Increasing lifestyle-related ill health, escalating health care costs, expanding health inequalities within and between nations, and an aging population are challenges facing governments globally. Governments, especially in industrialized countries like Sweden, are investing in health promotion and health communication, especially in ICT-supported health communication as a way to increase health literacy and empowerment at individual and population levels. Studies show that many eHealth communication efforts are narrow in scope, medical oriented and therefore not enough to address the complexity of lifestyle-related ill health and equity issues.

This thesis proposes integrating health promotion values and principles in the design process of eHealth systems for health promotion in order to develop usable, sustainable, engaging, eHealth resources that are adaptable to their context of use and user’s skills. The overall aim of this thesis was to study the participatory development process of an interactive ICT-supported health communication channel for health promotion and enhancing health literacy in PHC context.

Participatory Action Research (PAR) with a multi-phase and multi-method approach was used in this thesis. A model entitled Spiral Technology Action Research (STAR) was used to guide the development of the health channel. This design process was framed in three developmental and evaluation phases corresponding to formative, process and outcome evaluation. A total of 146 participants consisting of professionals from primary health care services, information technology and academia, and local citizens participated in the project’s different phases. A triangulation of methods was used to collect the data; survey, document analysis, participatory observations with field notes, individual interviews, focus groups, think aloud protocols and log statistics. Qualitative and quantitative content analyses were used to analyse data.

The results revealed that integrating health promotion values and principles in the design process proved to be valuable not only to the content of the channel, but also in PHC practice. The different design phases yielded valuable results that built into each other and contributed to an eHealth channel that was perceived as relevant to the local people’s need for health communication; accessible and user friendly. The results also indicated that an Internet based interactive health channel, could be a valuable resource for enhancing health literacy if users are involved in the design.

Key words: eHealth, eHealth literacy, empowerment, health communication, health literacy, health promotion, Internet, participatory action research, primary health care
Designing ICT-Supported Health Promoting Communication in Primary Health Care

Amina Jama Mahmud
Designing ICT-Supported Health Promoting Communication in Primary Health Care

Amina Jama Mahmud

Doctoral Dissertation in
Applied Health Technology

School of Health Science
Blekinge Institute of Technology
SWEDEN
In memory of my mother

Hawa Ali Warsame.
“With today’s information age translating into a wild and wired world, promoting health can become a greater challenge in this new, global, un-centralized information world”  
Scott C. Ratzan
Abstract

Increasing lifestyle-related ill health, escalating health care costs, expanding health inequalities within and between nations, and an aging population are challenges facing governments globally. Governments, especially in industrialized countries like Sweden, are investing in health promotion and health communication, especially in Information and Communication Technology (ICT)-supported health communication as a way to increase health literacy and empowerment at individual and population levels. Studies show that many eHealth communication efforts are narrow in scope, medical oriented and therefore not enough to address the complexity of lifestyle-related ill health and equity issues. This thesis proposes integrating health promotion values and principles in the design process of eHealth systems for health promotion in order to develop usable, sustainable, engaging, eHealth resources that are adaptable to their context of use and user’s skills.

The overall aim of this thesis was to study the participatory development process of an interactive ICT-supported health communication channel for health promotion and enhancing health literacy in Primary Health Care (PHC) context. Participatory Action Research (PAR) with a multi-phase and multi-method approach was used in this thesis. A model entitled Spiral Technology Action Research’ (STAR) was used to guide the development of the health channel. This design process was framed in three developmental and evaluation phases corresponding to formative, process and outcome evaluation. A total of 146 participants consisting of professionals from primary health care services, information technology and academia, and local citizens participated in the project’s different phases. A triangulation of methods was used to collect the data; survey, document analysis, participatory observations with field notes, individual interviews, focus groups, think aloud protocols and log statistics. Qualitative and quantitative content analyses were used to analyse data.

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Hälsotorget

Skaffa dig ett bättre blodtryck!
Låt oss ta hand om din hälsa genom att ha en hållbar livsstil.

Hälsovaktet i landet

Kontakta

Fråga oss

Forum

Chat

Egenvårdsguiden

Din ingång till ett Gott liv!


Veckans webbfråga


Veckans webbfråga


Veckans webbfråga


Veckans webbfråga


Veckans webbfråga


Veckans webbfråga


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Veckans webbfråga

List of publications


Mahmud, A J., Olander, E., Eriksén S. Design and evaluation of a collaboratively developed health promotion website - A qualitative study (manuscript).

Mahmud, A J., Olander, E., Eriksén S. Collaborative design for health promotion-experiences from a Participatory Action Research work group (manuscript).

**Related publications not included in this thesis.**


## Abbreviation List

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AHT</td>
<td>Applied Health Technology</td>
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<tr>
<td>CHS</td>
<td>Child Health Care</td>
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<td>DN</td>
<td>District Nurse</td>
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<td>GP</td>
<td>General Practitioners</td>
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<td>ICT</td>
<td>Information and Communication Technology</td>
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<tr>
<td>ISs</td>
<td>Information Systems</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organisation</td>
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<td>PAR</td>
<td>Participatory Action Research</td>
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<td>PD</td>
<td>Participatory Design</td>
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<tr>
<td>PHC</td>
<td>Primary Health Care</td>
</tr>
<tr>
<td>SGF</td>
<td>Syster Gudrun Fullskale lab (Nurse Gudrun Health and social Care project)</td>
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<tr>
<td>VHT</td>
<td>Virtual <em>Hälsotorg</em> project</td>
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<td>Virtual <em>Hälsotorg</em></td>
<td>The interactive health promotion channel</td>
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<td>WHO</td>
<td>World Health Organisation</td>
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Glossary

Community
A specific group of people, often living in a defined geographical area, who share a common culture, values and norms, are arranged in a social structure according to relationships which the community has developed over a period of time. Members of a community gain their personal and social identity by sharing common beliefs, values and norms which have been developed by the community in the past and may be modified in the future. They exhibit some awareness of their identity as a group, and share common needs and a commitment to meeting them (WHO, 1998). Community in this paper refers to the laymen in the project and is used interchangeably with citizens.

Disease prevention
Disease prevention covers measures not only to prevent the occurrence of disease, such as risk factor reduction, but also to arrest its progress and reduce its consequences once established (WHO, 1998).

eHealth
Use of Internet and other electronic media to disseminate or provide access to health and lifestyle information or services (Pagliari, 2007).

eHealth literacy
The ability to seek, find, understand, and appraise health resources available and consumer’s skills for using them (Norman and Skinner, 2006b)

Health
A state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity. Within the context of health promotion, health has been considered less as an abstract state and more as a means to an end which can be expressed in functional terms as a resource which permits people to lead an individually, socially and economically productive life. Health is a resource for everyday life, not the object of living. It is a positive concept emphasizing social and personal resources as well as physical capabilities (WHO constitution of 1948) (WHO, 1998).

Health education
Health education comprises consciously constructed opportunities for learning involving some form of communication designed to improve health literacy, including improving knowledge, and developing life skills which are conducive to individual and community health (WHO, 1998).
**Health literacy**
Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health (WHO, 1998).

**Health promotion**
The process of enabling people to increase control over, and to improve their health (Ottawa Charter for Health Promotion (WHO, 1998).

**Interactive Technology**
Interactivity refers to the number of forms of input and output and the level of responsiveness to the user’s actions. Interactive technology is computer based. It enables users to access and services of interest control how the information is presented and respond to information and messages in the mediated environment (Street et al., 1997).

**Participatory Action Research**
Participatory Action Research is defined as “a democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview. It seeks to bring together action and reflection, theory and practice, in participation with others, in pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities” (Reason and Bradbury, 2001).

**Primary Health Care**
Primary health care is essential health care made accessible at a cost a country and community can afford, with methods that are practical, scientifically sound and socially acceptable (WHO, 1998).

**Public health**
The science and art of promoting health, preventing disease and prolonging life through the organized efforts of society (WHO, 1998).
Foreword
My interest for health communication emanates from personal experience as well as professional experiences. My personal experience comes from the time I was a primary carer to my mum who was suffering from diabetes, kidney failure and dementia in 1999-2003 in the home. As a non-Swedish speaker, with no medical experience or knowledge caring for a terminally ill person, I got a rude introduction to the Swedish health care system’s “autonomy” philosophy. To begin with, all information was in Swedish, which meant that I had to develop a good relationship with the Internet as it was my main source of health information in English.

Due to her poor physical and mental health, my mother needed help from various agencies. As I mastered the new language, my ability to decipher the medical, health and social care jungle did not improve as I had hoped. Furthermore, the telephone help I was accorded was not sufficient support, as the person on the other end assumed my worry or lack of understanding was due to my insufficient Swedish language and not on the quality of the information or how that information was communicated. The lack of open communication from both my side and the health care services is probably one of the major barriers to health care for most patients and their carers but especially for non-Swedish persons, from my personal experiences. It was not easy for them to know how I felt. On the other hand; health care personnel did not create the conditions to facilitate an open communication where I would feel comfortable enough to share my experiences. Hence creating favourable conditions for communication empowers the health consumer and could be just as important as the content of the communication.

Years later, the tables were turned. This time I was “the” nurse. As a professional nurse in PHC, I experienced how health care personnel, myself included, made decisions on behalf of the patients. Decisions were often based on expert assessment on what was best for patients, based on evidence-based tools such as questionnaires, and protocols, without much reflection on how relevant they were to the patient’s everyday life context. It was not only WHAT we communicated, but HOW we communicated. The communication was often instructive, bordering paternalistic, telling patients ‘how’ to stay healthy and avoid more complications. This often translated into instructions on what to do and how to do it, without considering the receiver’s own priorities, capacities and life situation. The saddest part is that we truly believed that we were listening and acting with the patient’s best interest in mind and using evidence-based methods and tools. In most cases my colleagues and I were aware of the problem, but it was hard to change routines without the right knowledge, resources and support from the management. The opportunity to acquire more knowledge and skills came when I started my masters programs in Public Health Sciences and Communication for development.

In my master’s thesis in Public Health Sciences, I explored high school students’ perception of school-based sexual health education. At the time (2005-2006), there was a concern over the rising number of sexually transmitted infections among the youth in Sweden. There was
an on-going awareness campaign in town when I was conducting my interviews. The majority of the students related that they rarely paid attention during the sexual health lessons. When asked where they attained their knowledge on the subject, they pointed to commercial websites with dubious intentions and contents. My thesis also revealed that the youth in my study stopped noticing the colourful posters warning them of Chlamydia and other sexual transmitted infections around them.

It is thanks to the youth in my study that my curiosity towards the Internet as a potential setting for health promotion and decision support was born. However, there was one problem; health care services were inconspicuous on the Internet. Review of the literature gave, and still gives, conflicting messages: on one hand, there was an overflow of health information on the Internet which causes information pollution and cognitive overload; on the other hand, there is inadequate health information in the same media. This equation does not add up, which indicates the existence of a gap between the available information and its ability to match the needs of the people seeking it.

In summary, my experiences show that health communication is mediated by factors such as receiver’s language competency, accessibility of the language used in the message, the intention behind the message, the recipient’s life situation, attitudes and methods used to disseminate. In the case of the youth the mediating factors included age, context (school, media), the nature of the subject hence the importance of media/message appropriateness and ability to engage the recipients. More importantly, the needs and preferences of the recipients, health literacy levels and power relation between health care personnel and the recipients should be taken in consideration. These are issues this thesis is trying to address in order to design health promoting communication that can meet the people’s needs and preferences using Information and Communication Technology (ICT Primary Health Care (PHC)).
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1 Introduction

The studies presented in this thesis apply knowledge from Health Promotion to the design of Health Information and Communication Technology (ICT) or eHealth applications. The thesis was carried out within Applied Health Technology; an interdisciplinary research field at the interface between health and technology, including studies of how health may be related to the implementation and impact of technology, both directly and indirectly.

Interdisciplinary research is necessitated when dealing with complex problems that do not fit neatly within disciplinary boundaries, resulting in the need to draw upon diverse bodies of expertise (Huber and Shaw, 1992). Studies presented in this thesis have integrated knowledge from Public Health Sciences; specifically Health Promotion (Green and Tones, 2010), Participatory Design (Gregory, 2003), Human Computer Interaction (Forlizzi et al., 2008) and Computer Supported Cooperative Work (Fitzpatrick and Ellingsen, 2012). The common denominator for the above named fields is the centrality of human involvement in the design of programs.

Interdisciplinary research has in the last three decades re-shaped the eHealth landscape, resulting in innovations that contribute to more usable systems (Kummervold et al., 2008, Tucker and Lodders, 2011). However, the process is challenging. Disciplines have long established histories and cultures (Choi and Pak, 2007), which can be hard to bridge (Sutton and Kemp, 2006). In the development of eHealth applications for health promotion, researchers from the technology field might be more interested in the technical elegance and innovations of the utility than researchers from the health promotion field who are more interested in how accessible the applications are to the users and how well they fit into the organizations’ practices and infrastructures (Kreps and Neuhauser, 2010). The latter are issues of importance to health promotion researchers whose ultimate concern is if the utilities are designed to cater for diverse population of users and if the information/services support the recipients’ health decision making (Kreps and Neuhauser, 2010).

The field of research for the studies in this thesis is the adaptation of modern technology for health communication in a Primary Health Care (PHC) setting. PHC is identified as an important setting for health promotion (WHO, 2008) as it is the gateway to the health care system and has good contact with the local communities (Rawaf et al., 2008, Watson, 2008). PHC has both professional knowledge and access to a large segment of citizens. This places it in an opportune position to promote health, prevent diseases and contribute to enhanced health literacy in the population (Dennis et al., 2012, Moulton et al., 2006).

Health communication is a key strategy for promoting health within and outside of health care settings (Ratzan, 2011). Modern health care systems have witnessed what some researchers term a ‘communication revolution’ (Kreps and Neuhauser, 2010), whereby modern technology has changed health care provision through a wide range of eHealth applications including ubiquitous health information websites, online social support networks, tele-health applications, health care systems’ web portals, tailored health education programs and
personal medical records (ibid.). The use of eHealth technologies for promoting health is a new and growing branch of health technology. Different kinds of Internet and mobile applications are devised to prevent diseases and empower people to take more responsibility for their own health (Hoyo Barbolla, 2007, van Gemert-Pijnen et al., 2011). As the demand for individual responsibility for health is gaining more importance in health care systems, especially with the increasing challenges facing the health care systems in terms of increasing lifestyle diseases (Dennis et al., 2012, Laverack and Keshavarz Mohammadi, 2011, Ziglio et al., 2011), so is the demand to create societal conditions to enable people to take these responsibilities. One area that has gained international support is health literacy (Kickbusch et al., 2013).

1.1 Thesis outline
This thesis is a framework synthesis for four studies, containing nine chapters. Chapter two presents a background and motivation for the need for research in health communication. The chapter ends with the presentation of the context within which the studies were conducted. Chapter three presents the research aims and an overview of the studies. Chapter four presents the conceptual framework of the thesis with health communication as the focal point. Related concepts are then discussed in relation to available literature and the aims of this thesis. Chapter five describes the methodology in detail; the approach and study design. This is followed by a summary of each of the four studies accounting for data collection methods and analysis. The ethical considerations are also discussed in this chapter, which ends with a discussion of validity and trustworthiness of the methodologies used. Chapter six presents a summary of the results for each of the four studies. Chapter seven is divided into two parts; the first part discusses the main outcome of the four studies. It provides a synthesis of the results in regards to what knowledge we can derive from the findings of this research and the lessons learned. The second part critically examines the design and methodology of the thesis, and contains a quality assessment of the studies. Chapter eight presents the conclusions and suggestions for future studies. Chapter nine presents the research contribution to research and practice.

2 Background
Increasing lifestyle-related ill health, escalating health care costs, expanding health inequality within and between nations and an aging population are challenges facing governments globally (Ahern, 2007, Nutbeam and Kickbusch, 2000, Parker et al., 2003). Governments within the European Union region, including Sweden, are investing in health promotion and health communication, especially in ICT mediated health communication systems, as a way to increase health literacy (Stroetmann et al., 2011). Health promotion is defined as the process of enabling people to increase control over factors that determine health and to improve their health (WHO, 1986). Health promotion depends on health communication and education to inform, influence and motivate individuals, institutions and the general public about important health issues (Kickbusch and Ratzan, 2001, Nutbeam and Kickbusch, 2000). Health literacy refers to the cognitive and social skills which determine the motivation and ability of
individuals to gain access to, understand and use information in ways which promote and maintain good health (WHO, 1998). Health literacy was recently recognised as a key determinant of health by the WHO, on the basis that literacy is a stronger predictor of health status than other socio-economic factors such as education and income (Kickbusch et al., 2013).

Studies show a clear correlation between low health literacy and poor health, risky health behaviour and increased risk for chronic diseases (Magoulas et al., 2012, Kickbusch et al., 2013). In a wider perspective, low health literacy was found to affect participation in civil society (Nutbeam, 2008) as well as an understanding of the consequences of political decisions and the impact they would have on one’s life (Magoulas et al., 2012). As such, health literacy is an important life skill needed to navigate complex health care and social systems (Magoulas et al., 2012, Ratzan and Parker, 2006, Wolf et al., 2008). Being health literate entails making sound health decisions in a complex world where people are confronted with health information from numerous sources including mass media, family, governmental organisations, books and friends (Kickbusch and Maag, 2008). In this sense, health literacy is a critical resource for everyday living, making it an important means for promoting population health (Chinn, 2011). Enhancing health literacy should therefore be an important Public Health goal (Nutbeam, 2000).

eHealth technologies have the potential to enhance active learning, increase motivation, improve self-efficacy and provide an environment for shared decision making; thus making it an attractive strategy for enhancing health literacy (Ratzan and Parker, 2006, Zarcadoolas et al., 2006). Use of eHealth communication technologies in health care services has grown exponentially in the last three decades (Kreps and Neuhauser, 2010), although mainly within the field of medicine and less in health promotion (Neuhauser and Kreps, 2011, Timpka et al., 2008). When an eHealth system for health promotion is implemented within the health care context, it is often narrow in scope and targets behaviour change such as increased physical activity (Hoyo Barbolla, 2007), smoking cessation (Skinner et al., 2006) and chronic disease management (Homko et al., 2007); strategies which have shown to be inefficient at addressing challenges facing population health (Kreps and Neuhauser, 2010, Neuhauser and Kreps, 2011).

The same trend is reflected in the design and evaluation of eHealth mediated communication where the concepts of equity and empowerment, which are central to the health promotion concept, are rarely mentioned as variables for quality criteria (Pilemalm and Timpka, 2008). Thus there is a need to broaden the functions of eHealth communication systems beyond providing information (Neuhauser and Kreps, 2011), to eHealth communication that addresses the determinants of health and enhances health literacy in order to enable people to meet the complex demands of health in modern society (Sorensen et al., 2012). Interactive technologies have the potential to provide a supportive environment for active learning by utilising multiple modes of communication such as videos and facts, as well as providing user control whereby the user chooses which topics to explore and which paths to follow. In this
format interactive health communication applications, if properly implemented, can be an important tool for empowerment.

