are based on lessons from various lifestyle interventions. Most of the interventions we reviewed request extensive diet changes, moving to a (largely) vegan diet, with a much increased consumption of fruit, vegetables and legumes, and low in fat (Campbell & Campbell-II, 2006; Fuhrman, 2005; McDougall & McDougall, 1995; Ornish et al., 1998; Plant, 2007b). And several of them promote increased physical exercise, explicit stress management techniques and/or social support (Paffenbarger and Olsen 1996; Vale, Jelinek et al. 2003; Fuhrman 2005; Plant 2007b), or all of them (Ornish, 2008; Servan-Schreiber, 2008). Some of the interventions explicitly studied effectiveness of support formats (Demark-Wahnefried et al., 2007; Stull et al., 2007; Vale et al., 2003); but most of them had the intervention content as main focus and treated compliance as a hygiene factor. Collectively, these interventions provide us with a wide range of interventions and effects, offering multiple lessons for designing lifestyle interventions.

Table 1 is organized in the order of needs and drives as patients run into them. Hence they move from the terrifying diagnosis to awareness and guiding self-efficacy and from extrinsic to intrinsic rewards, in order to foster sustained motivation. In section 2.2 we move to a more detailed level of design: optimizing service experience elements to improve positive reinforcement and motivation.

2.2 Service Experience Design for Healthy Living Interventions

Service experience design is often addressed in the context of commercial service offerings. In this case we apply it to eHealth intervention programs, which are also designed and generate service experiences. This is to our knowledge not only a new approach of looking at it explicitly, but with the development of a health service industry in many advanced economies also reasonable. Taking certain mechanisms into consideration, e.g. customer loyalty, stickiness, retention or the use of incentive schemes, puts the patient in a specific customer role. While this may seem obvious for the mechanisms applied in acquisition and selling of prevention schemes, it opens up a new perspective when incorporated in the service process. Besides, the implementation of a health coach in addition to the common medical specialist (e.g. a cardiologist) offers not only a higher level of personal care but might result in an increased level of trust in the prevention or health recovery scheme.

Elsewhere we have discussed the service experience design literature (John, Simons, & Bouwman, 2009). In this paper we limit ourselves to introducing the main service experience factors and using them in section 4 to describe differences between the in-house and the eHealth intervention programs.

much more important than intensity: it is important to get into the habit and to start enjoying it before it is extended.

Table 2: Overview of experience factors, service components and motivation enhancement

Experience Factor	Service Components	Motivation Enhancement
Service Benefits (Fynes & Lally, 2008; Shaw, 2005a, 2005b)	<ul style="list-style-type: none"> ▪ Service functions & Patient Experience Statement 	Explicit health and quality of life benefits; create fast results; experience statements that support and empower participants.
People (Berry, Carbone, & Haeckel, 2002; Voss & Zomerdijk, 2007)	<ul style="list-style-type: none"> ▪ Primary patients; Fellow patients ▪ Service and Back Office Employees 	Enhance enjoyment, participation, empowerment and social contacts by invoking interactions and contributions from participants.
Process (Berry et al., 2002; Voss & Zomerdijk, 2007)	<ul style="list-style-type: none"> ▪ Flow Management 	Service processes are easy, and welcoming, with support cues ('keep it up') to enhance joy and self-efficacy.
Perception design (Berry et al., 2002; Fulberg, 2003)	<ul style="list-style-type: none"> ▪ Emotional Service Clues <i>Cordial, Empathic</i> ▪ Physical Clues <i>Signs, Symbols, Artefacts</i> ▪ Sensory Design <i>Sight, Sound, Touch, Smell, Taste</i> 	Experiences which involve all the senses and a broad range of health activities: demonstrate the positive aspects of the new lifestyle: tasty foods, fun exercise, emotional support from social interactions, and emotional or spiritual well-being from tai chi or mindfulness for example.
Participation Activities (Stuart & Tax, 2004)	<ul style="list-style-type: none"> ▪ Co-creative process; Social interaction; Artefact inclusion 	Services with high participation create new habits and results fast: and the shorter the learning curve the sooner people can move to being intrinsically motivated by the new lifestyle.