The 2012 annual statistical report on the Swedish population’s Internet use shows that not only has the number of Internet users increased, but also that the biggest increase has occurred amongst children of high school age down to the age of two (Findahl, 2012). This trend is an indication of the important role of the Internet and technology in people’s lives, both in recent times and in the future, when these young citizens grow up. A majority of the people depend on health care services for their health information based on the notion that the information is trustworthy and evidence based (Ratzan, 2011). However, health care services are not equipped to provide health communication to help people make decisions based on situations they face on a daily basis. Thus despite the large number of health related websites on the Internet, most of them provide medical information or lack the much needed interactive services to support health decision making (Kreps and Neuhauser, 2010). Thus the growth of eHealth technologies poses a challenge to health care services to provide effective health communication in the new media (ibid.) that is relevant to the users’ preferences and addresses the health challenges identified above.

PHC has been singled out as the most appropriate health care setting to address health inequities and increased chronic diseases through re-orienting its services into more health promoting services (Frankish et al., 2006, Wise and Nutbeam, 2007, Watson, 2008, WHO, 2008). To achieve this, Dooris (2009) recommends adopting a health promoting approach which entails integrating health promotion values and principles into all aspects of the organisation, in order to guide health promotion and disease prevention activities. PHC as a concept is guided by a set of values and principles of social justice, right to better health for all, participation and solidarity (WHO, 2008). The same values are reflected in the Swedish National Public Health goal: to create societal conditions to ensure good health on equal terms for the entire population (Socialdepartementet, 2008), 2008, and in the Swedish Health Act (HSL: 1982:763 §2) the goal of health care services is to provide good health and care on equal terms for the whole population (Socialdepartementet, 1982). It further states that care is to be provided with respect for the equal worth and human dignity and those who have the greatest need shall be given first. Furthermore, PHC is expected to provide health care for individuals and the population as a whole, a mission which often demands different approaches and can often be difficult to synthesise (Olander, 2003). The challenge is to determine how eHealth can contribute to the national public health goal of equitable health for the entire population (Socialdepartementet, 2008) contribute to better individual and population health, and can aid in re-orienting health care services to health promoting services (Hesse and Shneiderman, 2007). Studies show that if properly implemented, eHealth could be instrumental in providing services that are equity oriented and meet citizens’ needs if the citizens are involved in the process (Kreps and Neuhauser, 2010, Neuhauser and Kreps, 2011, Pilemalm and Timpka, 2008).
Involving patients and citizens in their own health (Schulz and Nakamoto, 2012b) is a widely adopted strategy in health and social care services in Sweden (Vallgårda, 2011). This trend of involving people in decision making is reflected in the new public policies such as the ‘person centred’ public health policy introduced by the right-wing government in 2008 (Socialdepartementet, 2008) and the “free choice of care act” transferring the choice of care provider from the health care system to the individual in 2009 (Govern Bill, 2009) was introduced in PHC. The policies’ intentions are noble as they proceed from people’s need for integrity and freedom of choice, giving individuals the autonomy to take control of their health and lives. However, this growing shift of responsibilities from society to the individual without the corresponding support systems disregards the socio-economic and other determinants of health that are beyond the individual’s control (Kickbusch, 2012, Hörnsten et al., 2013).

The consequence may be placing an unnecessary burden on the individual to take full responsibility for their own health (Vallgårda, 2011) and the resulting consequences of the choices made (Laverack, 2012). Vallgårda (2011) further went on to conclude that the shift of responsibility was not done to help people lead a better life but to increase expert driven governance and appeals for citizens’ autonomy, responsibility, obedience and trust in authorities. Vallgårda’s study indicated that the goals and methods of disease prevention and health promotion have undergone a significant change without a corresponding change in the governing technologies in public health in Sweden and Denmark.

Taking responsibility for health is not an easy task in today’s information society where patients and the general public receive a plethora of health information from different actors in the health and allied sectors (Schulz and Nakamoto, 2012a). Furthermore, availability of health information does not necessarily lead to adoption of a healthier lifestyle as many health practitioners tend to assume (Mol, 2008). People need a set of cognitive skills to access, understand, assess and use health information in their everyday life contexts (Nutbeam, 2008), as well as skills to navigate complex health care systems (Zarcadoolas et al., 2006). These sets of skills have been conceptualized as ‘health literacy’ and are seen as critical to enable people to take responsibility for their lives (Kickbusch and Maag, 2008). In our modern, ICT intensive society, individuals also need an additional set of skills in ‘eHealth literacy’, to be able to seek, find, understand and appraise health information from electronic sources and apply the knowledge gained to address or solve health problems (Skinner et al., 2006). Hence in addition to health literacy skills, eHealth literacy demands additional knowledge within areas such as information, media, computers and science (ibid.).

Studies indicate a mismatch between existing ICT applications, relevance to the context for its functions and people’s abilities to interact with them effectively (Baumwol et al., 2011, Kreps and Neuhauser, 2010, van Gemert-Pijnen et al., 2011). These gaps represent potential barriers to the uptake, implementation and sustainability of eHealth technologies in health care services (ibid.). Thus, there is a need to explore methods for design of eHealth resources that take into consideration the needs and abilities of potential users as well as the context of use.
By doing so, the potential benefits of eHealth applications may be realized, including enhanced active learning, increased motivation, improved self-efficacy and provision of an environment for shared decision making. These benefits present an attractive strategy for enhancing health literacy (Ratzan, 2011). The design of eHealth systems is usually in the hands of systems suppliers or professional systems designers (Kreps and Neuhauser, 2010, Wessels et al., 2008). This often results in discrepancies between functionality of the system and ease of use. However, since the 1990's, there has been an increased move towards a more user centred ICT design using varieties of Action Research (AR) approaches, the most common being Participatory Design (PD) (Baskerville, 1999, Wessels et al., 2008). The PD approach in ICT design has been accredited with succeeding at integrating social factors that are of importance to the acceptance, usability and accessibility of the system where other research methods failed (Cornford and Pollock, 2005). It is important to take into account social factors in the framing of the design and process of eHealth applications for health promotion (Neuhauser and Kreps, 2011). Design in this thesis refers to a process in which something is created - working out the form and content of something new (Fallman, 2003). Applying a holistic approach and involving potential users and providers in the design process of eHealth communication will shift the focus of the system from the technology to contexts for implementation and to the people involved in them (Gartner, 2012, Johannesson and Winge, 2011).

This thesis proposes the use of health promotion values and principles as a logic for design of health promotion communication in PHC based on the premise that it has to adopt a health promotion process in its design process (Tremblay et al., 2012).

2.1 Study Context
The context for the studies in this thesis is a county council owned PHC centre in the southeast of Sweden, its health promoting setting known as Hälsotorg and the Virtual Hälsotorg project (VHT-project). The PHC-centre houses several units; General Practitioner (GP) and District Nurse (DN) consultations services, Child Health Services (CHS), Hälsotorg, Dental and Psychiatric Clinic and Pharmacy, and provides health services to approximately 10,500 inhabitants.

Hälsotorg emerged in several Swedish county councils in the 1990’s in collaboration with the then, state-owned, pharmaceutical company Apoteket AB to increase health promotion within the PHC services. The concept of Hälsotorg arose from the realisation that health care services were inadequate to cater for the public’s health communication needs with calls for re-orientation of health and medical services to more health promoting services (Government Bill, 2002) The origin of Hälsotorg can be traced internationally to the community pharmacies movement, i.e. re-orientation of pharmacies into a health promoting service (WHO, 1996) and to Healthy City shops; a Danish Healthy Cities Network initiative for health information and guidance in health issues (Klinker and Rasmussen, 2003). Comparison could also be drawn with "Healthy Living Centre's" in the United Kingdom (Bailey, 2007).
These meeting places with community health service and health programs aimed to promote health in its broadest sense, target disadvantaged groups and tackle inequalities in health.

In Sweden, experiences from Apoteket AB ‘Health Dialogue’ project laid the foundations for the formulation of an Apoteket AB Action plan 2002 and the Hälsotorg concept. The Action Plan declared Hälsotorg as a setting for health in which partners (local pharmacies, primary health care and municipalities) could allocate resources and enable a long-term health dialogue with the population (Mahmud et al., 2010). A Hälsotorg offered universal health information and individual health counselling on lifestyle related issues (with health professionals), health measurements, group activities, and access to trustworthy Internet-based health information sites and lifestyle tests. All services were free of charge for the local citizens. Hälsotorg also provided guidance to appropriate care providers.

During 2008-2009 PHC in Sweden was undergoing structural changes with privatisation of the pharmacology services (Social departmentet, 2008) and the introduction of a new bill ‘Health and Medical Care Policy’ (Government Bill, 2009) which transferred the choice of care provider to the individuals and opened up to private care providers. Hälsotorgs in the actual county council were closed down by the time VHT-project was initiated (Mahmud et al., 2010).

The VHT-project was a product of years of collaboration between PHC and Blekinge Institute of Technology where there was an on-going research project in collaboration with Hälsotorg personnel on ways to improve health communication. Ideas on ways to increase accessibility to health promotion services for local citizens via Internet were raised. These ideas formed the foundation for the VHT-project which was initiated by the county council management and researchers in 2007. VHT was initially conceptualised as a region wide project with its base in a Hälsotorg catering for a large immigrant population. This Hälsotorg was closed in 2008 by the county council and the VHT-project moved to a PHC- centre, which became the base for the studies in this thesis. In 2008 the VHT-project became part of an EU financed research and development project entitled “Nurse Gudrun full scale lab for health and social care” (in Swedish, Syster Gudrun Fullskalelabb). SGF’s overall objective was to explore innovative ways of using ICT to increase citizens’ accessibility to, and participation in, health care services. As part of this venture, the VHT-project aimed to design an eHealth resource that would provide reliable, relevant, accessible health information and decision support to enable local citizens to lead a healthy life. The VHT-project focused on improving access to health promotion and disease prevention services in PHC.

All studies in this thesis, with the exception of study one, were carried out within the VHT-project. As in most participatory research and development projects with prolonged engagement (Nitsch et al., 2013), political and structural changes such as the closure of Hälsotorg, transferred choice of care provider to the individuals, and establishment of the national health website 1177.se with the purpose to gather all regional health websites under a
single health portal, affected the plan, process and outcome of the VHT-project, as shown in the results section in Chapter six.

3 Research Aim
The overall aim of this thesis was to study the participatory development of an interactive ICT-supported health communication channel for health promotion and to enhance health literacy in a PHC context.

To achieve this aim, four studies were conducted (Table 1); these studies explored the feasibility of applying health promotion values and principles as a logic for the design of health portals. In this way, this thesis can contribute to the knowledge of designing equitable and empowering eHealth communication systems, which can contribute to health promotion and enhanced health literacy.
Table1: Overview of the studies included in this thesis.

<table>
<thead>
<tr>
<th>Study</th>
<th>Aim</th>
<th>Study population</th>
<th>Materials and Methods</th>
<th>Data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>To explore Hälsotorg’s as a health promoting setting in Primary Health Care</td>
<td>Total 26: Pharmacy managers</td>
<td>Electronic survey Document analysis</td>
<td>Quantitative and qualitative content analysis</td>
</tr>
<tr>
<td>II</td>
<td>To gain a better understanding of health communication for health promotion in PHC with emphasis on the implications for a planned ICT-supported interactive health channel</td>
<td>Total: 36: Professionals (PHC and pharmacy) and local citizens</td>
<td>Case study Field study Document study Focus groups</td>
<td>Qualitative content analysis</td>
</tr>
<tr>
<td>III</td>
<td>To collaboratively design and evaluate a web-based health channel for the purpose of health promotion and to enhance health literacy in PHC context</td>
<td>Total 89: PHC professionals (district nurses) and local citizens</td>
<td>Focus groups Log statistics Diaries Field notes Questionnaires Think aloud protocols Prototyping Workshops Brainstorming Literature review</td>
<td>Qualitative and quantitative analysis</td>
</tr>
<tr>
<td>IV</td>
<td>To explore participant’s experiences of collaboration in the development of an interactive ICT-supported health communication channel for health promotion</td>
<td>Total 11: Professionals (district nurses, IT, researchers) and local citizens.</td>
<td>Project documents (field notes, meeting minutes, monthly reports and evaluation reports) Individual interviews</td>
<td>Qualitative content analysis</td>
</tr>
</tbody>
</table>
“If I had asked people what they wanted, they would have said faster horses.” Henry Ford
Or would they?

4 Conceptual framework
This thesis takes its departure from a real life problem of the need to develop eHealth communication for promoting health and to support citizens’ in making informed health decisions in a PHC context. The goal is to create knowledge that sheds light on how to design this communication from a user’s perspective.

The studies in this thesis take their departure from a pragmatic approach and scientific understanding (Dewey, 1925). According to Dewey, knowledge is derived from experience and as such a scientific enquiry begins with a problem into “indeterminate situation” which is transformed by first understanding the problem, describing its elements and identifying their relations through practical problem-solving techniques, so that by the end of the enquiry, one would have a better grasp (Dewey, 1925). In line with this view, inquiry should not be understood as consisting of a mind passively observing the world and drawing from these ideas but rather as a process which is initiated by a problem or obstacle that hinders successful human action (Scheffler, 1974). Hence, pragmatism as a philosophy of science is open to exploration of multi-realities, theoretical approaches and use of multi-methods to enable exploration of people’s needs for health communication from different perspectives, including how it can be designed to support health decision making and health care services (Creswell, 2013).

Flexibility of enquiry is important especially for this thesis which delves into new research area such as Applied Health Technology (AHT) and has the intention to find out what kind of technology based communication would be appropriate to support people living a healthy life, and how it should be designed. It is not an easy task; the people might not have thought about technology as an appropriate solution for health related decision support even if they use such tools every day. Participatory Action Research (PAR) (Whyte, 1991), which is the study approach adopted in this thesis, is based on pragmatism’s theoretical assumption that humans are active beings, capable of active participation in activities that are of benefit to them (Scheffler, 1974). PAR researchers assume that knowledge is evolving, value laden and contextual, hence dovetails the underpinning of pragmatism (McNiff and Whitehead, 2011). PAR accords flexible methodology for reflection and learning. The purpose of this chapter is to make explicit the philosophical position of this thesis and to map out the concepts used in this thesis and how they are related.

4.1 Health Communication
Communication is a process of exchanging information between a sender and a receiver and involves a message. Health communication is a key strategy to inform the public about health concerns and to maintain important health issues on the public agenda (WHO, 1998). Health
promotion relies on health communication and health education as well as systems and policies that advance the public’s health status (Zarcadoolas et al., 2006). According to the WHO (ibid.), health communication encompasses different dimensions of communication: function (to inform, maintain, disseminate, and increase): medium (mass and multi-media) and desired outcomes. This increases awareness of specific aspects of individual and collective health as well as the importance of health in development. Health communication for health promotion however, is conceptualised as strategies to inform and influence individual and community decisions to improve people’s health (Nutbeam, 2000).

Conceptualisation of health communication depends on how health is defined and the goal of the outcome. First I discuss the latter and come back to the definition of health and how that affects the definition of health communication in the next section (4.2).

A definition of health communication in relation to goals can be divided into those that seek to motivate individuals and public audiences change behaviour and advocate a position on a health issue or policy; increase demand or support for health services (Freimuth and Quinn, 2004) and create a process to increase knowledge and understanding of health related issues, and empower people (Muturi, 2005). Baker et al (1998), point out that the role of health communication is to create a receptive and favourable environment in which information can be shared, understood, absorbed, and discussed by the intended audience. Freimuth and Queen (2004) argue that health communication without substantiated supportive environments is ineffective to sustain behaviour change, communicate complex messages or compensate for lack of access to health care. Hence, for health communication to be effective, it needs to adopt a holistic approach and aim to create a supportive environment for health (ibid.).

The creation of a supportive environment presupposes local knowledge of the context of participation. According to Freire, people are not “passive” recipients, but capable, thinking persons who have the ability to interact and make their own decision (Heidemann and Almeida, 2011). The studies in this thesis adopted a participatory approach to health communication inspired by Freire’s dialogical pedagogy (Freire, 1972). In this approach the strategies in the project are based on dialogue and community participation. The communication adopts a participatory approach whose main aim is empowerment through dialogue and mutual learning; the process is as important as the outcome (Tufty and Hemer, 2005). Participatory communication could facilitate collaborative learning of both the system owner and end user of the health communication (Mantoura and Potvin, 2012). Collaborative learning enables providers to construct health communication materials and contents that are relevant and accessible to their receivers as they learn about receiver’s needs and preferences. Through dialogue with health personnel, receivers may gain more knowledge on health and health management as well as the relationship between health and lifestyle. Raising health literacy of both parties is important for sustainable health care services (Zarcadoolas et al., 2006) and sustainable population health (Kickbusch and Maag, 2008). In VHT-project, the importance of dialogue as an important for design tool design and evaluation of Virtual
4.1.1 eHealth

e-Health is an emerging field in the intersection between medical informatics, public health and business. eHealth refers to health services and information delivered or enhanced through the Internet and related technologies (Eysenbach, 2001). As a growing branch of health communication, eHealth that is gaining more importance with the advancement of information technologies in modern society (Findahl, 2012). The focus of this thesis is eHealth applications used in the interaction between health care personnel and patients and citizens/communities. eHealth as a term is used to describe any health care practice supported by ICT such as electronic processes and communication, including health information technology and electronic health information exchanges (Kummervold et al., 2008). There is a wide range of ICT tools and services integrated into the health care systems such as electronic patient records, national electronic registers, decision support systems, prescriptions among others, which are beyond the focus of this thesis.

eHealth communication refers to health communication that is channelled through some kind of electronic media such as Internet and related media; and is used to disseminate or provide access to health and lifestyle information or services (Pagliari et al., 2005). The European Union (EU) commission (Commission, 2012) defines eHealth in broader terms to include; health products and processes combined with organizational change in health and social care systems. According to the EU, eHealth encompasses both medical and social dimensions of health with an objective to improve citizens’ health and increase health care efficiency and productivity. This definition continues to point out the importance of new skills, in order to improve citizens’ health, efficiency and productivity in health care delivery, and the economic and social value of health. eHealth covers the interaction between patients and health-service providers, institution-to-institution transmission of data, or peer-to-peer communication between patients and/or health and social care professionals.

eHealth communication technologies have the potential to provide access to timely, tailored health information to patients and other health consumers (Rimal and Lapinski, 2009, Suggs, 2006), It can also create innovative opportunities for web based health communication, universal access to health information and health decision support, electronic records, online social support networks and anonymity (Ahern, 2007, Pagliari et al., 2005, Street et al., 1997). These attributes make eHealth an attractive strategy for promoting health and enhancing health literacy (Ratzan and Parker, 2006).

Availing eHealth resources will not necessarily lead to adoption of healthy lifestyles, the recipients need skills and capacity to engage with the eHealth resources (Ratzan, 2010). Consequently, providers/owners of the eHealth resources need health literacy skills to design health communication resources that enhance health literacy and decision support (ibid.). Studies indicate a mismatch between available eHealth resources and the context for its
functions (van Gemert-Pijnen et al., 2011) as well as a gap between eHealth resources and consumer’s skills to engage with it (Ratzan, 2011, Zarcadoolas et al., 2006). Both are potential barriers for the uptake, implementation and sustainability of eHealth technologies in health care services. To overcome potential barriers to eHealth use and implementation, a shift of focus from the technology to contexts for implementation (Flicker et al., 2008, Skinner et al., 2006), and adoption of multi-disciplinary and holistic approaches to the design of eHealth systems was suggested (van Gemert-Pijnen et al., 2011).

Elaborating on the virtues of eHealth applications in health care, Eysenbach (Eysenbach, 2001) maintains that the ‘e’ stands for a number of values that are important in conceptualizing eHealth beyond the ‘electronic’ medium; Eysenbach’s values for ‘e’ are as follows:

- Efficiency - ability to enhance and increase efficiency and thereby reduce cost;
- Enhancing – the quality of care;
- Evidenced based;
- Empowerment - patients and consumers owning their medical records, access to information for decision making;
- Encouragement - support tool for interaction between health care personnel and patients;
- Education - health education, tailored interventions and medical education for health personnel through Internet;
- Extending - health care beyond the health care setting as in online health services;
- Ethics - as a new form of communication between health personnel and citizens raises privacy issues;
- Equity - equal accessibility of eHealth services to all citizens.

Eysenbach’s elaboration exhibits important values that need to be considered and integrated into the eHealth systems but it also shows the dominating domain of medicine and health care that has become characteristic feature of eHealth (Kontos et al., 2010). Thus, there is the need to adopt a holistic approach that goes beyond the health care domain to where people actually live, (Kreps and Neuhauser, 2010) love and play, as suggested by the Ottawa Charter (Choi and Pak, 2007, Kreps and Neuhauser, 2010, WHO, 1986). The attributes of eHealth listed by Eysenbach are of importance when conceptualizing the design of a health promoting health channel such as Virtual Hälsotorg. The issue of empowerment, education and equity are probably more pressing in the light of health promotion discourse, as there is a concern that ICT is aggravating health inequities by excluding some segments of society (Wong et al., 2009). Exclusion of people from the electronic media (digital divide), entails more than exclusion due to lack of access to the technology but also the inability to access available information due to lack of capacity which can be lack of education or technical capacity to interact with the electronic media (Efrat and Esther, 2013, Lorence and Heeyoung, 2008, Wong et al., 2009, Zarcadoolas et al., 2005).

The dichotomy along accessibility – good health care versus inaccessibility – poor health care divide along socioeconomic, geographic, gender, age and ethno-racial lines in health
communication technology is similar to that reflected in the gradient of health inequity. It is thus a reflection on the general socio-political context (Wong et al., 2009). Other aspects that can contribute to the digital divide are ownership and management of the infrastructure, technology and content (Paul, 2013). There is a concern that there is too much uncontrolled information on the Internet that is causing ‘cognitive overload’ and insecurity among the public but at the same time, health care services have not taken advantage of this development (Petersen et al., 2013).

The design of eHealth systems is usually in the hands of systems suppliers or professional systems designers (Kreps and Neuhauser, 2010, Wessels et al., 2008). This often results in discrepancy between functionality of the system and ease of use. However, since the 1990’s, there has been an increased move towards a more “user centred” ICT design using varieties of Action Research (AR) approaches, the most common being Participatory Design (PD) (Baskerville, 1999, Wessels et al., 2008). The PD approach in ICT design has been accredited for succeeding in integrating social factors that are of importance to the acceptance, usability and accessibility of the system where other research methods failed (Cornford and Pollock, 2005). It is important to take into account social factors in the framing of the design and process of eHealth applications for health promotion (Neuhauser and Kreps, 2011).

In summary, health communication and its fast growing branch of eHealth communication are becoming important tools, strategies and a medium in promoting health at both the individual and population levels. In order to fully take advantage of the opportunities presented by health communication tools and strategies, there is a need for a move from traditional health communication strategies (health communication synonymous with information/instruction) to innovative and holistic approaches that take into consideration the social context that people live in (Neuhauser and Kreps, 2011).

4.2 Health

The way health is conceptualised has major implications for how health communication and health promotion programs are planned, implemented and evaluated. The two most common perspectives used to define health are the atomistic-bio-medical and the holistic-humanistic perspective (Nordenfelt, 1986). In the atomistic-bio-medical perspective, man is essentially viewed as a complicated biological organism with a number of interacting parts. The central concepts used in this perspective are biological, chemical and statistical (ibid.). This perspective is also known as the pathogenic paradigm and health is defined in relation to disease or risk of disease and is therefore, deficit oriented (Eriksson and Lindström, 2008). The pathogenic approach is the dominating approach in health care services, especially in the West. Hence, health promotion and health communication efforts following this paradigm are geared towards preventing diseases and identifying risks for diseases (Whitehead, 2008).

In the holistic-humanistic perspective, man is regarded as a social agent, a complete human being acting in society (Nordenfelt, 1986). In this regard, the person is central and so are the concepts of action and goal, according to Nordenfelt (ibid.). This perspective is also known as
the salutogenic paradigm (Eriksson and Lindström, 2008) where health is defined in holistic and absolute terms as in the case of WHO’s 1948 definition (WHO, 1998); health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Salutogenic paradigm, is asset oriented and adopts methods and strategies that strengthen participants own resources to enable them to address their own health issues (Eriksson and Lindström, 2008). This definition is more in line with the health promotion concept advocated in the Ottawa Charter for health promotion (WHO, 1986) which inspired the health promotion approach adopted in this thesis.

4.3 Health promotion

The origins of the modern concept of health promotion is accredited, by many health promotion researchers, to Marc Lalonde the Canadian health minister who published a paper in 1974 entitled “A new perspective on the health of the Canadians - a working paper” (Laverack, 2004). This was the first national government policy document to identify health promotion as a key strategy to achieve population health (ibid.). Lalonde introduced the concept of health promotion, where health was defined in broad terms, and pointed out other fields besides health as central to enhancing public health. These areas were; human biology, environment, lifestyle and health care organisation which later formed the “health field concept” (Laverack, 2004). Prior to Lalonde’s report, the concept of health promotion was only used by a few, a new generation of public health practitioner, who were displeased with the traditional top-down, individual focused approach that was practiced in the public health sector in the 70’s (Catford, 2004). Lalonde’s report was followed by a number of strategic decisions by the WHO, which played an instrumental part towards steering health from a narrow perspective to a more socio-environmental and policy oriented. The most notable steps taken towards conceptualisation of health in its broad, determinants orientation are the Lalonde health field concept in the Alma Ata declaration and Health For All 2000 (Kickbusch, 2003).

The Alma Alta declaration of 1978 (WHO, 1998), came about as a result of the gross inequalities especially in developing countries, which were struggling to cope with a high burden of diseases. The Alma Ata identified PHC as an instrumental to achieving universal health and pointed out to the need of involving communities in the decision making in matters concerning their health. In essence it encouraged empowerment of communities (Laverack, 2004). Health for All 2000, declared that the goal of health policy is to provide people with opportunity to lead a socially and economically productive life. The document extended the governments’ responsibilities to ensure health of its citizens and not just health care services (Kickbusch, 2003).

The Ottawa Charter is regarded as the document that has had most influence in the development of the health promotion movement (Kickbusch, 2003). It was launched in 1984, during the first health promotion conference in Ottawa, Canada. The Charter is said to have clarified the concept of health promotion (Catford, 2004) and defined health promotion as the process of enabling people to increase control over, and to improve, their health (WHO,
hence health is regarded in positive terms and is considered as a resource for everyday living. The Charter made explicit a need to change people’s living conditions in order to promote health and pointed out pre-requisite for health, shelter, income and food, and the role of health promoter is to;

i) enable creating supportive environment and providing skills and information to make health choices;

ii) advocate: ensure creation of conditions favourable for health;

iii) mediation between different groups of people to ensure the pursuit of health.

(Green and Tones, 2010, page18)

The Ottawa Charter further identified five main action areas: building healthy public policy, creation of supportive environment, strengthening of community actions, developing of personal skills and reorienting health services. Taking its departure from Alma Ata, the health field concept and Health for All 2000, the Ottawa Charter emphasizes the inextricable links between physical, environment and economic factors, and individual lifestyles and health. These links are essential to holistic understanding of health. A holistic approach in health promotion recognises that creation of health goes beyond the realm of health care services, focuses on structural factors and the need for intersectoral collaboration, creation of healthy public policy focused on everyday living (Nutbeam, 2000).

To address the underlying values for health promotion, Rootman (2001) pointed out to principles focused on participation, empowerment, holistic and intersectoral approach, equity, sustainability and multi-strategy to guide health promotion policies and activities. Values and principles that advocate a strong bottom-up approach (Tones and Green, 2004). These values and principles, with the exception of multi-strategy, were integrated in the way the VHT project was carried out. The design process of Virtual Hälsotorg was carried out collaboratively of a workgroup consisting of laymen, professionals from health and other sectors besides the health care. All participants in the workgroup regardless of age, sex, socio-economic background were accorded same opportunities to contribute to the content and design of the interactive channel. Using health promotion principles as foundation for the design process of ICT mediated health promotion infrastructures, take into consideration the socio-technical factors of workplaces but also engage different stakeholders in a dialogue resulting in a better system based on shared values, and sense of ownership based on mutual interest for all parties (Lintonen et al., 2008, Neuhauser and Kreps, 2011, Ratzan, 2011). A challenge facing designers in adopting health promotion values and principles is that these values are not integrated in PHC contexts (Frankish et al., 2006, Waterston, 2008).

Health promotion research is also steered by what Laverack terms as ‘individualisation’ of health (Laverack, 2012), where individuals are given sole responsibility for their health disregarding structural determinants of health (Kickbusch, 2012). This runs the risk of blaming the victim (Tones and Green, 2004). This development, which is trending in Europe, with the new wave of right-wing politics spreading in Europe is regarded as an antithesis of the approach advocated in the Ottawa Charter i.e. addressing the determinants of health.
(Kickbusch, 2012). The right-wing politics advocate for the autonomy and self-determination of individuals to make health decisions, choose lifestyle and health care services without balancing all those tasks with supportive infrastructures (Kickbusch, 2012, Laverack, 2013, Vallgårda, 2011). Individual responsibility for health is not a new phenomenon in most industrialised countries including Sweden, the ability to think and act freely is important for individuals, hence the logical approach to promoting healthy lifestyle or behavior change is to promote individual responsibility (Minkler, 1999). Similarly, historically the ideology of individual responsibility has been the driving force behind health promotion within the United States and has influenced the professional practice of nurses (Morgan & Marsh, 1998; Rush, 1997).

4.3.1 Participation and Sustainability

Participation has become the ‘buzz’ word for participatory projects especially when working with communities. Participation often connotes the ‘inclusion’ of persons affected by or profiting from the program or intervention. It is not often clear what is meant by or how this ‘inclusion’ is realised. Participation can be conceptualised as a means of cooperation or collaboration between parties to achieve a given goal or as an end in itself (Marent et al., 2012). The latter better fits into the health promotion paradigm where participation is regarded as a democratic right and duty that is closely linked to equity in health (WHO, 1998, Waterston, 2008). Participation as a goal pre-supposes power transfer from those in power to the disempowered, which often demands skills acquisition and co-ownership. In research projects this translates to addressing power relations between participants and the researchers and maximising genuine participation on equal terms (van der Riet and Boettiger, 2009). This is usually not an easy task as participants in a project can be a heterogeneous group with different and conflicting objectives, perceptions and attitudes (Avison et al., 1999). However, the benefits far outweigh the inconvenience (Bradbury, 2008), particularly in the development of eHealth systems as participation is likely to result in the following benefits: People are more likely to use and respond positively to health services if they have been involved in decisions about how these services are delivered, thus helping to make the services sustainable.

Sustainable development within health promotion refers to the use of resources, orientation of technological development, and institutional development in ways that would not compromise the health and well-being of future generations (Nutbeam, 1998) or cause friction within or between organizations. Sustainability also refers to developing capacities to sustain programs after the project phase (Whitelaw et al., 2011). In the case of the VHT-project, involving key actors of health promotion agents, i.e. PHC and municipal workers, local community members, researchers and an interaction designer in the design process, increases the likelihood of developing a health channel that is relevant to the organization and the local people who are the end users. It also contributes to the sense of ownership among the local people, and thereby increasing accessibility and usability (Baskerville and Wood-Harper, 1996, Baum et al., 2006).
People have individual and collective resources (time, money, materials and energy) to contribute to activities for health improvements in the community. People are more likely to change risky health behaviour when they have been involved in deciding how that change might take place (Michie et al., 2008). They gain information, skills and experience through involvement that helps them take control over their own lives and challenge social systems that have sustained their deprivation (Baskerville and Wood-Harper, 1996, Bradbury-Huang, 2012). Participation creates critical awareness among participants, concerning their problems, which is an important aspect of capacity building. The process is central to the creation of knowledge on issues facing them (Springett, 2001). In this regard, participation can be a key facilitator of critical health literacy (Chinn, 2011). Throughout the process the ground was laid for genuine participation and responsibility sharing. Both ICT and health care systems are highly technical and can be intimidating for people to get involved in hence participation was conceptualised as a learning process as well as a design process.

Many of the participation models used in health promotion are based on Arnstein’s ladder of participation (Arnstein, 1969). This emphasizes the notion of genuine participation, which can only be achieved if the ‘experts’ give power to the ‘powerless’ (Nitsch et al., 2013). Nitsch et al, pinpoint that ‘ladder models’ adopt a normative and reductionist character of participation which is not practical in health contexts as it neglects opportunities created during the research process (ibid.). Furthermore, these models presuppose participation of two groups: -- experts’ and -- ‘laymen’ (Nitsch et al., 2013) and they can be difficult to apply to a project like the VHT-project where participants possess different ‘expertise’, in the case of the VHT-project, it spanned from health, politics, management, research and ICT. This entails that, depending on the task at hand, participants may be considered as experts or lay. According to Laverack (2004), power is relational and context dependent. Hence, a different kind of participation can still be regarded as authentic as long as it serves the intended purpose (Green and Tones, 2010). Participation in the VHT-project was conceptualised as a continuum (ibid.) with a focus on the quality and purpose of participation (Patton, 2002).

The PAR approach applied in this thesis, allowed participants in a design process to form a partnership that enabled them to negotiate and engage in activities that benefited them as equal partners (Arnstein, 1969, Whyte, 1991). In the VHT-project power sharing was integrated into the participation process. All participants in the workgroup were regarded as co-researchers, unless they chose not to participate. According to Laverack (2004), the choice to not participate can also be regarded as participation due to the “active” choice made by the participant. However, it is important for the researcher to be aware of that PAR brings unequal participants to an uneven table and as such, they should find out participants’ reasons for not participating (ibid.).

In the beginning of the VHT-project, it was understood that all participants would have access to the project management meetings, where decisions on financing and practical arrangements concerning the VHT-project were made. At the same time it was decided that a wider group would be consulted in order to capture multiple perspectives to increase relevance and
usability of the Virtual Hälsotorg channel to a wider audience. Thus, it became necessary to enable different levels of participation. These reference groups were merely consulted (Minkler and Wallerstein, 2010).

4.3.2 Empowerment

Empowerment in health promotion refers to the process through which people gain greater control over decisions and actions affecting their health. Empowerment may be a social, cultural or political process through which people are able to express their needs and devise solutions to meet the expressed needs (Nutbeam, 1998). An empowerment process in health promotion is strengthened by participation, which can lead to increased probability for action when meaningful goals with the health promotion interventions are stated by the participants (Sparks, 2010). The use of the term empower is contradictory in the literature as nobody can empower another (Labonte, 1994, Mol, 2008, Tengland, 2007). Power, by its very nature is gained or lost, not given. Labonte (1994) and Laverick (2004) cast a warning on power which is given which they mean is a subtle form of control of the giver over the receiver.

Labonte (2004) suggests that continually stating the need to empower this or that group, creates and reinforces a world of professional practice in which non-professional groups are incapable of their own powerful actions. No researcher can empower another individual; the empowering process must come from within the disempowered group or individual. Researchers can, however, contribute to the creation of an environment wherein empowerment may occur. Same caution has been expressed by Vallgårda (2011), points out that the professed changes in the governing technologies of health that stresses autonomous and responsible citizens, is nothing but a way of strengthening the expert-driven governing of citizens. In essence, no power has been relinquished to the citizens, according to Vallgårda. However, power dynamics in research interaction are inevitable, especially in complex organisations such as health care (Ben-Ari and Enosh, 2013, Laverack and Keshavarz Mohammadi, 2011). The most important thing is to be aware of and address the existing power structure within its context so that they do not undermine the empowerment process in the project (Whyte et al., 1991).

Participation and empowerment were the locus of the VHT-project. As in any health promotion intervention/action, participation of and empowerment of problem owners, is the ultimate goal (Nutbeam, 2000). Empowerment in health promotion is “a process through which people gain greater control over decisions and actions affecting their health, a process through which individuals and social groups are able to express their needs, present their concerns, devise strategies for involvement in decision-making, and achieve political, social and cultural action to meet those needs” (Nutbeam, 1998:16). A great deal of work was put into creating a supportive environment for participation, such as rules of collaboration and all participants were regarded as experts in their respective area, including laymen. In this way, the collaborative process in the development of Virtual Hälsotorg, created a learning environment whereby end-users and system-owners obtained insight in the design process and, thereby, capacity to maintain and adapt it to the needs that might arise in the future.
(Wessels et al., 2008). Participation fosters capacity building and empowerment, which are core principals of health promotion interventions (Bifulco, 2013, Hirschheim, 1983, Pilemalm and Timpka, 2008).

PAR and Freire’s ‘Conscientization’ which refers to consciousness raising, is fundamental to empowerment. Conscientization implies learning to perceive social, political, and economic contradictions, and to take action against the oppressive elements of reality. In a later definition, Freire (1972) describes conscientization as occurring when people achieve a deepening awareness both of the socio-cultural reality that shapes their lives, and of their capacity to transform that reality (Freire, 1972) This definition is more compatible to the approach adopted in this thesis, as it seeks to “conscientize” participants involved in the VHT-project on the need for health promoting communication. Through conscientization, participants can move from the status of objects to subjects, from being known and acted upon to knowing and acting beings (Deans, 1999) even in ICT- development, which can be intimidating.