As listed in Table 2, service experiences can differ in the degree in which they exhibit service benefits (Fynes and Lally 2008, Shaw 2005a,b) and the emotional and experience theme they embody. To enhance motivation and compliance, it can help to make the health and quality of life benefits very explicit and to use (implicit or explicit) experience statements for the design, which express support and empowerment for participants.

Secondly, experiences can vary in their people involvement (Berry, Carbone and Haeckel 2002, Voss and Zomerdijk 2007): how are contributions from primary patients, fellow patients and service employees used to enhance enjoyment, participation, empowerment, social contacts and hence motivation (Deci 1972, Bandura 1997, Reiss 2004) for participants?

Thirdly, the overall service process flow can be used for creating motivating experiences (Voss and Zomerdijk 2007). If the process flow is easy, welcoming and contains comforting and supporting cues ('you have made the right choice, you are

progressing well, etc) this can increase enjoyment and self-efficacy, which are important intrinsic motivational drivers (Bandura 1997, Reiss 2004).

Fourthly, experiences can vary in terms of perception design (Berry, Carbone and Haeckel 2002, Fulberg 2003): using emotional service clues (being cordial or empathic), physical service clues (signs, symbols and a ‘service-scape’ (Grönroos, 2000) and sensory design (sound, sight, touch, taste, smell). In relation to extensive lifestyle changes, many participants are unfamiliar (and maybe wary) with all the hearty options for wholefood meals, fun exercises, revitalizing forms of stress management, like tai chi or mindful eating for example, and the power of sharing ones emotions with others. Service experiences that immerse participants in these things can help motivate them and speed up the learning curve.

Finally, participation design can be used to differentiate experiences: if self-service or other participatory activities take place, this can promote taking ownership, self-efficacy and tailoring interactions to ones individual needs (Stuart and Tax 2004). Moreover, in the context of extensive lifestyle changes, services with high participation create new habits and prove results fast. The shorter the learning curve, the sooner participants will experience the rewards and intrinsic motivation from the new lifestyle.

3 Method

In this section we discuss our design research approach and describe which case analysis we deploy.

Regarding lifestyle intervention programs, there are two strands of ‘improvement research’ theory forming. One strand is aimed at the *content* of the intervention (for example: is nutrition more effective than exercise in preventing cancer, and are they more effective when used together?). This is addressed in another paper (Simons & Hampe, 2010). The other strand of theory forming is aimed at the *format* or *process* of the intervention. For example: Should we aim for slow changes or fast changes? Should we motivate participants via health education or group support/pressure, or both? And if so: how?

There is only limited research focusing explicitly on designing intervention *formats* (Vale, Jelinek et al. 2003; Demark-Wahnefried, Clipp et al. 2007; Stull, Snyder et al. 2007). And this research generally has two limitations. Firstly, if there is an empirical comparison between approaches, usually the ‘control’ condition is rather limited. The limitation is that this makes any intervention look good, but we don’t learn which of these interventions is most effective. Secondly, these studies refer to moderate lifestyle changes. The research that we found addressing more *extensive* lifestyle interventions (Holmes, Chen, Feskanich, Kroenke, & ;. 2005; Ornish et al., 1990; Pierce et al., 2009; Schneider, Alexander, Staggers, Rainforth, & al, 2005), all focused on the intervention content and degree of medical effect. Hence we included also anecdotal, experience-based inputs as a basis for the design lessons overview in theory section 2.1.

Regarding our design research approach, we follow the design cycle of (Vaishnavi & Kuechler, 2004): from problem awareness and solution suggestion to development, evaluation and conclusion. Our research method follows three steps: a) As ‘awareness’ and ‘suggestion’ steps: Extract motivation design lessons from past lifestyle interventions (this step follows solution suggestions in the abduction step of Vaishnavi

and Kuechler; this study does not test the underlying assumptions, but takes them as a stepping stone: section 2.1). b) As ‘development’ and ‘evaluation’ steps: Create an eHealth solution with the same lifestyle intervention as an existing In-House program and use experience design factors from theory to compare them regarding differences in degree of motivation support that can be achieved (deduction step of Vaishnavi and Kuechler: sections 2.2 and 4). c) As ‘conclusion’ step: Based on the evaluation of similarities and differences in both solutions, we propose designing a motivation cycle in lifestyle interventions for secondary prevention, see Figure 2 in section 4.2. This is theory generation, applying motivation concepts to lifestyle intervention design. And we conclude that eHealth solutions will be likely to support that motivation cycle differently than In-House solutions (sections 4.2 and 5).