4.3.3 Holistic and Intersectoral
Health promotion involves the population as a whole in the context of their everyday life, rather than focusing on people at risk from specific diseases (WHO, 1986). Thus a holistic approach in health promotion refers to fostering of the different dimensions of health; physical, mental, social and spiritual. A holistic approach calls for collaboration between different sectors or settings that people move between such as schools, homes or other public institutions. An intersectoral approach refers to the collaboration of these settings to promote the health of the people (Rootman, 2001). In Sweden, the municipality and county council share the responsibility for citizen’s public health provision. The responsibility is generally understood along the divide of, health promotion-disease prevention respectively. However, within health promotion, this division is not feasible as the two approaches complement each other (Tengland, 2010). This often causes discrepancy and conflicts about who is responsible for what while the people concerned are not bound by these “invisible” boundaries. Hence, collaboration and placing the people in the centre of the programs is the key to achieving both organizations’ goals (van Gemert-Pijnen et al., 2011). Health promotion demands a combination of health promotion and disease prevention strategies to advance public health (Poland et al., 2000). Following the holistic approach adopted in the studies in this thesis, it was necessary to bring together the county council, municipality and the local citizens as each had an important role to play in advancing public health (Axelsson and Axelsson, 2006). According to Axelsson and Axelsson (2006) inter-organizational collaboration can be fragile and volatile. It therefore necessary to create supportive conditions to facilitate collaboration across the municipal - county council jurisdiction in pursuit of better health for the population who are also represented in the design process by the local citizens.

4.3.4 Equity
Equity means fairness, and is not the same as equality. Inequity in health refers to unfair and avoidable differences in health status, not accounted for by genetics (Minkler and Wallerstein, 2000).
“Equity in health therefore refers to people’s needs guide the distribution of opportunities for well-being” (Nutbeam, 1998:354). According to Whitehead (1992) equity has a moral and ethical dimension and is concerned with creating equal opportunities for health. In order to describe a situation as inequitable, the cause has to be examined and judged to be unfair in the context of what is going on in the rest of society. This implies that all people have equal opportunity to develop and maintain their health, through fair and just access to resources for health (Nutbeam, 1998).

There is overwhelming evidence in the literature on the consequences of inequity on the health of individuals and the country (Dahlgren and Whitehead, 2010, Choi and DiNitto, 2013, Marmot et al., 2008, Whitehead et al., 1997, WHO, 2008). Health literacy studies show that people with high health literacy have better health as a result of better lifestyle (von Wagner et al., 2008), attend voluntary health programs (Harris et al., 2010) and consume more health care than the people with low health literacy, who often needed it the most (Green et al., 2007). Creating opportunities to health enhancing goods and services is not enough; health promotion initiatives have to take into consideration social and other structural factors that shape lifestyles in order to address the concerns of disadvantaged groups in society (Baum, 2007). Citing England as an example, Green et al. (2007) argue that new “choice” reforms introduced in health care policies has replaced the original concept of equity which health promotion advocates for. Studies show that affluent people in society are better at utilizing offered opportunities such as health care services, than the poor (Baum, 2008a, Marmot et al., 2008, Mogford et al., 2011). Given this development in society, health promotion practitioners have a reason to be concerned. There is a need to address social and structural factors, an approach that is losing ground in practice and may lead to exclusion of the people who need health interventions the most, (Rohde et al., 2008). This includes developing of eHealth communication for the general public.

Many of the existing health promotion programs in PHC are planned through the biomedical framework where the outcome focuses on individual behaviour change and epidemiological indicators and not on values and equity (Springett et al., 2010). Such behaviour-based strategies are normally attractive as the outcomes are measurable compared to value-based intervention such as empowerment projects where dividends are not immediately seen (Dooris, 2009). In the eHealth field, equity concern is conceptualized as the “digital divide” (Choi and DiNitto, 2013). Advancement of Internet and related technologies in all aspects of human life including education (eLearning), health (eHealth), economy (Internet banking) and government (eGovernment), has created a new exclusion which is built into the existing socio-economic gradient (Wong et al., 2009). The digital divide is not limited to access to these technologies such as lack of computer/mobile phones and Internet but also quality of the access and capacity to use it. This has resulted in a call for policies to bridge this gap (ibid.). Adopting a participatory approach and including the potential users and providers in the research process is a way of addressing equity with regards to ownership (Baskerville, 1999, Pilemalm and Timpka, 2008) and to ensure that the health resource corresponds to needs and is adapted health literacy levels (Ratzan, 2011).
4.4 Health Promotion Settings

A health promotion setting is defined in the WHO glossary as "the place for social context in which people engage in daily activities in which environmental, organizational and personal factors interact to affect health and wellbeing" Smith et al., (2006:19). A settings approach provides an ecological perspective where local context networking and alliance building is important (Poland et al., 2000). This approach is built upon the principles of health promotion, empowerment, participation, holistic, intersectional, equity, sustainability and multi-strategy (Mittelmark, 2008).

The concept of settings is fundamental to the theory of health promotion as it defines boundaries for understanding context for health promotion intervention and views the physical, organisational and social contexts in which the people are found as part of the enquiry and intervention (Poland et al., 2009) According to Dooris (2009), the settings approach is characterized by three interconnected dimensions. First, an ecological model of health promotion which stresses a holistic approach to health promotion intervention addressing determinants of health, and providing information and life skills to make appropriate health decisions. Such an approach includes promoting health and preventing diseases (Mittelmark, 2008) This approach is a critique to a reductionist focus on single issue such as risk factors, as in the case of many health communication strategies in PHC (Mahmud et al., 2013, Waterston, 2008). Second, the approach adopts a system perspective which acknowledges that settings are unpredictable complex and open systems that interact with other settings (Dooris, 2009). The capacity of the health care sector to improve population health and health equity is strongly influenced by other sectors. It is therefore important to involve actors from both within and outside the health sector. Third, a settings approach adopts a whole systems thinking and development (Dooris, 2009). This approach involves organisations and communities in introducing, managing and sustaining change within the setting in its entirety. Norms, values and interrelationships are carefully considered to ensure the intervention is relevant to the people and organization in the context.

4.5 Health literacy

Adopting a settings approach in the design process of Virtual Hälsotorg, entails involving a multi-disciplinary team (van Gemert-Pijnen et al., 2011), and shifts the focus from the technology to the context and its people (Flicker et al., 2008, Skinner et al., 2006). These strategies overcome potential barriers to eHealth use and implementation.

Health literacy contains two words 'health' and 'literacy', which are considered essential components of pursuing health (Kickbusch et al., 2013), and are an important area for health promotion. Health literacy is a relatively new concept, and as such there is no consensus on the definition of health literacy (Sorensen et al., 2012). Some of the most cited definitions in health promotion contexts are WHO’s, “the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand, and use information in ways which promote and maintain good health” (WHO, 1998) and Ratzan and Parker’s (2006) “the capacity to obtain, interpret and understand basic health information and services
and the competence to use such information and services to enhance health” (Ratzan & Parker, 2000, p. vi). Rootman (2004), stresses the importance of a differentiating between literacy and health, which refers to the relationship between general literacy and other types of literacy, including health literacy, and health outcomes with health literacy. In other words, literacy and health have to do with the ways in which literacy affects health, both directly by determining people’s ability to understand information critical to health and safety (such as directions for the use of medications), and indirectly, by affecting factors that determine our health such as the ability to obtain and hold a job, to have an adequate income, and to engage in health enhancing practices.

A recent European health literacy study (Magoulas et al., 2012) was an eye opener for many health researchers as it confirmed what several researchers have pointed out. The study revealed prevalence of poor health literacy and differences in health literacy at population levels between and within countries in Europe. The study also confirmed that health literacy is not the same as literacy, as people with high education levels fared poorly in the health literacy questionnaire. The study also pointed out that health literacy is low among the elderly and the sick, thus, showing the importance of equity in conceptualizing strategies to meet the population’s health literacy challenges.

A health literate person possesses the ability to make sound health decisions in the context of everyday life at home, in the community, at the work place in the health care system, the market place and the political arena. It is therefore an empowerment strategy to increase people’s control over their health, their ability to seek out information and to take responsibility for their own health (Kickbusch and Ratzan, 2001). Health literacy is contextual (Sørensen and Brand, 2013), language bound and therefore needs to be developed locally in the context of practice. Enhancing health literacy in PHC must therefore engage the different stakeholders to ensure that the health communication is adapted to the people’s culture and values (Muturi, 2005) for them to use it. To achieve this, the people involved must be local people who possess local knowledge (Bradbury-Huang, 2012).

Nutbeam (2000) identified three levels of health literacy: basic or functional health literacy, communicative or interactive health literacy and critical health literacy. According to Nutbeam (ibid.), the three health literacy levels represent the different hierarchies of health literacy where basic or functional health literacy is lowest and critical health literacy is the highest desirable set of skills. The studies in this thesis, explore communicative and critical health literacy in conjunction with the learning process, as these are the higher levels of literacies that have been pointed out as the most important types of health literacies needed to be able to interact with eHealth systems (Norman and Skinner, 2006b) The two literacies are therefore important goals for Virtual Hälsotorg. Health literacy can be a goal and an outcome of health promotion intervention (Kickbusch and Ratzan, 2001, Nutbeam, 2000).
4.5.1 eHealth literacy

eHealth literacy is a relatively new concept that emerged in the 90’s and first appeared in scientific journals in the year 2000 (Oh et al., 2005, Pagliari et al., 2005). There is no consensus on the definition of eHealth literacy, but the most quoted definition is that of Norman and Skinner (2006): “the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to address or solve a health problem” (page 4). eHealth literacy is, therefore, an important skill in our modern society. Norman and Skinner’s (ibid.), definition narrowly defines the functions of health literacy as that of solving and addressing health problems, and as such is reminiscent of the pathogenic health paradigm. In their definition, the authors also disregard other settings, and the health provider’s need for health literacy. In the studies in this thesis, eHealth is defined as ‘the use of emerging ICT, especially Internet, to improve or enable health and health care’ (Eng, 2001). Eng’s (ibid.) definition is therefore more compatible with the health promotion concept, as the action is focused on enabling both health care givers and receivers.

As the use of the Internet and related technologies increases in all aspects of people’s lives, so do the services, applications and the complexity of the language used (Norman and Skinner, 2006b). Integrating health promotion values and principles in the design process of Virtual Hälsotorg could increase the possibility for the channel to achieve its goal of enhancing health literacy but since the medium is an important mediating factor, other skills and literacies need be considered (Norman and Skinner, 2006b). According to Norman and Skinner (2006), people need six different types of literacies to fully interact with interactive behaviour change tools, health information websites and telephone-assisted services in everyday life context. Traditional literacy encompasses basic literacy skills including reading and fluency of language. Media literacy involves skills to critically analyse and interpret content and context from different media resources.

Information literacy entails the ability to search, find, evaluate and make sense of the information, as well as to be able to convey the achieved knowledge. Computer skills are needed to use the computer and solve problems. These are considered as basic skills. Scientific literacy is an advanced set of skills that demands exposure to scientific thought and systematic knowledge creation and politics. It entails skills to understand aims, applications and limitations of eHealth resources. These skills present a challenge to users in general but more so, for those with low education levels who risk exclusion from Internet and related technologies which are the most common source of information in modern society (Eysenbach, 2007). From a health promotion perspective, health care and other sectors have a responsibility to produce accessible eHealth services that match the people’s capacities to use them (Viswanath and Kreuter, 2007). To do this, there is a need to determine what kind of health information is needed and match with the resources and contextualise to suit the potential users. The prerequisites for an accessible and usable eHealth system need to be clarified prior to implementation (Norman and Skinner, 2006b). It is not enough to estimate people’s literacy based on the level of education, as studies show that even young, computer literate college students perform poorly in eHealth literacy tests (Stellefson et al., 2011).
5 Methodology

5.1 Participatory Research Approach

Participatory research approach is a collective name for research involving communities, one of which is Participatory Action Research (PAR) (Whyte, 1991). PAR was used as an approach and a method in the studies on this thesis. Participatory research approach refers to an enquiry where the people who are the subject of the enquiry are involved in the enquiry process (Reason and Bradbury 2001). Participation in participatory research entails that participants are co-creators in the knowledge development phase and interpretation of results (ibid.). In health communication research, the participatory research approach facilitates collaborative learning and capacity building, which are desired outcomes of health communication strategy (Nutbeam, 2000).

5.1.1 Participatory Action Research

PAR draws heavily on Freire’s concept of praxis whereby action and reflection are intertwined (Baum et al., 2006). PAR is defined as a democratic process concerned with developing practical knowledge in the pursuit of worthwhile human purposes, grounded in a participatory worldview (Reason and Bradbury, 2001). To achieve the VHT-project health promotion goal of designing accessible and usable eHealth communication, it was important to involve potential users and providers of Virtual Hälsotorg in the design process (Baskerville, 1999, Timpka et al., 2008) in order to define needs and devise solutions to meet the identified needs; in this way the process is as important as the outcome (Whitehead et al., 2003). PAR, in this sense has a double mission. Firstly, to produce knowledge through reflective inquiry which results in an action to improve practice or situations in which the people concerned find themselves and want to change. The action is then evaluated iteratively and further action is collaboratively decided upon and the cycle repeated as long as it is necessary. Secondly, to bring about “change” that is relevant to the context and culturally acceptable (Baum et al., 2006). The local citizens, as participants in the VHT-project, bring personal experiences of using the Internet in their daily lives, providing knowledge of the needs and preferences for health resources of fellow citizens. The professionals, on the other hand, contribute with expert knowledge of health, medical care and understanding of their respective organisational needs and regulations. PAR is used in ICT system research based on the assumption that knowledge is contextual, and for a system to be valid and accepted, it has to be based on the user’s norms, values and interests (Baskerville, 1999, Pilemalm and Timpka, 2008). Furthermore, involving stakeholders in the design process increases engagement fosters ownership and builds the capacity of participants to sustain the system after the project is over (Pagliari, 2007). In this view, PAR fulfils the empowering, enabling and capacity building goals of health promotion (Whyte, 1991, Baskerville, 1999).

According to Wicks and Reason (2009) creation of communicative spaces should be the first step in PAR. These are spaces and structures for communication based on democratic rules of participation where participants feel safe to share ideas, which is a prerequisite for achieving the kind of interaction that results in learning and empowerment (ibid.). Within the VHT-
project it was, therefore imperative to adopt research design that not only facilitated participation but was also flexible enough to accommodate change, as the next course of action would depend on the previous action/activity. The researcher’s role is to facilitate processes for the transfer of power to participants and contribute to participants’ capacity building by providing technical support to guide the research when needed (Byrne and Alexander, 2006, Löfman et al., 2004).

5.2 Study design
A multiphase phase design (Creswell and Clark, 2007) using a PAR approach, (Whyte, 1991) was applied for the studies in this thesis. Multi-design approach provides an overarching methodological framework to a multi-layered project that calls for multiple phases to develop an overall program for research or evaluation (Creswell, 2011). In this respect, multiphase design is flexible and is governed by the research aim or objective and suits projects that employ multi-professional teams of researchers with different worldviews and assumptions (Creswell, 2011). A multiphase design was deemed suitable for the study of the development of ‘Virtual Hälsotorg’ since the design process of Virtual Hälsotorg was envisioned as a collaborative process involving different stakeholders from conceptualisation to dissemination, thus, there was a need for a flexible model. The project was also carried out in phases in accordance with the health promotion planning process (Green and Tones, 2010), which entails analysis, design, implementation and evaluation of the process and outcome.

A model entitled ‘Spiral Technology Action Research’ (STAR) was used to guide the design process of the development of Virtual Hälsotorg. The STAR model is a developmental process model that combines health promotion behavioral theories, PAR approach, and Freire’s “critical pedagogy” with the ICT systems design approach. The STAR model consists of five cycles; Listen, Plan, Do, Study and Act (Skinner et al., 2006) (Figure 1). These cycles represent an incremental improvement approach for rapid cycle change that was used to design, test and disseminate the eHealth program. The process also divides the technical development process into a series of smaller decisions and development steps for improvement, evaluation and reflection. The STAR cycles fitted well with the PAR cycles and allowed for continuous feedback and dialogue between project participants, thus enabling learning and subsequent design refinements of the prototype. This process is referred to as “rapid prototyping” in the STAR model (Skinner et al., 2006) in the VHT-project. Rapid prototyping consisted of “mini studies” carried out by individual workgroup members. These included interviews for needs assessments among peers/networks, literature review and usability tests. The findings were presented in the workshops to then be reflected and acted upon. The iterative action-reflection process was then repeated; hence, design and evaluation are integrated in the development process, making STAR a tangible model for realizing the PAR and the empowerment approach adopted in the VHT-project.

The STAR model was originally developed for programs with a behaviour change approach (Skinner et al., 2006), but applied in an empowerment approach (Baum, 2008b, Nutbeam, 1998) adopted by the VHT-project. To steer away from the behaviour approach, health
promotion values and principles, which are the cornerstones of the participatory and empowerment approach, were integrated into the design process. A participatory evaluation approach was adopted in order to produce knowledge that can be acted upon and is relevant to the people concerned (Springett, 2001). In the VHT-project, the five cycles in the STAR model were combined to form three phases (Figure 2): Listen (Study I and II), Plan and Do (Study III), and Study and Act (Study III and IV). These phases represent formative, process and outcome evaluation processes (Bowling, 2002).

**Figure 1: The original STAR model (Skinner et al., 2006).**
5.3 Materials and Methods
A total of 146 participants took part in the three phases of the study (Figure 2). Multi-method approach (Cresswell, 2013) to data collection and analysis techniques were adopted throughout the three phases. Each phase explored ideas and issues pertaining to content and layout of the planned Virtual Hälsotorg a topic/problem through iteration of a mix of methods; each phase built on the outcome of the previous phase in order to address the project objective of developing an accessible web-based health channel for promoting health and enhancing health literacy in PHC.
Table 1: Participants in the studies

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
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<tbody>
<tr>
<td><strong>Pharmacy personnel</strong> (n=26)</td>
<td><strong>Project group (PG)</strong> (n=5) all females.</td>
<td><strong>Test group 1 (T1)</strong> (n=15) 4 men, 11 women.</td>
</tr>
<tr>
<td><strong>Group 1-2 (FG1 and FG2) DN from PHC (n=9)</strong></td>
<td>1 health and lifestyle DN, 2 researchers, 1 interaction designer</td>
<td>Local citizens. Ages 17-71 yrs.</td>
</tr>
<tr>
<td><strong>Group 3 (FG3) Hälsotorg network group (n=10)</strong></td>
<td>1 project manager</td>
<td><strong>Test group 2 (T2)</strong> (n=17) women</td>
</tr>
<tr>
<td>3 pharmacists, 3 regional Hälsotorg–DN, 1 PHC manager, 1 regional public health strategist, 1 psychiatry clinic manager and 1 dental clinic manager</td>
<td>Ages 28-60 yrs.</td>
<td>DN from Child Health Care, DN consultations, GP and Geriatrics.</td>
</tr>
<tr>
<td><strong>Group 4 (FG4) Immigrants (n=8) 6 women, 2 men</strong></td>
<td><strong>Work group (WG)</strong> (n=13) 4 men, 9 women.</td>
<td><strong>Test Group 3 (T3)</strong> (n=6) 5 men, 1 woman</td>
</tr>
<tr>
<td><strong>Group 5 (FG5) Hälsotorg personnel from PHC centre (n=3) women</strong></td>
<td>6 local citizens, 2 DN + project group</td>
<td>Local citizens of migrants. Age 23-43 yrs.</td>
</tr>
<tr>
<td></td>
<td>Ages: 28-71 yrs.</td>
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<tr>
<td></td>
<td><strong>Reference groups:</strong> (n=33)</td>
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<tr>
<td></td>
<td><strong>Reference 1 (R1)</strong> (n=4) women</td>
<td></td>
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<tr>
<td></td>
<td>2 PHC managers, 2 physiotherapists.</td>
<td></td>
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<tr>
<td></td>
<td><strong>Reference group 2 (R2)</strong> (n=10) 6 men, 4 women</td>
<td></td>
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<tr>
<td></td>
<td><strong>References group 3 (R3)</strong> High School students (n=13) 9 men, 4 women.</td>
<td></td>
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<tr>
<td></td>
<td>Ages 18-19 yrs.</td>
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<tr>
<td></td>
<td><strong>Reference group 4 (R4)</strong> (n=6) Pensioners. Ages: 65+</td>
<td></td>
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</tbody>
</table>
5.3.1 Study I

Study one explored the Hälsotorg phenomenon and its potential as a health promotion setting (Mahmud et al., 2010) and adopted a multi-method design (Bowling, 2002). Materials included key documents related to the development and character of Hälsotorg on national and local levels and an electronic survey was distributed to key persons at 30 Hälsotorgs in Sweden in 2006. Twenty-six responded, representing 13 of 18 county councils and two regions. The survey consisted of 25 closed questions with the opportunity to comment on the answer and four open-ended questions. The survey focused on four domains; 1) Hälsotorg’s intentions and objectives, 2) collaboration and agreements, 3) personnel and activities and 4) development and evaluation.

Key documents encompassed national public health and local Hälsotorg policy documents, meeting protocols, and Apoteket AB (Pharmacy) documents related to the development of Hälsotorg. The documents and protocols were obtained through a request in the survey and Internet search. Search terms ‘Hälsotorg’ and ‘Apoteket’ were used to search the websites of the county councils and municipalities that responded. Data from the survey, documents and Internet searches were analysed using quantitative and qualitative content analysis (Denscombe, 2007, Patton, 2002). Thereafter, a policy analysis triangle framework inspired by Walt and Gilson (Buse, 2008) was used to analyse components in the policy triangle, the policy making process (problem identification, issue recognition, policy formulation, policy implementation, policy evaluation), actors, content and contextual factors, and its complex interaction. A meta-analysis of the results was then conducted to discuss the results in the light of health promotion principles in relation to Hälsotorg activities.

5.3.2 Study II

Study two investigated health communication in practice at a PHC in the South East of Sweden, factors affecting it and the use of ICT by both health personnel and local citizens (Mahmud et al., 2013). A qualitative exploratory case study (Yin, 2009) was conducted. Multiple data collection methods including field study with participatory observations (Reason and Bradbury, 2001), document studies (Patton, 2002) and focus groups (ibid.) were applied in the study, to facilitate a holistic view of health communication practiced at Hälsotorg and PHC. Since the boundary between Hälsotorg and its context (PHC) was not evident, the whole context was treated as a single case study (Yin, 2009).

A field study was conducted under a period of three months, twice a week, in 2008–2009 in order to familiarize with the setting for the planned intervention, i.e. the Virtual Hälsotorg, assess needs and identify how subjects interacted with technology. A total of 251 people visited the Hälsotorg during the field study period, some of whom took part in informal interviews. A field study manual covered Hälsotorg activities, visitors and reasons for participating in Hälsotorg activities. The manual also covered interaction between health personnel, and between health personnel and Hälsotorg visitors. The field notes were expanded when the situation allowed or the end of the day, to identify assumptions, make
sense of the data, and record personal insights that might have affected the data (Patton, 2002).

Purposive sampling (Patton, 2002) was used to identify documents, printed materials and records that were of importance to health communication and health promotion in PHC. A total of 13 documents and other printed materials used at Hälsotorg were identified as crucial to understand how health promotion in PHC was articulated in text and interpreted in praxis. This served as basis for understanding the what, how and why of health communication for health promotion practiced in PHC and the factors influencing it. The national and local policy documents were identified through an earlier study of Hälsotorg implementation analysis (Mahmud et al., 2010) and during field studies. Other documents included were an evaluation report, meeting protocols and monthly reports. All the documents related to the development, visions and goals for health promotion in PHC.

Focus groups were used to explore informants’ knowledge and experiences of Hälsotorg (Patton, 2002). Purposive sampling and snowball methods were used to recruit the participants to the focus groups (Patton, 2002). Five focus groups with 22 informants FG 1-5 (table 2) was conducted, each lasting between 1-1½ hours. The immigrant group (FG 4), was a strategic choice from an equity perspective, as immigrants are reported to suffer from poorer health compared to native Swedes and should therefore be a priority for health promotion efforts (National Board of Health and Welfare, 2009) (Furthermore, the immigrants rarely participated in Hälsotorg activities according to PHC personnel, who described the immigrants as a hard- to- reach group. Focus groups were used to generate a rich understanding of participant’s experiences, attitudes and beliefs of health communication and health promotion. The interaction and group processes between participants enriched the information generated (Krueger and Casey, 2009). The processes also created a dynamic interaction where participants could explore and clarify views between themselves in a way that was not possible in individual interviews (ibid.). Self-reflexivity (Whyte, 1991) often leads to re-evaluation of one standpoint, in the light of knowledge acquired/lessons learned, contributing to capacity building. This reflexivity at individual and group level helped to push forward the design process of Virtual Hälsotorg, thus resonating well with the PAR approach adopted in the studies in this thesis (Casey, 2007, Patton, 2002, Whyte, 1991).

A semi-structured interview guide (Patton, 2002) divided into two parts was used. The first part set out to identify health communication as practiced at the PHC as well as factors that could promote or obstruct it. The second part set out to identify potential areas for improvement of health communication using ICT. The interview guide was modified to adapt to the different groups of informers, in order to capture the different perspectives, experiences, roles and needs. Focus groups were recorded and transcribed per verbatim.

Data from participatory observations, document analysis and focus groups were analyzed, coded and categorized separately using inductive qualitative content analysis (Patton, 2002). Emerging categories from the different data sets were compared to each other and integrated
into themes to form a rich description of the case (Yin, 2008). Coding was initially done by AJM and thereafter negotiated and checked for comprehension with the co-authors. The derived results were then presented to the DN in Hälsotorg for validation.

**Summary:** Study I and II, corresponded to the formative evaluation (Nutbeam and Bauman, 2006) and focused on scanning the context, interacting with target groups and conducting a needs assessment (Skinner et al., 2006) The two studies were conducted to ensure that Virtual Hälsotorg adapted to the context for its use and stakeholder’s needs; and that appropriate methods and materials were used to inform the design of the prototype (ibid.).

5.3.3 Study III
This phase represented the outcome evaluation of the design process of Virtual Hälsotorg and it corresponded to both the ‘plan and do’ and the ‘study and act’ phases of the STAR model. The study focused on how the collaborative design and evaluation processes affected content and user interface of the different prototypes to the final prototype of the Virtual Hälsotorg at the end. It also evaluated if and how the Virtual Hälsotorg achieved its goals of providing accessible, relevant health communication and its impact on users’ health/eHealth literacy.

Four groups participated in the design process of Virtual Hälsotorg prototype (Table 1): One project group (PG), one work group (WG), four reference groups (R1-R4) with a total of 33 participants and three test groups with a total of 38 participants. The project group participants were recruited through a purposive sampling (Patton, 2002) and consisted of a DN, working as a health and lifestyle consultant in the PHC clinic, a senior researcher, a doctoral student, an interaction designer, and a project manager from the county council’s PHC administration body. To ensure that the needs of potential users were implemented in the design process (Pagliari, 2007), the project group was expanded to include local citizens and other PHC personnel. The additional participants were recruited through an advertisement in a local paper, snowball methods (local citizens) and purposive sampling (district nurses and a public health strategist from the municipality) (Patton, 2002). The new recruits and the project group together formed a workgroup sharing responsibility for the development of Virtual Hälsotorg and were directly involved throughout the design and evaluation process. The reference groups and test groups were recruited through advertisement in the local newspaper and snowball methods (Bowling, 2002).

The reference groups participated in the design process as consultants and were contacted at different intervals to test and give feedback on the different versions of paper prototype, while the test groups tested the final version of the web adaptive prototype (Figure 2). Test group one were the only group that participated during the test period of five weeks, where they actually interacted with the PHC and tested all the interactive functions, and participated in the planned activities. Test groups two and three tested the user interface and content for about ½ -1 hour, after the test period.
A room on the PHC centre was converted into a ‘design workshop’; a physical meeting place for the workgroup to meet once a week over a period of 1½ years. The initial workshops focused on definition the potential aims, the functions and the target group(s) for the planned Virtual Hälsotorg. Quality criteria for a good’ health website, and the participants’ reflections on their own needs based on their roles as citizens/end users, providers/professional user or decision maker, were discussed. Workgroup members contributed through mini-studies and dialogue in the workshops; each was regarded as a designer and a co-researcher in accordance with PAR principles (Whyte, 1991). Every workshop was documented in meeting minutes, graphic layouts (sketches) and reflexive field notes (Patton, 2002, Skinner et al., 2006). At the end of each workshop, new problems/challenges were identified and plans to solve/overcome were devised in the following meeting. Meeting minutes were sent to all participants in the workgroup by e-mail or regular post.

As a complement to the participants’ expressed quality criteria in the mini-studies conducted, a systematic literature review was conducted by AJM, to explore quality criterion and methods for web-based health communication for health promotion. The searches were conducted in the databases Medline, CINAHL, PubMed, ACM, IEEE, Academic Search Elite, Science Direct and Google Scholar. The review revealed that most tools and measurement criterion for health websites were content and target group specific, thereby inadequate for evaluating the Virtual Hälsotorg with its broad scope of content and target groups. A content analysis of the search results exposed three main domains for quality criteria and related categories: Content, Interface Design and Readability. Content referred to quality of the content and its relevance, currency, trustworthiness and accuracy. Interface design referred to the website’s layout including ease of navigation (horizontal and vertical), clear organizational scheme, presence of a well-structured menu bar/contents, availability of tracking functions, a clear system for help, links and aesthetics. Readability referred to ease with which users, including people with disabilities, interact with the system. This entailed that the designers adhere to guidelines for the design of web-based information including language and graphics.

Since learning is an important and desired outcome of PAR, an eHealth literacy tool eHEALS (Norman and Skinner, 2006a), retrieved in the literature review, was integrated into the results. The eHeals tool was first translated into Swedish, piloted and validated through a collaborative process in the workshops and tested by six independent evaluators recruited through the workgroup’s personal network. The tool was chosen because it was validated and simple to use and has a broad scope that suited Virtual Hälsotorg, according to the work group (Norman and Skinner, 2006a, van der Vaart et al., 2011)

The workgroup then used the results from the literature review and mini-studies to develop a 14-item usability questionnaire Usability refers to the ease with which users can use a particular tool or object to achieve a specific goal (Nielsen., 2002) . The tool contained multiple choice questions, with the possibility to comment, on participants’ socio-demographic status, computer using habits, user satisfaction, prototype’s relevance,
accessibility and eHealth literacy competence. The questionnaire was used as a research protocol by the work group members in phase two, to guide the data collection. They were free to use it as a guideline but also to apply other data collection methods such as interviews and think-aloud protocols (Nielsen., 2002) if these better suited their respondents. A think-aloud protocol in combination with task performance, is commonly used to conduct usability tests to identify problem areas and devise suggestions for improvements (Hinchliffe and Mummery, 2008). Ideas and feedback were then discussed and a consensus could be reached on which ideas to incorporate into the prototype. The County Council’s Information Technology department (IT- department) was also consulted for expert opinion to ensure the Virtual Hälsotorg’s compatibility with County Council’s web policy, especially the domain of readability.

Data from the different sources was analysed using qualitative and quantitative content analyses inspired by Creswell and Clark’s (2007) guidelines. In this approach, the research objective was used as a conceptual framework for data analysis. Analysis of data, collected during the workshops and evaluations from the reference and test groups was conducted simultaneously as an outcome of each workshop, mini-study or evaluation. In essence, data was collaboratively analysed, evaluated and acted upon by the workgroup in the iterative process and results/outcomes were used to feed back to the design process (Skinner et al., 2006). Field notes were used to complement this process.

Data from the different sources - field notes and design workshops- were printed out and read several times (Patton, 2002). Codes and memos were written in the margins. Similar codes were grouped into categories. Data from the different sources, were constantly compared to each other and integrated into themes (Creswell and Clark, 2007). The analysis was initially always negotiated with the work group in the workshop.

5.3.4 Study IV

Study four represented the ‘plan and do’ and ‘study and act’ phases of the STAR model and corresponded to the process evaluation of VHT (figure 2). The qualitative study focused on the workgroup’s experience of participation in the design and evaluation process of the Virtual Hälsotorg. Materials included project documentation and the individual interviews with the workgroup. Project documentation included meeting minutes from design workshops collected once a week over a period of 1½ years, field notes kept by the first author throughout the project, notes from reflexive meetings, one final SGF project report from external evaluators monitoring the SGF project, seven monthly reports from the SGF project manager and personal e-mail communication between first author and workgroup participants.

All 13 members in the workgroup were invited to take part in the interview; 11 responded. Five were professionals and six were local citizens. Each interview session was initiated using a general question like “How would you describe your experience of taking part in the development of Virtual Hälsotorg?” The participants were also asked, if possible, to give
concrete examples of factors that have influenced their experiences and what they would do differently if they were to repeat the same process since learning is a desired outcome of PAR, participants were also asked to share if they felt that they had learnt anything in the process. Since the interviewing researcher was part of the work group, field notes, kept throughout the design processes, were used as a reflexive tool to critically reflect upon her own role as a researcher and draw upon some lessons learned.

A qualitative content analysis (Patton, 2002) was applied in this study. The aim of the study was used as a framework for analysis. Each data source - field notes, meeting minutes, e-mail communications, SGF project reports and project leader’s monthly reports - were read several times and summarised to get a sense of the whole. Interviews were audio-taped and transcribed verbatim. Each data set was analysed separately as follows: Instances pertaining participation, collaboration and learning were marked with different colours and coded. Similar codes were grouped and categorized. Codes from the different data sets were then compared and similar codes were integrated. The categories were then grouped around three predetermined themes: Participants’ experiences of participation, participants learning outcome and researcher’s reflections on participation.

5.4 Ethical Considerations

The study was approved by ‘The regional ethical committee for Lund/Malmö region’, at Lund University in Sweden. Diary number 2009/120. Permission to conduct the studies was granted by the pharmacy manager (Study I), PHC manager (studies II, III and IV).

5.4.1 Autonomy and Informed consent

Participants were informed on the nature of the study, in accordance with the Swedish Ethical Review Act (SFS 2008:192). All participants received written and oral information about the project and were informed on the voluntary nature of their participation. Autonomy refers to the participants’ right to determine whether to participate or not depending on the accuracy of the information provided, concerning nature of the project and their involvement (Reason and Bradbury, 2001).

Informed consent presupposes accurate information, however, given the evolving nature of PAR where neither the researchers nor the participant know where it will end, the traditional concept of informed consent may be inadequate (Williamson and Prosser, 2002). According to Löfman et al. (2004), the participant may consent to participate in the project as a whole after receiving accurate information (Löfman et al., 2004). The test and reference groups were involved periodically and performed specified tasks, so they received comprehensive information on what their involvement would entail. The workgroup participants on the other hand received information on the objective of the study and working approach. Hence their consent was to participate in an evolving project where they were to be part of the process.
5.4.2 Confidentiality and Anonymity
Ensuring confidentiality and anonymity of participants is a hard issue to tackle in PAR, due to the small number of participants and the close interaction between participants (Löfman et al., 2004). All the participants in the survey (Study I) focus groups, field study (Studies II and III), reference groups (Study III), were assured anonymity. No identifiable details are given when reporting the results, for example, in findings from focus groups; the whole group was cited instead of the individual. It was, however, difficult to do the same with the workgroup (Studies III and IV) as they were few, and had specific roles in the group. However, this was mostly related to inner anonymity as opposed to outer anonymity (Reason and Bradbury, 2001). Inner anonymity pertains to fellow participants in the project while outer anonymity pertains to anonymity against non-project members. This problem was taken into account and workgroup participants were made aware of the dilemma to which they gave their approval. Only two people had access to participant’s personal information, the project manager and the author of this thesis.

5.4.3 Ownership
One of the most challenging ethical dilemmas in PAR is the location of ‘power’ in PAR, and the ownership of the research. It is particularly important in PAR to proceed according to the participants, and to involve them from the beginning of the process, in order to insure the equal balance of power between participants and researcher (Huang, 2012, Löfman et al., 2004, Murray et al., 2012). In the VHT- project power balance and research process ownership were addressed by involving different stakeholders throughout the design process in the workgroup as co-researchers. To facilitate participation and knowledge creation (Wicks and Reason, 2009), spaces and places for participation were created (physical workshop, a project website, enabling varying degrees of participation). The researchers devised ways of simplifying participant’ data collection skills by simplifying the scientific jargon, and allowing flexible data collection using tools they were comfortable with (for example think-aloud protocols or interviews instead of a questionnaire).

Transparency also facilitates power balance and the creation of equality between the researcher and research subjects (Whyte, 1991), as well as making explicit the researcher's assumptions, values and motives (ibid.) (Whyte, 1991). Furthermore, individual meetings with members of the work group were conducted to investigate and capture discontentment. To achieve this kind of transparency and power sharing within the working group, an open communication strategy was adopted. All meetings and design workshops were documented and all members were given access to the archive created in a web page created for the Virtual Hälsotorg project. All members had access and administrative authority to the web page. Furthermore, individual interviews with members of the workgroup were conducted to investigate and capture discontentment.
6 Summary of the results

6.1 Study I

The aim of this study was to explore the Hälsotorg policy implementation on the local level and to analyse the Hälsotorg activities, in order to provide a more in depth understanding of the Hälsotorg’s potential as a health promoting setting.

The data analysis revealed factors that made Hälsotorg to a potential supportive setting for health promotion. The policy documents and the survey indicated a strong intention to adopt a health promoting approach and a need to create a supportive environment to support people in their effort to take more responsibility for their health. Hälsotorg was an established concept in PHC. It brought together actors from different sectors, making it an ideal setting for collaboration between different actors like NGO’s and the municipalities. The results also revealed a strong support for Hälsotorg as a setting for health promotion in both national and local policy documents but the implementation of these policies was flawed. The data analysis from the survey exposed unbalanced power relationships between stakeholders, activities that are health promoting but lacked a health promoting approach, and weaknesses in the policy process.

6.2 Study II

The aim of this study was to gain a better understanding of health communication for health promotion in PHC with emphasis on the implications for a planned ICT-supported interactive health channel.