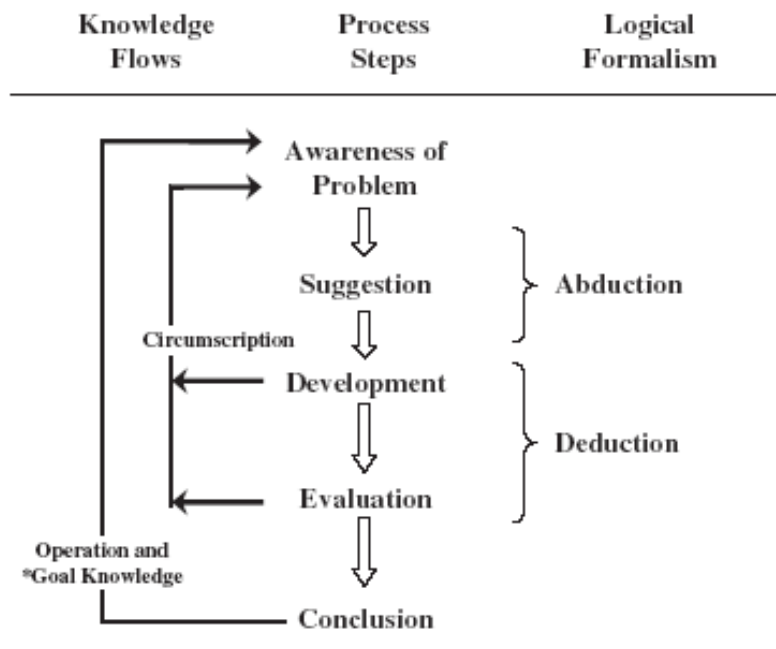


Figure 1: Design Cycle: Knowledge Creation via Design Iterations and Evaluations (Vaishnavi and Kuechler 2004)

4 Case Analysis and Findings

4.1 Case comparison: In-House and eHealth intervention concepts

The in-house program is the Ornish program for secondary prevention of prostate cancer (Ornish, Magbanua et al., 2008; Ornish et al., 2005). It resembles traditional revalidation programs and support group based interventions: participants come into the clinic for at least four hours every week. They receive coaching and training on nutrition, exercise and stress management, as well as on health self-management and their health progress. And there is a weekly group support session.

Based on lessons from existing tele-coached moderate lifestyle interventions (Demark-Wahnefried et al., 2007; Stull et al., 2007; Vale et al., 2003), a design was made for a

next ambition level: designing tele-coaching services for extensive lifestyle changes. An eHealth solution has been created, together with the Dutch organization Cancer Health Coach and with the Onco-Coach. It is offered via a member login on www.onco-coach.org. In this paper it is referred to as the Cancer eCoach program. It contains the following elements, all centered around ICT-enabled integration of the health management process, relevant to the patient, the health coach and the physicians in charge:

- An online ‘Do It Yourself’ start package, with brief tutorials, an initial ‘health related Quality of Life’ measurement (the SF-36 standard questionnaire) and an invitation for a phone based start-up session.
- A personal weekly progress dashboard (health behaviors and outcomes), used by patient and tele-coach
- Progress reporting to and integration with own care providers; the physician in charge remains medically responsible, with the health coaching as an add on.
- Online cancer health information to enable learning and empower self-control.
- Online community 24x7; patients are stimulated to be active here: share recipes, advice and support.
- Support materials online like shopping lists and exercise schedules.

In the near future a user based evaluation of the eCoach program will also be conducted. Here an expert review is applied to compare it with the Ornish in-house program.