The study revealed potential barriers and opportunities that needed to be addressed prior to embarking on the design process of the Virtual Hälsotorg. Some of the barriers identified included misunderstanding of the health promotion approach by the personnel, low prioritisation of health promotion in the PHC organization, lack of dialogue and collaboration between the different categories of personnel. The opportunities identified included the willingness of PHC leadership to improve their health promotion services, district nurses’ (from Hälsotorg) competence to work with both individuals and groups, established networks with the local population through the physical Hälsotorg’s activities and PHC personnel competence of working with ICT tools like the computer. The results revealed that health communication was a key strategy in PHC medical and health promotion services. However, it focused on prevention of disease or reducing the risks of getting a disease. Health care personnel took the role of experts who ‘taught’ patients on what was best for them and what they needed to do to minimize the risk of lifestyle diseases.
6.3 Study III

The aim of this study was to collaboratively design and evaluate a web-based health channel for the purpose of health promotion and to enhance health literacy in PHC context.

Study III represents the process and outcome evaluation (Figure 2) and, as such, it covered the whole design process of the prototype, including the formative evaluation. The study focuses on the ‘product development’ or design and evaluation phase of the Virtual Hälsotorg prototype.

The results showed that adopting a health promotion, participatory approach to design was effective as it facilitated dialogue between professionals, citizens and other professionals like the IT professionals who worked towards the same goal. The collaboration enabled knowledge exchange as citizens contributed with local knowledge while professionals contributed with technical knowledge on health or ICT. The combination of knowledge resulted in the design of a health portal that was, to our knowledge, unique in Sweden. The results also suggest that engaging local citizens in the design process influenced the content of Virtual Hälsotorg which could be seen in the emphasis on ‘the local contexts’ and scenes that portrayed the local recreational resources, such as health promotion resources like parks and jogging trails in the town. Consequently, physical activities were portrayed in terms of everyday activities like walking barefoot along the beach, working in the garden and cycling.

The multi-phase and methods approach applied was effective in capturing and facilitating the iterative design process. The results indicated that the different evaluation phases yielded valuable results that built into each other and contributed to the development of a health portal that was perceived as relevant to the local people’s need for health communication - accessible and user-friendly. The results showed improvement of health literacy among the people tested with regards to navigation and retrieving skills, as well as knowledge of the available health resources on the Internet at the end of the test period, compared to the beginning, of the test period. An improvement in trust and more positive attitudes towards the Internet as a health resource were also noted among the people tested.

6.4 Study IV

The aim of this study was to explore participant’s experience of collaboration in the development of an interactive ICT- supported health communication channel for health promotion.

The results revealed that participants perceived their participation and collaboration with others as a positive and enriching experience. The participants described their experience as motivating, but lengthy inclusive and engaging, reciprocal and interdependent. The professional participants reported a better understanding and respect for each other’s work. New collaborations were forged between the PHC and the IT department which led to other
ICT project in the PHC. The collaborating school also started a ‘health group’ consisting of students and teachers. The health group organised a health information campaign once a semester in the school to inform fellow students on various health issues. The group adopted the VHT-workshop model to decide on which health topics to discuss and how.

All participants reported that they have gained some health literacy as a result of having participated in the workgroup, the reference group or as a test person. The data analysis showed that participants reported enhanced health literacy knowledge and skills which made them more aware of what kind of food they ate. They also read food labels more often. The results also revealed enhanced awareness of Internet-based health resources websites with information on self-care, alternative medicine and knowledge on how to assess quality of health websites. The most appreciated discovery, however, was the awareness of existing health promotion and eHealth resources in their localities. These included availability of recreational resources in their local town, opportunities for physical activities in their communities, interactive eHealth services, such as renewing of prescriptions in their local PHC clinic’s websites and the national health website (1177.se), which they did not know existed. From the results, it was evident that the participation process enhanced participants’ health literacy and eHealth literacy.

The project documentation revealed that despite the general satisfaction among participants, the project was faced with numerous challenges, such as structural changes in the PHC sector, differences in values between the people involved in the workgroup, and lack of inclusion in the decision pertaining to resources in the SGF projects. One of the most significant structural changes that affected the VHT project negatively, was probably the introduction of a new national health website; 1177.se. The new website contained a ‘health’ section, offering information on disease prevention and lifestyle change. The introduction of 1177.se, entailed centralisation of health websites and termination of local websites run by the regional based county councils. This undermined the necessity of the virtual Hälsotorg. These factors resulted in long periods of inactivity, threats of discontinuation and lack of resources.

7 Discussion

7.1 Results discussions

The overall aim of this thesis was to develop and study the development process of an ICT-supported health communication for the purpose of promoting health and enhancing health literacy in a PHC context. The study results demonstrate that adoption of a health promotion approach and integrating health promotion principles in the design process of an eHealth application such as health promotion website, contribute to health communication that is relevant, engaging, accessible and usable for the potential users. Furthermore, people’s interaction with the eHealth application and interactions between professionals and laymen resulted in increased health literacy among the participants. In the following section the results are discussed in the light of health promotion and health communication in PHC, from
health communication to health promoting communication, and professional-lay collaboration.

7.1.1 Health promotion and health communication in PHC

The findings from the studies in this thesis revealed a strong support for health promotion in the policies and among health personnel at the PHC. This support could be seen in the health promotion in the PHC, such as alcohol prevention programs in the Child Health Care unit and interpersonal communication in counselling, such as motivational interviewing in the DN unit, and the Hälsotorg activity (Study I & II). However, the results also confirm findings from other studies, showing that PHC is focusing more on individual and preventive care, and that health promotion and population health is not implemented as indicated by national and international policies (Frankish et al., 2006, Wilhelmsson and Lindberg, 2009).

The results revealed, confirm the general perception among researchers that PHC, dominated by a top-down fragmented and bio-medical approach (Frankish et al., 2006, Laverack and Keshavarz Mohammadi, 2011), focusing mainly on behaviour change strategies directed at single health problems, such as smoking cessation, hypertension, physical activities (De Maeseneer et al., 2007, Moulton et al., 2006, Tengland, 2010). The studies in this thesis also show that the disease approach adopted by the PHC is often framed as empowerment, due to the misinterpretation of the concept of health promotion (Studies I –II). This result is supported by Irvine (2007), whose study revealed that nurses were confined to the traditional conceptualization of health promotion, comprising actions aimed at changing the behaviour of individuals, instead of a holistic and integrated approach, that addressed the determinants of health. Other studies, conducted in Sweden, point out that health care personnel have the motivation and skills to work with a broader perspective of health promotion, but the lack of resources is the main barrier to their efforts (Johansson et al., 2010). Laverack (2006) contends that the top-down approach is a deliberate action motivated by the estranged economic conditions in the Western countries.

Results from study II show that the framing of health communication mirrored the activities conducted at the PHC. Health promotion and disease prevention were used interchangeably in the PHC (Study II), which affected the way health communication was framed and communicated. Disease or risk of disease, became the main focus even when discussing quality of life (Mol, 2008). Different studies suggest that the pathogenic approach, adopted in health care, is reflected in eHealth communication as well (Neuhauser and Kreps, 2011, Ratzan, 2010, van Gemert-Pijnen et al., 2011). This could perhaps explain why participants in (Studies III-IV) did not seek health information in the county council’s or public owned health websites, based on the perception that PHC is in fact is a ‘sick care’ and does not provide other health promoting services.

Sweden, like the rest of the Scandinavian countries, has strong equity based policies (Government Bill, Mackenbach et al., 2008), to support integrated health promotion efforts in the health care settings. The reality of working conditions with economic crises, and an
increase of older care-demanding patients, present a barrier to health promotion practice in PHC (Johansson et al., 2010, Wilhelmsson and Lindberg, 2009). Sparks (2010), suggests empowering health personnel to be realistic about what they can do within their own unique contexts. Critical analysis of the context is essential according to Sparks.

Suggestions to critically analyse the context and empower health care personnel are in line with the approach, and the methodology adopted by VHT-project in designing Virtual Hälsotorg, whereby the formative evaluation was used to develop ICT-based health communication made it more health promoting, and to reach out to a larger audience (Studies III and IV). Health personnel (Study III) could relate to the Virtual Hälsotorg partly, because they were involved in the design process, but also because it was based on their day-to-day life contexts. This confirms that understanding context is vital to obtain a match between the eHealth system and potential user’s needs, preferences and skills to interact with it.

7.1.2 From health communication to eHealth promoting communication

Studies 1-IV, demonstrate the process of turning the health communication practiced in the PHC to a health promoting eHealth communication, which was tested in the final prototype in study III. This process involved integrating health promotion principles throughout the development process, from the formative evaluation through to the outcome evaluation. The formative evaluation conducted in phase 1 (Studies I and II) contributed valuable knowledge and insights into the barriers and the facilitators of health communication, and the fact that these were interrelated. This knowledge facilitated the adoption of a socio-ecologic approach (Mittelmark, 2008, Poland et al., 2009).

Formative/context analysis prior to the implementation of health promotion programs is said to increase the rate of success, save it from unpleasant surprises (Poland et al., 2009) and enhance sustainability and appropriateness (Springett, 2001, Springett et al., 2010). In the studies in this thesis, the formative evaluation also facilitated the identification of key actors, both within the health care services and in other sectors as well. This in turn, enabled the intersectoral collaboration (Dooris, 2009). From an equity perspective, the formative evaluation also shed light on the groups that PHC found hard to reach, such as the young people and immigrants, and the need to involve them in the design process. Similarly, the context analysis is highly recommended in the design of eHealth communication systems, based on the assumption that involving target groups in the design process, contributes to a better fit with the needs of the users or creation of function/system specifications (Hoyo Barbolla, 2007, Pilemalm and Timpka, 2008, Scandurra et al., 2008, Sutton and Kemp, 2006).

Studies III and IV demonstrate the importance integration of health promotion values and principles in the design and evaluation process of eHealth applications, which aim to promote health and enhance health literacy. Such an approach is supported by the socio-ecological/determinant approaches and by proponents of empowerment, who believe that health promotion interventions and programs should be value-based and address the determinants of health (Green and Tones, 2010, Laverack, 2004, Nutbeam, 2000).
Empowerment is regarded as one of the most important principles of health promotion (Nutbeam, 1998), however, there can never be an empowerment without participation (Laverack, 2004). In this thesis, participation was integrated throughout the design process starting with conducting a participatory field study (Study II), the recruitment of a workgroup which was conducted by the project group (Study III) and finally, the design and evaluation processes where both professionals and laymen shared the responsibility of designing and evaluating the Virtual Hälsotorg (Studies III-IV). This process was facilitated by the different levels of participation applied in the studies. Partial participation may be necessitated by the reality of the situation and may not necessarily be disempowering if the objective is justified. In the case of developing the Virtual Hälsotorg (Studies III), the reference and test groups, were consulted when the need arose (Laverack 2004). The results from study III indicate that direct participation of laymen and professionals in the design process led to a knowledge exchange which contributed to an accessible, usable health portal.

Studies applying PAR identify knowledge and control of the research process as constituents of power (Gaventa and Cornwall, 2008, van der Riet, 2008). Thus, genuine participation is a pre-requisite for empowerment and capacity building as discussed in Whitelaw et al. (2011) and Bifulco, (2013). However, not all participants were directly involved; some laymen participated as briefly as test persons or in a reference group (Study III). There is a disagreement among PAR researchers on the legitimacy of partial participation whereby some conceive participation as a continuum, where different degree of empowerment can occur in the process (Cornwall and Jewkes, 1995), while others believe that empowerment can only occur with full control and ownership of the process by the people involved (Laverack, 2004, Mason, 1997, Minkler and Wallerstein, 2010).

The outcome of the health literacy tests conducted in study III, indicated an improvement in of eHealth literacy skills and attitudes towards the Internet as a health resource, especially eHealth literacy as a result of using the Virtual Hälsotorg. Similarly, results from study IV revealed that participants felt a sense of ownership during the development of the Virtual Hälsotorg, and were proud of the final prototype, despite the fact that the final prototype did not turnout as they had envisioned. Studies show that participatory processes that foster ownership, increase the probability of the use of the system and thereby sustainability (Bifulco, 2013, Marent et al., 2012, Santana et al., 2011).

7.1.3 Professional – lay collaboration

The results from study II show that health communication is a strategic strategy to promote health in PHC, but the communication content and approach did not correspond to the empowerment approach that was given as the goal. Several studies show that many health practitioners consider that giving information or making it available equates with empowering (Henwood et al., 2011), which is fallacious according to Mol (2008). A systematic literature review by Hörnsten et al. (2013), found that PHC nurses used strategies for health promotion that were characterized by for example, inspiration, instilling fear, motivating and demanding responsibility, which is completely different from the kind of strategy requested by the
participants in study III, who requested interactive services to complement the health information and other resources on the web portal.

Study III shows that dissemination of health communication is more than decoding information and the ability to read and write, especially when it comes to eHealth resources. The design and evaluation process of Virtual Hälsotorg uncovered a myriad of factors including familiarity with content, attitudes towards eHealth resources, interest, relevance of the information and trust as important factors, that foster interaction with eHealth communication. These results demonstrate the importance of making the health communication relevant to the recipients’ daily lives as Ratzan (2010) put it; it doesn’t really matter if what is being presented is evidence based, as long as it is not relevant to the people’s daily life, it will not be used. This is clearly illustrated in the people’s belief concerning health care services as a disease care service (Studies III-IV), as illustrated by the peoples’ poor knowledge of the source of health information on public owned health websites. The results found in studies III and IV corroborate the study of Westerman, et al. (2008), which shows that the population sought health information in commercial websites, more than in the government owned ones.

The Internet was used on a daily basis by all the participants, irrespective of age, according to the result in study III, however, the young people and immigrants tended to use it more often than the women and the elderly. The results also revealed that the local citizens were more versed with the Internet as a resource for information, than the DN in the PHC. This indicates that Internet is valued as a health resource by the citizens (Ratzan, 2011, Westerman et al., 2008), which makes Internet to an important health promotion setting, (Poland et al., 2009) and opportunity for PHC to reach out to a large group of people with health promotion communication and decision. Several studies reveal a similar pattern of Internet use in the population, where the young people are more inclined to use the Internet (Dennis et al., 2012, Skinner et al., 2006), or show that elderly people are less inclined to use the Internet (van Gemert-Pijnen et al., 2011). However, studies report low utilization of eHealth resources among immigrants (Klein and Kajbjer, 2009, Poureslami et al., 2007). This has repercussion for concerted effort for inclusion and equity. Hence, need to be reflected on in the design process to avoid exacerbating the digital divide (Choi et al. 2013).

7.2 Methodological consideration

Due to the limited available data on the phenomenon Hälsotorg, there was a need to gain a better understanding of the PHC context and explore its potential as a health promotion setting (Poland et al., 2009) prior to implementation of ICT-supported health communication. The STAR model (Skinner et al., 2006) was a valuable tool in the development process as it gave an overview of the different design and evaluation stages. However, it was not flexible enough to allow the different kinds of participation needed in the VHT-project. The VHT-project was a complex project, in the sense, that it involved more than two groups of participants. It involved diverse participants of different ages, backgrounds with varied
computer skills, and professions. Hence, there was a need to make the necessary changes to accommodate the complexities the VHT-project offered. To incorporate health promotion principles in the design process entailed that the process itself had to be flexible for the participants, who did not have any training in web design, to control the process. Thus, the multi-phase design (Creswell, 2013) employed in this thesis, enabled implementation of a series of studies each with a different focus, each building on the results of its predecessor to create continuity in the research process. This continuity is important in order to grapple complex and multifaceted issues (Creswell, 2013, Kreps, 2008), like policy implementation, health communication and the myriad of factors affecting it, designing and testing eHealth applications. Macauley et al. (1998), state that PAR projects are on-going relationships with ethical underpinnings that relate to social change, ownership of research process and control over research questions and result. In the light of their statement, the pragmatic stance and multiphase design applied in the VHT-project was compatible with PAR as it allowed for changes and adaptations to be made to include a broader participants and applications of multi-methods as needed throughout the development process. This is important in a study involving people, lay and professionals, working together in an exploratory process to find solutions agreeable to all parties involved (Huang, 2012, Naaldenberg et al., 2009, Pilemalm and Timpka, 2008).

Involving the people who are or will be affected by a program or intervention, is a well-established strategy used to create programs, or technical solutions that correspond to the user’s needs and skills; and the PHC goal of promoting population health (Flicker et al., 2008, Neuhauser and Kreps, 2011, Pilemalm and Timpka, 2008). However, one of the biggest challenges is recruiting and maintaining the interest of the people who join the workgroup (Nitsch et al., 2013). By familiarizing with the target groups, the researcher gained ‘access’ to the field as well as the opportunity to recruit participants to the planned workgroup in the VHT-project-project. The success of a PAR research project like the VHT-project, depends upon the establishment of an environment for trust between the researcher and other participants in the project (Smith et al., 2010). Using the PAR approach also enabled reflexivity during the research process, which entailed a constant review of choices of research method, data collection tools and data analysis as well as contextualization of the outcome, creation of transparency and anchoring of ownership of expression that “can otherwise masquerade as worryingly disembodied and neutral” (Bradbury-Huang, 2010:95). These obligations can be intimidating for an inexperienced researcher. In the VHT project, the presence of an experienced senior researcher in the research team, facilitated this process, as the senior colleague along with the workgroup, served as dialogue partners throughout the research process.

Furthermore, this formative phase fitted well with the ‘listen’ phase of the STAR model (Skinner et al., 2006) which entails interacting with the target groups, familiarizing with the context, identifying how target groups interact with technology and carrying out a needs assessment. This initial interaction became a natural step to start communicative space, and opened up discussions with the health personnel prior to the recruitment of the local citizens.
It was important to re-assure the health care personnel that the researcher’s presence would not disrupt their work.

7.3 Validity

Utility is central for the validity in research that aims to be used in practice, and the credibility is strengthened when there is action in the research process (Stringer and Genat, 2004). Validity in qualitative research refers to the accuracy and trustworthiness of the research process. Cresswell (2013) suggests eight strategies to increase the trustworthiness of a study and recommends that at least two of those should be used in a study. Five of the eight strategies were used in the studies in this thesis namely: triangulation, prolonged engagement and persistent observations, debriefing, in member checking and thick description of the methodology.

Triangulation of methods and strategies facilitated a holistic view of health communication as practiced at Hälsotorg and PHC (Studies I and II) and shed light on the opportunities and barriers to health communication, which increased an understanding of the structural and individual factors as well as the relationships between these factors. Multi-methods (Patton, 2002), the different methods used, corroborated with each other to produce a richer data than if a single method or approach (Patton, 2002) had been used. Likewise, application of multi-phase and methods in studies III and IV accorded flexibility to the design and evaluation process of the Virtual Hälsotorg was illustrated by the positive results of the outcome evaluation. The involvement of the different participants added increased the credibility and utility of the Virtual Hälsotorg channel.

Triangulation of methods in data collection and analyses in all the studies provided a rich description of the context and process. Participatory observation and actively taking part in the workgroup (Studies II, III and IV) enabled the researcher to study not only what was present but also what was missing (Study II). This was important for study II, as it sought to identify needs for developing ICT-supported health communication for health promotion in the PHC. As a participant and an observer in study III and IV, participatory observations as a method offered the researcher an opportunity to collect data from different perspectives; that of a researcher and that of a member of the workgroup. This process enabled the collection of rich data as an insider, but it was also a challenging process, as it was sometimes a challenge to balance these two roles and it is possible to miss important observations.

However, due to the multi-methods approach used in the VHT- project, the researcher’s data was complemented the data collected by other members in the workgroup; the project manager monthly report, workshop minutes, mini-studies, and the workshop reflection meetings once a month (Whyte et al., 1991). Thus triangulation through the multi-methods approach used in the studies in this thesis, revealed that the approach has the ability to expose more details that would have been difficult to unearth when using a single method - for instance, the discrepancy between what is written in policies and what is practiced in the PHC.
studied. The rich data also provide readers with detailed information to enable them to make their own judgments on the study’s applicability in similar contexts, thereby increasing the study’s transferability (Schwandt et al., 2007).

The researcher’s prolonged engagement of three months (Study II) in project and, the design workshop of 1½ years (Studies III and IV), provided ample opportunity for the researchers and participants to get to know each other and establish trust. Establishing trust is important in PAR, as trust enables people to feel comfortable and share their stories which, in turn contribute to the establishment of communicative spaces. Insights into the people’s everyday life contexts through personal stories, contributed to knowledge on users’ needs and preferences for health communication, hence, increasing the Virtual Hälsotorg’s relevance to potential users, thereby increasing the study’s credibility (Patton, 2002). The workgroup participants in the VHT-project were involved in the project as co-researchers, and as such, they co-created the prototype through the iterative process in the workshop. Hence, the PAR approach adopted in this thesis, fostered pragmatic validity (Wicks and Reason, 2009).

The researcher also gained “access” by familiarizing with the target groups, as well as gaining the opportunity on the given opportunity, to recruit participants for the continued research and development project the VHT-project. Furthermore, this phase resonated well with the “listen” phase of the STAR model (Skinner et al., 2006), which entails interacting with the target groups, familiarizing with the context, identifying how they interact with technology and doing a needs assessment. This process deviated from the STAR model, in that it combined needs analysis for the function and technical specification of the Virtual Hälsotorg channel, and the needs for developing a supportive environment for health promoting communication.

Utility is an important quality criteria in PAR (Stringer, 2004), which has a dual aim of contributing both to research and practice. The workgroup participants in the VHT-project, as such, co-created the prototype through the iterative process in the workshop. Hence, the PAR approach adopted in this thesis, fostered pragmatic validity (Wicks and Reason, 2009). Pragmatic validity refers to the extent to which the goals or intended consequences of the research project have been reached (Creswell, 2010). Judging from the positive response the Virtual Hälsotorg received, it can be concluded that participation of the different categories of people in the design and evaluation process, contributed to the goal of producing an eHealth communication channel, that was perceived as accessible and relevant to the people’s needs for health communication.

A limitation of the studies in this thesis could be the small sample of participants, who took part in the different phases of the project. The studies conducted in one Hälsotorg and one PHC, (Studies II, III and IV) and as such, were based on a small number of informants. Experiences of the other Hälsotorg have not been explored fully. Confining the field study (Study II) to only one Hälsotorg may have narrowed the results as a previous study (study I) showed that Hälsotorg offer different services and some had existed longer than others.
However, expanding the case to include workers from the other Hälsotorg, was an effort made in order to compensate for the above-mentioned limitations. The number of test persons in phase 3 (Study III) were fewer than originally planned. The number of test persons might have sufficed if they had only been testing for usability and design errors (Skinner et al., 2006). However, since it was a study that was also testing the feasibility of Virtual Hälsotorg as a resource for promoting health and enhancing health literacy, more test persons could have influenced the result.

We compensated for the small number of participants in the different phases by maintaining the same professional–lay workgroup throughout the development of Virtual Hälsotorg. The workgroup members consulted their own network, tested their ideas on friends, families and colleagues. Hence, member check (Creswell, 2004), was built into the structure of the workgroup process and the workgroup was actually larger than the actual number of workgroup members. The need to recruit more participants into the workgroup was weighed against the need to create an environment for genuine participation, where members could run the project as co-researchers (Whyte, 1991), instead of a large group of participants who acted as consultants. The choice fell on genuine participation, which was an important goal of the VHT project. Implementation of the VHT project in phases was also motivated by the need to solicit broad input from the larger population and health care personnel in every step of the design process. This move also compensated the smaller number of participants. Lastly, the duration of the test period i.e. five weeks, could be considered short, especially given that some of the tests persons were too busy to test all the functions of the health channel and activities offered by the PHC during the five-week test period. This may have affected the results as their feedback was overwhelmingly positive. Maybe, if the test group had been larger, the total answers would have been more nuanced.

8 Conclusions and suggestions for further work

This thesis shows that integrating health promotion values and principles into the design of eHealth resources for health promotion, contributes to capacity building. It enhances of health literacy and eHealth literacy of the people involved in the process, as well as contributing to a better match between eHealth resources and the people they are supposed to serve. Using health promotion principles as the logic for the design of health promoting eHealth infrastructure in PHC, will contribute to creating a health literate health service as well as health promoting communication. Hence, both the implementation and final product were health promoting.

There is a need for innovative and ‘layman’ friendly research methods, that will accommodate participants with little or no computer and related technology skills in the design process. There is a need to demystify the design of eHealth systems to be able to design usable and accessible systems. This thesis has shown the importance of establishing communicative spaces where people can meet, share ideas and engage in creative design processes. Such meetings benefit not only the planned system, but also the people involved and their practices. Establishing communicative spaces within PHC and other public places would encourage
citizen participation, and enable collaboration with other sectors, which could, in turn, contribute towards the establishments of health promoting settings.

Introducing a new eHealth system within PHC services, should involve the people who will be administrating it, as well as their intended end users throughout the design process, not only as consultants but also as partners and co-researchers. The involvement of end users contributes to eHealth communication infrastructures, that are accessible and relevant to the people whom they are intended serve. This increases the likelihood that the system will be used and knowledge gained during the design process contributes to the sustainability of the eHealth application or application into a new area. The collaboration process contributes to capacity building of all involved and could contribute to the creation of health literate health care services. Improving capacity for health personnel would empower them to make changes that are relevant in their context, such as using clinical meetings as an entry point for health promotion and empowerment (Sparks, 2010). Hence health promotion need be contextualised to foster local solutions as it is the easiest way to ensure that the solutions are compatible with the reality of the context.

Involving local citizens in decision processes in health care services, contributes to community mobilisation and empowerment. This could diffuse to other areas as in the case of the students, who were inspired and the nurses, who ventured into social media after forcing the IT-department to change its policy against using social media such as Facebook. Both health care personnel and citizens can play an important role in advocating for better eHealth systems, but to do that, they need to be health literate themselves, hence, the importance of involvement and capacity building in a collaborative situation. Furthermore, the eHealth systems should contain a function that enables users to give feedback without the need to log on, like a suggestion box. This function would facilitate continuous dialogue, which is valuable considering the need for peoples as well as organizations need change rapidly.

The development of ICT-based health promotion services should be integrated into the existing structures instead of developing them as different entities to ensure sustainability and re-establish the value of health promotion in PHC. By re-establishing the importance of health promotion in health care services, we will be able to motivate and eventually succeed in designing and implementing eHealth resources to promote health. Future research should focus on development of empowerment-based models for designing eHealth communication, along with better web quality assessment tools, that measure the health literacy of the website as there is a need to increase health literacy of health care services as well as health literacy of the population.

Given the positive feedback the Virtual Hälsotorg received, it indicates that there is need and opportunity for an empowerment model to guide the design and evaluation process for creating eHealth promoting communication. Interactive eHealth communication also present an opportunity for the health care services to achieve the goal of re-orienting health care services into health promotion services and to contribute to enhancing health literacy in the population.
9 Research contribution

9.1 Contribution to research

This thesis is a response to the call for holistic and sustainable eHealth systems. There are few studies that have used value based, participatory methodology, hence this thesis contributes to knowledge on working with value-based methodology in the design of ICT-based health communication. Through its contribution on collaborative design methodology, this thesis could contribute towards bridging the gap between existing technologies and the people’s abilities to engage with them.

To the field of health communication this thesis contributes to developing of ‘health promoting communication’ which is broader and health promotion oriented than the traditional health communication strategies available. It presents a new way to conceptualise health communication for health promotion. In the interdisciplinary research area of Applied Health Technology within which this thesis is presented, the results show that design of ICT supported health promotion communication is about more broad-reaching and complex issues than the design of the technology itself. In this thesis, the focus is on the conceptual and socio-technical design of health promotion communication in a PHC context, while the design of the ICT-support itself is subordinate to and dependent on this.

9.2 Contribution to practice

The implementing of an interactive health channel in PHC has sensitized the health care system to the opportunities available on the Internet to increase health literacy in the population. The project contributed with practical knowledge to the participants from both the IT- department and PHC services which can be used in similar projects in the future, hence, contributing to program sustainability.

The studies presented in this thesis, has shown that there is an interest in local-oriented health promoting communication based on familiarity and pride. Hence, the health care services can capitalise on this knowledge and further improve the citizens’ possibilities to live a healthier life. Providing public spaces such as parks and safe jogging/walking trails among others. The VHT-project has created networks with different groups of citizens in the region. The health care services, PHC in particular, can build on the established networks of civil society and involve them in future development of the health care services. The thesis also highlights the importance of empowerment and capacity building among health personnel. The health personnel who worked in the VHT-project have built their capacity in ICT-related knowledge. After the project ended, one of the nurses got a job in the IT-department as a system administrator. It may or it may not be a consequence of the VHT-project, but she brings with her a rich experience of user perspective, both as a nurse from PHC but also end-user perspective from her experience gained from VHT-project.
10 References


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11 Sammanfattning på svenska

Introduktion
Studierna i föreliggande avhandling har sin vetenskapliga hemtvist i tillämpad hälsoteknik, som är ett tvärvetenskapligt område mellan hälsa och teknik. Inom tillämpad hälsoteknik studeras hur hälsa direktt eller indirekt kan relateras till användandet av teknik. Forskningsfältet för studierna i denna avhandling är utformning av modern informations- och kommunikationsteknologi (IKT) för hälsokommunikation i en primärvårdscontext.

Bakgrund
Länder runt om i världen står inför stora folkhälsoutmaningar såsom ökning av livsstilsrelaterade sjukdomar, eskalerande sjukvårdskostnader, växande ojämlikheter i hälsa mellan folkgrupper och åldrande befolkningar. Industriländer som Sverige satsar alltmer på hälsokommunikation, i synnerhet genom IKT som ett sätt att höja hälsokunskap och förstärka egenmakt (empowerment) på hos individer och befolkning. IKT, däribland Internet, är en av de viktigaste informationskällorna och kommunikationskanalerna i vårt moderna samhälle. Denna ligger stora utmaningar i att med hjälp av modern IKT utveckla miljöer, teknik och arbetssätt som på bästa sätt kan främja tillgänglighet och hälsokommunikation för alla invånare ur en jämlikhetsaspekt "lika för alla efter var och ens behov". Studier visar att det finns en diskrepans mellan de krav som nya informationssystem för hälsoinformation ställer och människors faktiska färdigheter att utnyttja och använda sig av systemen, vilket medför att människor kan ha svårt för att förstå och agera utifrån hälsoinformation. Interaktiv kommunikationsteknik som Internet är ett nytt och innovativt kommunikationsverktyg i hälsowrkte. En sådan interaktiv digital kanal för hälsokommunikation kan utgöra en viktig resurs i arbetet för att förstå och minskning av ohälsa genom en ökad tillgänglighet till hälsoinformation och hälsokommunikation. För att hälsokommunikation ska kunna vara hälsofrämjande föreslås integrering av hälsofrämjande arbetsätt och hälsofrämjande principer i designprocessen av IKT-stödda hälsosystem i avhandlingens studier.

Studie kontext
Hälsotorg var en ny hälsofrämjande arena i Sverige som hade vuxit fram i samarbete med Apoteket AB, landstinget och i vissa fall kommuner under 1990 talet. Hälsotorg är en fysisk mötesplats med syfte att förbättra hälsa utifrån den lokala befolkningens behov och förutsättningar. Hälsokommunikation var en väsentlig del i det hälsofrämjande arbetet på dessa Hälsotorg.

Användningen av modern informations- och kommunikationsteknologi (IKT) och en interaktiv lokal hälsokanal kan öka tillgänglighet till hälsoinformation och hälsodialog. Utvecklingen utgår från en primärvårdscentral i sydöstra Sverige och dess Hälsotorg. Primärvårdscentralen betjänar cirka 10500 invånare. På primärvårdscentralen finns merparten av primärvårdsaktörerna samlade under ett och samma tak: Hälsotorg, distriktssköterskemottagning, läkarmottagning, psykiatrimottagning, barnhälsovård, apotek...
och folktandvård. Därmed erbjuder primärvårdscentralen en unik möjlighet till samarbete kring hälsofrämjande och förebyggande arbete.

Detta projekt har haft fokus på utveckling av ett Virtuellt Hälsotorg, tänkt som ett komplement till det fysiska Hälsotorget. Det fysiska Hälsotorg lades ned 2009 i samband med privatisering av Apoteket och införandet av en ny vårdvals och ekonomisk ersättningsmodell som överförde val av primärvård till invånarna.

Utvecklingen av ett virtuellt Hälsotorg var ett delprojekt i SGF (Syster Gudruns fullskalelabb i Blekinge för IT i vård och omsorg) vilket var ett EU finansierat strukturfondsprojekt som genomfördes i samarbete mellan Landstinget Blekinge och Blekinge Tekniska Högskola.

Syfte
Det övergripande syftet med studierna i denna avhandling var att studera den participatoriska utvecklingen av en interaktiv IKT-stödd hälsokommunikationskanal i en primärvårdscontext. För att kunna uppnå syftet, har fyra delstudier genomförts med syfte att:

- Studie I: Att kartlägga och undersöka Hälsotorget potential som en hälsofrämjande arena.
- Studie II: Att skaffa fördjupad förståelse för hälsokommunikation i hälsofrämjande arbete i primärvården med tonvikt på implikationer för en planerad IKT stödd interaktiv hälsokanal.
- Studie III: Att kollaborativt utveckla och studera design processen av en web-baserad hälsokanal för hälsofrämjande arbete och för att stärka health literacy i en primärvårdscontext
- Studie IV: Att undersöka deltagarnas upplevelse av samverkan i utvecklingen av en interaktiv IKT-stödd hälsokommunikation för hälsofrämjande arbete.

Metod
I det virtuella Hälsotorgsprojektet användes en hälsofrämjande ansats och en deltagarinriktad ansats (Participatory Action Research). I en delaktighetsprocess arbetade en professionell personal tillsammans med lokalbefolkningen, IT tekniker och forskare i utformandet av en Virtuell Hälsotorgskanal.

En modell benämnd ”Spiral Technology Action Research” (STAR), som kombinerar teorier för hälsofrämjade arbete, Freires’s medvetandegörande teori och innovativ teknologisk utveckling, användes för det stegvisa forsknings- och utvecklingsarbetet. STAR-modellen består av steg; dialog, planering, genomförande, testning och införande. De fem stegen sammanställdes till tre faser: dialog, planera och göra, testa och agera. Sammanlagt deltog 146 personer i hela processen. En kombination av kvalitativa och kvantitativa metoder användes för datainsamling och analys.
Resultat

*Studie 1*: Resultatet visar att Hälsotorg hade en stor potential att vara en hälsofrämjande arena utifrån den positiva hälsofrämjande betoningen i policydokumenten, Hälsotorgeuts intentioner och den befintliga naturliga kontakten med medborgarna och andra aktörer i samhället. Studien visar att Hälsotorgspersonalen arbetade med hälsofrämjande aktiviteter men att hälsofrämjande förhållningssätt inte var integrerat i deras arbete.

*Studie II*: Resultatet visar att hälsokommunikation var en viktig strategi i det hälsofrämjande arbetet på Hälsotorget och i primärvården. IKT användes flitigt av både hälso- och sjukvårdspersonal och befolkning. Studien visar på möjligheter och hinder för utveckling av IKT-stödd hälsokommunikation. Möjligheterna inkluderar hälsopersonalens goda datorvanor, erfarenhet av att arbeta hälsofrämjande på individnivå med bl.a. motiverande samtal, stöd för hälsofrämjandearbete både i policydokument och hos ledningen, vilket underlättar implementering av IKT. Hindren inkluderar låg prioritering av hälsofrämjande arbete jämfört med medicinska/akuta insatser, tidsbrist, brist på samarbete mellan de olika enheterna på hälsocentret samt attityder hos både personalen och medborgarna som förknippar hälso- och sjukvården med sjukdom och inte med ”hälsa”.

*Studie III*: Resultatet visar att den deltagaransats som tillämpades i denna studie hade positiv effekt på innehåll och utformning av den virtuella Hälsotorgskanalen. De tester som genomfördes av den slutliga prototypen visar att den upplevdes som innovativ, lättillgänglig och relevant i förhållande till testpersonernas behov av hälsokommunikation. Vidare visade resultatet att användning av virtuellt Hälsotorg kan ha bidragit till ökad eHälsokompetens hos testpersoner beträffande sökvägar samt Internet som ett värdefull eHälsorurs.


**Slutsatser**

Studierna visar att IKT- stödd hälsokommunikation kan vara en värdefull kanal för att främja hälsa och öka eHälsokompetens på individ och population nivå. Hälsofrämjande arbetssätt och integrering av hälsofrämjande principer i design och utvärderingsprocessen av en interaktiv hälsofrämjande kommunikationskanal kan bidra till hälsokommunikation som tar
hänsyn till befolkningens behov av sådan kommunikation samt är anpassad till deras dagliga liv och kompetens vilket ökat dess tillgänglighet, användarvänlighet och relevans.

Studierna visar att det finns ett behov av att skapa innovativa användarvänliga möjligheter för medborgardeltagandet i utveckling av hälso- och sjukvården såsom det kommunikativa rum och den mötesplats i form av en ”verkstad” som användes i föreliggande studier. Skapandet av hälsofrämjande arenor för möten mellan hälso-och-sjukvården och medborgarna skulle kunna bidra till ökat medborgarengagemang i den egna hälsan samt på lång sikt en ökad jämlighet i hälsa.
Appendix
Health promoting settings in primary health care - “hälsovorg“: an implementation analysis

Amina Jama Mahmud1*, Ewy Olander1, Lovisa Wallenberg2, Bo JA Haglund2

Abstract

Background: Sweden, like many other western countries, faces increasing rates of lifestyle related diseases and corresponding rise in costs for health care. To meet these challenges, a number of efforts have been introduced at different societal levels. One such effort is “Hälsovorg” (HS). HS is a new health promotion setting that emerged in collaboration between the Swedish County Councils and Apoteket AB, a state-owned pharmacy company. HS’s overall aim was to improve population health and facilitate inhabitants’ responsibility for self-care. A new National Public Health Policy, introduced in 2008, emphasizes more focus on individual’s needs and responsibility as well as strong need for county councils to provide supportive environment for individual-centred health services and increased health literacy among the population. In light of this policy, there is a need to examine existing settings that can provide supportive environment for individuals at community level. The aim of this study was to explore HS’s policy implementation at local level and analyse HS’s activities, in order to provide a deeper understanding of HS’s potential as a health promoting setting.