Both programs are very similar in their general motivational approaches, following the list of factors created in the theory section:

- 1) They use the motivation ‘peak’ around the moment of diagnosis to start the intervention.
- 2) They explain the rationale behind lifestyle guidelines and support compliance and progress.
- 3) Both programs ask for explicit commitment to comply during a trial period (1,5 to 3 months) and promise that by then participants will be likely to decide to continue their healthy lifestyle based on the rewards it brings.
- 4) Both programs generate fast results, which follow from rapidly making extensive lifestyle changes.
- 5) The programs are somewhat different in the sense that the in-house program has more intense contact between peers and thus also more peer pressure and support. The other motivational aspects of using social support and reinforcement from health care providers are present in both programs.
- 6) Also, both programs are aimed at making the new lifestyle fun and rewarding, and making the transition as easy as possible.
- 7) Related to this, both programs use the principle of losing weight and gaining health and energy by abundance in foods, as long as they are healthful and satisfying foods. Regarding physical and stress management exercise, both programs invest in

creating a positive motivational basis first: fun, choice of options and building a daily routine are initially more important than intensity. Then, after getting into the habit and building up ability and joy, the degree of exercise is increased.

- 8) Both programs focus on building self-efficacy and healthy attitudes and habits in the relations between health, food, fitness and feeling well. Fostering care and love for oneself is seen as the kernel for long-term health.

By contrast, both programs vary significantly in terms of service experience design. This is illustrated in Table 3.

Table 3: Overview of experience design in both programs (In-House & eHealth)

Experience Factor	Ornish program – In-House	Cancer eCoach - eHealth
Service Benefits	<ul style="list-style-type: none"> - Warm, extensive support in a specialized lifestyle clinic. - Much health information online and in book form. - Develop habits and joys of healthful foods and behaviours as part of the group process. - Experience: support 	<ul style="list-style-type: none"> - Can start immediately (24x7) - Information and resources online to empower self-control. - No travelling, not restricted to location, plan coach sessions any time - Progress reporting to and integration with own care providers - Experience: empowerment
People	<ul style="list-style-type: none"> - Weekly physical meetings with peers and entire clinic staff. Partners are welcome too. 	<ul style="list-style-type: none"> - A personal coach, plus additional specialists on call. - Online community
Process	<ul style="list-style-type: none"> - A very local process flow: weekly 4-hour clinic visits. Discussing issues and progress with staff and peers. - Extensive medical support in-house. - Everyday health tasks. 	<ul style="list-style-type: none"> - ‘Do It Yourself’ start, with brief tutorials, a short initial measurement and a phone based start-up session. - Personal weekly progress dashboard. - Online and printed support materials, like shopping lists and exercise schedules. - Medical care remains with own doctor(s), who receive(s) progress reports. - Everyday health tasks.

Perception design	<ul style="list-style-type: none"> - Clinic culture of empathy, support and connectedness. - A <i>clinic</i>: medically extensive, but with a health focus. - Very broad range of in-house sensory experiences: exercise, high quality foods, stress management and support group participation. 	<ul style="list-style-type: none"> - Empathy and pep talks from personal coach - Empathy and connectedness 24x7 in the online community - Main physical clues in personal progress graphs. - Sensory design uses coach audio and photo, instruction videos, plus cooking and exercise training.
Participation Activities	<ul style="list-style-type: none"> - Weekly support groups and 4-hour clinic visits; a strong sense of community develops, with staff and co-participants. - Participants have a large role and responsibility in creating health experiences on a daily basis. 	<ul style="list-style-type: none"> - Participants have a large role and responsibility in creating health experiences on a daily basis; they develop a relationship with their coach and are stimulated to be active in the online community. - The personal progress dashboard requires weekly input and promotes results.

What both programs share is a strong appeal to participants to take ownership of their health in the full breadth from physical to mental health. As part of this, participants take up daily activities for improving their health. But the way in which participants are supported and motivated is different across all experience design factors. Below we provide an expert opinion evaluation of the benefits and disadvantages of both the In-House and eHealth programs.

4.2 Concept Evaluation and Theory Generation

In this section we take two steps. First an expert opinion evaluation of both the In-House and eHealth programs is conducted: what are their benefits and disadvantages for enhancing participant motivation? This is the evaluation step in the design cycle. Next we discuss theory generation based on our design research, which is the conclusion step in the design cycle.

In relation to enhancing motivation, important experience benefits of the In-House program are: a) to be uplifted by the group process [people & process], b) to receive high quality clinical support and intensive guidance [benefits & process], c) to receive in-house trainings and experiences: gourmet foods for vitality, yoga, meditation, reaching out to others [sensory design, physical clues, participation].

Experience disadvantages of the In-House program for enhancing motivation are a) that it is mainly suitable for those living near the clinic, b) that it can be a time burden: weekly 4-hour visits plus travel time [both are benefit and process issues] and c) that not everybody likes group support sessions (Demark-Wahnefried et al., 2007; Pinto et al., 2002; Stull et al., 2007; Vale et al., 2003) [people; emotional clues; participation].

Experience benefits of the eHealth solution for increasing motivation are: a) all information, supporting materials and other resources that are desired, are right under participants' fingertips 24x7 [benefits], b) no travel and appointment restraints, thus flexible, low threshold integration into weekly schedules [benefits & process], c) very explicit weekly progress monitoring and action plan [perception design; participation], d) a personal coach and sessions to help participants along [people; process; participation].

In order to highlight these effects, we discuss briefly some innovative examples. A relatively low cost solution is a WiFi equipped scale (Withings, 2009). The corresponding iPhone application then allows one to analyze the times series of weight measures (taken every morning, with an empty stomach, undressed) over a long period. Using common network connectivity, data monitoring by the health coach can lead to nearly instantaneous feedback, especially positive in the case of high compliance to an agreed level of change. Clearly, this supports the above stated multisided trust relationship much better than irregular checks at broad intervals. The same approach can be found for monitoring other parameters, e.g. project senSAVE (senSave, 2009). An NFC-based nutrition management for elderly patients has been suggested by (Prinz, Menschner, & Leimeister, 2009). Due to the prime focus of this paper, we restrict the list, although many more interesting developments would deserve to be mentioned.

Experience disadvantages of the eHealth program for enhancing motivation are a) contact with the coach is limited in terms of sensory design: only speech and text [perception design], although video contact will probably be used increasingly in the future, b) participants who look for 'closeness' and 'not feeling alone' may prefer having more physical encounters [people; participation], c) and related to the previous point: there is no physical 'service-scape' in which people are immersed, only a virtual one [perception design], d) when patients see each other on a weekly basis, they often start helping each other (practically and emotionally); those who participate online, help each other too, but the degree of relationship formation is still a question (Leimeister, Schweizer, Leimeister and Krcmar 2008, Schweizer, Leimeister and Krcmar 2006) [participation].

From comparing the In-House and the eHealth concepts **we draw four lessons for designing extensive eHealth lifestyle interventions**. The first lesson is that the overall motivational flow that appeared in 2.1 (theory and intervention program lessons on motivation) for stimulating motivation and compliance is largely the same for online and offline concepts. The second lesson is that the In-House and the eHealth concept each appeal to different user preferences and maybe different user segments ('valuing social support and living near Los Angeles' versus 'seeking empowerment, progress tracking, flexible integration into weekly routine and living elsewhere'). A third lesson is that the online progress dashboard as a focus point for coach- and patient self-management activities, when combined with physician reporting, creates a welcome form of care integration across location, time and expertise. A fourth lesson may be that hybrid programs may have added value since they can combine In-House and eHealth benefits: functionality, flexibility and reporting online plus locally: social support, health activities and food experiences, participation. There are multiple options for hybrid programs, for example starting with a full-day workshop or a 7-day 'health holiday' and then moving online as a community, or organizing regular retreats or

theme programs for those already in the program, or asking participants or local clinics to organize local events. The extension of the eHealth concept with local events is subject of future study. If the hybrid formats were to offer equal or more value than In-House formats for some patient groups, this could offer relevant cost advantages in servicing our aging population.

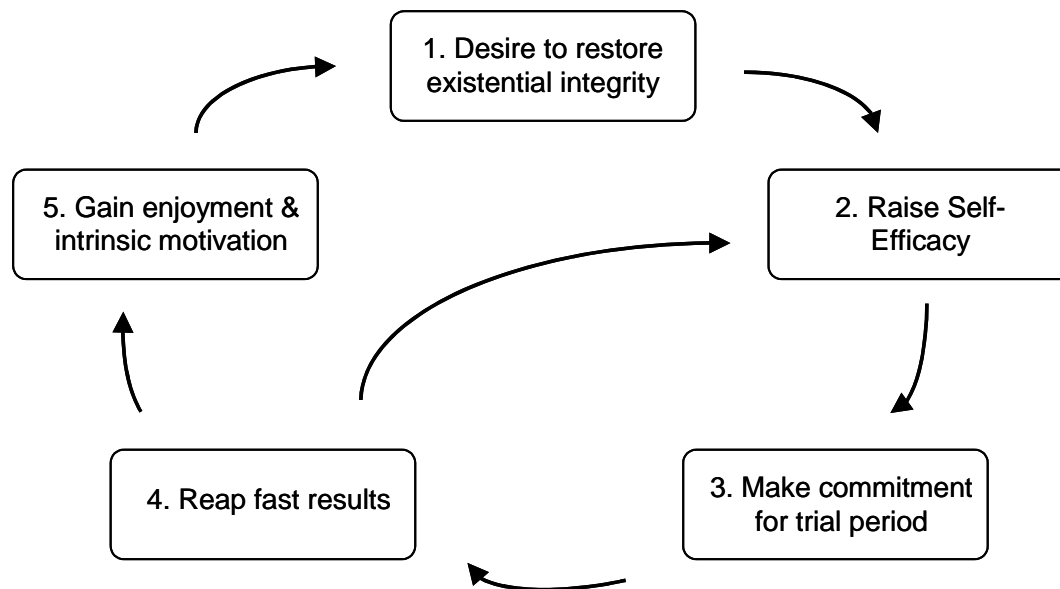


Figure 2: Short- and Medium-Term Virtuous Motivation Circles for Lifestyle Interventions

Finally, by making explicit which motivational aspects are supported by which intervention approaches, we have discovered that extensive lifestyle intervention for secondary prevention can ignite a virtuous motivation cycle, as shown in Figure 2. The first step is the urgent intrinsic need or drive (Reiss, 2004) to restore physical and existential integrity, caused by a cancer (or other serious) diagnosis. There is empirical research showing that this need is strongest in the diagnosis phase (Stull et al., 2007). In step 2, when people learn that they can contribute, their self-control and self-efficacy is restored, which inspires people to take action (Vroom, 1964). Step 3 is making a commitment to invest time and effort, and continuing that commitment during tough moments. Step 4 is reaping results, which reinforces the step 2 self-efficacy (Bandura, 1997; Deci & Ryan, 1985)) in a short-term virtuous circles. Step 5 is gaining enjoyment and intrinsic motivation from the lifestyle changes. This reinforces step 1, that it is ‘rational’ to strive to restore existential integrity and step 2, increase self-control. Thus, the medium-term virtuous circle of lifestyle motivation is reinforced.

The In-House program appears more suited to support step 3, (continued) commitment, and step 2, belief in self-efficacy (‘If X can do this, so can I’ or ‘together we can do this’). The eHealth solution should either compensate this via faster or more apparent results and rewards (steps 4 and 5), or via other means of supporting steps 2 and 3. How this can be done is a subject for future research.

5 Conclusion

Based on this research, a two-tier design approach for enhancing motivational support from lifestyle interventions appears most sensible: First use generic motivational factors (need to restore existential integrity and control, increase self-efficacy via health

insights, asking for explicit commitments, generating fast results and intrinsic rewards). Next, use service experience factors to optimize eHealth Service details.

The eHealth solution generates different experience benefits than the In-House solution. On the one hand this indicates that they may be used to serve different patient segments. On the other hand, our analysis suggests there are ways in which in-house and eHealth elements may be combined to generate promising new service concepts.

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