Methods: Materials included a survey and key documents related to the development and nature of HS on local and national levels. A policy analysis inspired by Walt and Gilson was used in data analysis. In addition, an analysis using the principles of health promotion in relation to HS policy process and activities was also carried out.

Results: The analysis illuminated strengths and weaknesses in the policy process, its actors, contextual factors and activities. The health communication approach in the analysed documents contained health promoting intentions but the health promoting approach corresponding to a health promoting setting was neither apparent nor shared among the stakeholders. This influenced the interpretation and implementation of HS negatively.

Conclusions: The analysis indicates that HS has potential to be a valuable health promotion setting for both population and individuals, given the strong intentions for a health and empowerment building approach that is expressed in the documents. However, for a more sustainable implementation of HS, there is need for an in-depth understanding of the health promotion approach among HS stakeholders.

Background

Sweden, like many other western countries, faces increasing rates of lifestyle related diseases and corresponding rise in costs for health care. In order to meet this challenge, a number of efforts have been introduced at different societal levels. At the national level, the government introduced a new national public health policy [1] in which other actors such as the Pharmacy (Apoteket AB) were invited to take a more active role in health promotion and disease prevention. It was in line with this, that a new health promotion setting or a healthy living centre named Hälsovorg (Health Square (HS) in English) emerged in collaboration between “Apoteket AB”, a state-owned pharmaceutical company and county councils as a new setting based Primary Health Care (PHC) activity.

A new National Public Health Policy bill [2] introduced by the centre-right coalition government in 2007, marked a transition from strong focus on social structures and health determinants to more attention on individuals [3]. The overall aim of the new bill was to create social conditions to ensure good health on equal terms for the entire population, as stated in the former public health policy (Govern Bill 2002/03:35) however, the new policy focuses...
more on health behaviours and individual’s responsibility for health [3]. The new policy also emphasizes stronger local health promotion initiatives in different settings, one of which is a more health promoting oriented health services. Recently the Swedish Government also introduced a new Health and Medical Care Policy [4] with objectives to offer accessible and effective health care based on individuals’ needs, and transferring the choice of care provider to the individuals. These policies force county council regions to provide a supportive environment for individuals to make informed health related choices and to provide available efforts for individual-centred health services. The utmost goal is to increase health literacy skills among the population. The question we are asking in this paper is if the new Swedish HS could be such a health promoting initiative in Primary Health Care (PHC) that could meet and support both community and individuals at different levels of health literacy [5].

HS is a meeting place for universal health information and individual health counselling on life style related issues with health professionals, health measurements, group activities, and access to trustworthy internet based health information sites and lifestyle tests. HS also provides guidance to appropriate care providers. The origin of HS can be traced internationally to the “community pharmacies movement”, i.e. re-orientation of pharmacies into a health promoting service [6] and to “Healthy City shops”; a Danish Healthy Cities Network initiative for health information and guidance in health issues [7]. Comparison could also be drawn with “Healthy Living Centre’s” in the United Kingdom [8]. These meeting places with community health service and health programs aimed to promote health in its broadest sense, target disadvantaged groups and tackle inequalities in health.

Settings for health is defined as “the place for social context in which people engage in daily activities in which environmental organizational and personal factors interact to affect health and wellbeing”[9]:pg.19. A settings approach provides an ecological perspective where local context networking and alliance building is important [10]. This approach is built upon the principles of health promotion, of empowerment, participation, holistic, intersectional, equity, sustainability and multi-strategy [11,12], and health promotion as a process for enabling people to increase control over, and to improve their health [9].

Settings approach has gained importance in the past decade and has enjoyed sustained support in international health promotion research and discussions [13,14]. Similarly local evaluations of HS, have considered it as a valuable setting for health promotion and a complement to traditional health and medical services [15-17]. HS, according to these local studies, is well accepted as a strong health promotion effort among local communities and HS personnel. However, evaluation of settings based health promotion is not an easy task as settings are complex contexts with many actors whose varied interests and expectations can influence the implementation process [18]. There is therefore a need to understand the implementation process of HS to corroborate or contradict the results of the local evaluations before further expansions is considered. In the light of the Swedish governments’ request for more local health promotion initiatives and a more health promoting health services there is need for further studies of HS and HS’s potential as a supportive environment that could strengthen health and health literacy in the community [2,19].

The aim of this study was to explore the HS policy implementation on local level and to analyse HS’s activities, in order to provide a more in depth understanding of the HS’s potential as a health promoting setting.

Methods
The study adopted a multi-method design [20]. Materials included a survey to HS personnel, and key documents on national and local levels related to the development and character of HS. A policy analysis triangle framework inspired by Walt and Gilson [21] was used for the data analysis. In addition, an analysis using the principles of health promotion in relation to the activities of HS was carried out.

An electronic survey was distributed to key persons at 30 HSs in Sweden in 2006. A pilot test of the questionnaire was conducted prior to the survey. Twenty-one HSs responded initially and five more responded after two reminders. In total, 26 HS responded representing 13 of 18 county councils and two regions. Four HS did not respond, two claimed lack of activities, and two cited lack of time. The questionnaire consisted of 25 closed questions with opportunity to comment on each question, and four open-ended questions focusing on; HS’s intentions and objectives, collaboration and agreements, personnel and activities and development and evaluation.

Key documents encompassed national and local policy documents, meeting protocols, an Apoteket AB Action plan and an Apoteket AB internal report related to the development of HS. Current national key policy documents on national levels encompassed the National Public Health Strategy for Sweden - A Green Paper [22]. The local policy documents included a total of 11 local policy documents; two regional/county council policy plans for 2006, one local primary health care policy plan for 2005, four municipality plans including local public health plans formulated in 2005 and four local HSs' contracts formulated between 2003-2006. The documents were obtained on request in the survey and by internet.
search with the search terms “Hälsotorg” and “Apoteket” (Pharmacy) from the involved county councils and municipalities’ web pages. The local documents represented ten HSs in four regions/country councils.

Data from the survey, documents and internet searches were analyzed with quantitative and qualitative content analysis [19,23]. Thereafter Walt and Gilson’s “policy analysis triangle framework” [21] was used to analyse components in the policy triangle, the policy making process (problem identification, issue recognition, policy formulation, policy implementation, policy evaluation), actors, content and contextual factors, and its complex interaction.

Results

Problem identification and issue recognition

Policy documents and survey response indicated that the implementation of HS arose from a need for structural changes due to high patient load on health services and request for enhanced health services, especially the PHC. Two main rationales for implementation of HS in Sweden were pointed out. These were; the government’s responsibility for public health as indicated in national policy goals, and the uncertainty in health services’ ability to overcome health challenges i.e. escalating costs of prescribed drugs, lifestyle related health problems, health differences within the population and increasing rates of sick leave. The national public health policy documents and the Apoteket AB Action plan identified health information as a vital area that needed improvement in order to increase accessibility to health communication and raise health literacy among the population.

Policy formulation and implementation

A National Public Health Strategy for Sweden - “a Green Paper” [22] published in 2000 proposed Public Health Goals addressing structural and environmental health determinants. One objective focused on a more health promoting Health and Medical Services and their key functions in health promotion. Another focused on access to accurate health information as a prerequisite for equitable good health. Apoteket AB was pointed out as a public health actor with the responsibility to provide producer independent, accurate and accessible health information to pharmacy customers.

These statements marked a starting point for Apoteket AB’s “Health Dialogue” (HD) projects intending to involve pharmacies actively in public health work and to contribute to improved long-term public health. The HD experiences laid foundations for formulation of an Apoteket AB Action plan 2002 and the HS concept. The Action Plan declared HS as a setting for health in which partners (local pharmacies, primary health care and municipalities) could allocate resources and enable long-term health dialogue with the population. Furthermore, the Action plan indicated that a HS should be located near a pharmacy, or as part of ordinary pharmacies, in primary health or municipality centres to profit from the pharmacy customer flow.

The former Swedish Public Health Objective Bill [1] was the third important national policy document for the HS development. The bill diminished Apoteket AB’s responsibility for health information and stated that responsibility for health information should rest on all relevant public sectors allocated with this responsibility. The policy also stated that all sectors of society should bear responsibility for supplying of health information at no cost to the population and should support healthier living. The Pharmacies were however, encouraged to continue taking advantage of the big flow of customers visiting them to provide objective and accessible health information.

According to the Apoteket AB Action plan, 30 HSs were established between 1990-2005 in 18 of the 21 county councils in Sweden. Two HSs started during the late 90’s as pharmacies with expanded health information activity using district nurses as a health counselling resource. Most of the responded 26 HSs were established between 2003 and 2005 (table 1). An additional 25 were planned. The ambition was to establish one large HS in each county council nationally.

At the time of this study, seventeen HSs were integrated into the ordinary day to day activities of the PHC or the Pharmacy (depending on the location), while one HS was in project form. Respondents at eight HSs were uncertain if their HS was in project form or an integrated ordinary activity. At local level, policy formulation emerged in discussions between local pharmacies and county councils but, this process was mainly guided by the Apoteket AB Action plan. Contracts with Apoteket AB were finalized mostly at local level. It is not clear as to what extent HSs’ personnel, interest groups; patient or community associations were involved in the local policy formulation. Thirteen of the responding 26 HSs had written agreements with county councils, 10 had verbal agreements and three had none. Four HSs also had additional agreements with municipalities and one with private companies.

The common overall aims for HS in the investigated local policy plans were to improve population health, facilitate inhabitants’ responsibility for self-care, and to

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be a meeting place for health promotion. Survey respondents considered that local aims and activities corresponded well with those formulated at the national level. Five categories of objectives for HS emerged in the local documents: partnership, personnel, finance, activity and community health promotion. The partnership category focused on improvement of intersectoral collaboration and creation of shared settings for public health actions mainly between the pharmacy, county councils and municipalities. Other actors could be invited to participate in specific HS’s activities and in production of health information material. The personnel category focused on HS’s agreements including participating personnel professions, stipulated time for duty at HS and education for HSs’ personnel. The finance category focused on partners’ responsibility for costs such as salaries, offices, computers, health information material, tests and evaluations. The activity category focused on mediating accurate and contemporary health information, supporting self-care and strengthening individual actions for health with an emphasis to healthy eating habits, physical activity, use of tobacco and alcohol and promoting sexual health, in order to correspond to the national health goal objectives. Finally, the community health promotion category focused on commitment to use HS as a setting for community actions that could support healthy lifestyles for individuals, groups and communities.

The concept of “health promotion” was used positively to express a new approach for a more health-promoting health and pharmacy service throughout the documents and survey response. Different expressions such as “promoting health”, “risk and disease prevention” and “public health work” were used to express HS’s activities. Also, survey respondents used different terms to explain HS’s objectives, activities and implementation. Survey respondents expressed the need for clear guidelines as far as HS’s activities were concerned. According to the respondents, there was a gap between the stated objectives in the policy documents and how they were implemented in the practice i.e. HSs. Common reflections on health promotion resulted in comments like, “unclear objectives could weaken a common approach” and “inability to act according to national aims”.

The implementation process could be seen as both a top down as well as bottom up process. Top down in the sense that the national Apoteket AB governed the HS’s structure and content. Bottom up, as the HSs’ groups were established with representatives from local pharmacies and county councils including HSs’ personnel.

Content
The HS’s activities were based on a “basic package” stipulated in the Apoteket AB Action plan and objectives in local agreements. Most HSs offered health information in form of pamphlets, access to a customer “health computer” with quality assured health information and tests, and individual health counselling free of charge. Almost all HSs provided health products for purchase, equipment for visitors to measure weight, BMI, waist and blood pressure, and health profiling with coaching at a cost. Several HSs had specific topic activities usually organised in recurrent announced “theme weeks” with local representatives from governmental and non-governmental organisations (NGO’s). Depending on local available resources, service for physical activity prescriptions, lectures or study circles, organised physical activities and Nordic walking were offered. Only a few respondents discussed a more focused activity for target groups and chronically ill in accordance with the objectives in the national Apoteket AB’s documents. Most respondents pointed out easy access to objective health information, and to individual health support of community inhabitants to increase personal responsibility for health, as the most prioritized of HS’s activities.

Stakeholder and Actors
The analyses of documents and survey response indicate that a number of actors were involved at different levels in the HS’s policymaking process, referred to as “stakeholders”, “partners”, “interest groups” and “active HS’s actors”. Both the central pharmacy chain and personnel at local pharmacies were involved. County councils and primary health services were represented by managers and personnel at HS. These include nurses, physiotherapists, dental hygienists, occupational therapists. The municipalities’ health and social sector were mainly represented by health planners.

At local level, county councils and public primary health services were important key stakeholders as they had the responsibility for implementing HS’s activities into practice in order to fulfil national and county council aims and objectives of “a more accessible and health promoting health services” [1]. Apoteket AB appeared as the most powerful “policy keeper” and “agenda setter” for the establishment of HSs and the activities. The central Apoteket AB manager took part in the establishment of all local HSs and the central Apoteket AB and pharmacy personnel were constantly present actors at local HSs. In this way, Apoteket AB kept power and took immense responsibility.

The Swedish Government, the Swedish National Institute of Public Health, Swedish Municipalities and County Councils’ Association were mentioned as stakeholders with interest in the HS’s development, in both the Apoteket AB Action Plan and by the survey respondents, but could not be identified as “active actors” in the policy formulation or implementation. Neither were
governmental organisations nor NGOs, local municipalities and inhabitants mentioned as partners in the documents. According to the survey respondents "the active HSs' actors" on local level, mainly consisted of pharmacy and county council personnel and mostly district nurses. Their presence varied from daily to one day a week, depending on the collaboration agreement. The local documents indicated that county council personnel were more active in the HSs situated at primary health centres. This was also corroborated by the survey respondents who confirmed that HSs located in PHC centres involved other health professionals such as dental hygienists, occupational therapists and physiotherapists in their activities from time to time. Due to differences in involvement, county council actors' power and responsibility varied in relation to the pharmacy actors from one HS to another. Non-governmental organisations were or could be invited to participate in different theme-weeks and campaigns.

Policy evaluation
Neither policy documents nor survey respondents provided a clear indication on how the implementation of HSs should be or were monitored and evaluated. According to the survey respondents, most HSs had follow-up meetings at least once a month to reflect on progress and planning although local policy documents and contracts made little provision for this. Four HSs reported comprehensive annual evaluations, while three had occasionally conducted a comprehensive evaluation. The Apoteket AB internal report therefore, requested coordinated evaluations for comparisons and more in depth evaluations regarding evidence and cost-effectiveness of HS's activities.

Contextual factors
Several contextual, structural, situational and exogenous factors affected the implementation of the HSs. The "Green paper" [22] and the Swedish Public Health objectives [1] had particular influence on the development of HSs as they highlighted lifestyle determinants, the need of improvement of health information, and a more health promoting health services. The "Green paper" as well as the Apoteket AB Action plan also referred to an international discourse for more health promoting health services and pharmacies. These discourses supported to a large extent the HS's policy process and gave it high legitimacy.

Another contextual factor was the shared responsibility for HSs between two principal founders; Apoteket AB and county councils. Apoteket AB had a central steered management while the county council had a local steered management. Apoteket AB also had a dual role: to sell pharmaceutical products as a profit-making concern and at the same time, provide health information to reduce consumption of prescription drugs. These overt differences and Apoteket's seemingly incompatible dual role gave at times conflicting roles and could affect the HSs' activity and decisions, according to the survey respondents. However, this was not considered as problematic. Survey respondents also narrated that HS progress and transition after the project phase was affected by lack of adequate resources and guidelines which resulted in little time for planning, development and evaluations.

The populations' need for HSs' services, availability of qualified personnel and the possibility to host activities affected the resource allocation and establishment of HSs. A political will and clearly stated collaboration plans in the local policy plan, acted as catalysts for establishment of new HSs. Furthermore, presence of municipality health planners seemed to be a supporting factor for municipality participation in HSs' establishment. All four collaborating municipalities who had HS's agreements with Apoteket AB and county councils had a health planner, responsible for the municipality public health work, in their workforce.

Discussion
The documents and the survey express ambitions to strengthen local health promotion activities in line with the Swedish Public Health Policy objectives [3]. The survey respondents pointed out health benefits with HS activities and see HS as a vital physical location for health promotion activities. The rapid and extensive diffusion of HSs in 18 of 21 regions/county councils, indicates a strong local political will for implementation of HS as a valuable investment for health promotion efforts. However, the local policy documents were short of origins for health promotion and connection to national and international health policy goals and objectives. In this way the underpinning meaning of a health promoting settings approach [24] does not seem obvious to the HS stakeholders and actors. This could diminish the understanding of HSs' health promotion roots as it is important that fundamental philosophical values of health promotion are clearly reflected in the structures that create a supportive environment for health promotion [25]. The health promotion principles [11], were more or less explicitly mentioned and reflected in documents and by the survey, respondents but not consciously discussed as foundations for the HSs. Such indistinguishable foundations could reduce the possibilities for a consistent and shared health promoting settings based approach among HS's stakeholders and actors [26].

In the following discussion the health promotion principles; intersectoral collaboration, participatory, empowerment, holistic multi-strategy, equity and sustainability; will be used as a base for reflections of HS's potential as a health promotion setting.
Intersectoral collaboration

Although collaboration between different actors and organisations was highly pursued, collaboration was mostly established between Apoteket AB and county councils. Municipalities and NGOs were recognised as important HS actors, but were hardly involved in the policy making process. Apoteket AB was strongly driven by their own agenda which could give the impression that HS is an Apoteket AB- project and not a collaborative project, especially when HSs were located in pharmacies. This caused a power imbalance between the different stakeholders. This power as a “thought control” [21] could diminish local authorities and organisations feelings of participation and responsibility for implementation and sustainable development of HSs in ordinary Health Services. Also, an unclear financial cooperation, various employment and financial situations, values and interests made the collaboration into a balancing power act between Apoteket AB, county councils and municipalities. To avoid conflicting interests, there is a need to hold on to agreements and underpinning HS values of health promotion and settings approach [12,13]. As these agreements are vague and inaccessible to all actors in the case of the studied HS, must management of such barriers be the main task for the collaborating partners as the people working in the practice or the “implementers”, will need a lot of management support [27].

Participation

In both the documents and the survey, stakeholders and actors participation were emphasised as a strong concern for the implementation process and collaboration in HS’s activities. The survey respondents considered their work to be individual-centred, with a high level of participation whereby HSs’ visitors had influence on the consultation mode and right to take part in decisions concerning their own health. In reality the municipality representatives, NGO’s and HSs’ visitors mostly participated as invited by Apoteket AB and county councils on their premises. This gave them a lower participation level than the pharmacy and county councils actors. Such limited involvement could weaken the health promotion settings approach, where activities are supposed to be guided by local needs and context expressed by the people whom these interventions are meant for [28]. More involvement of stakeholders, HSs’ actors and community actors could strengthen an understanding and adaptation of HSs, and development of HSs to a more comprehensive settings based approach [29].

Empowerment

The survey respondents considered that the HS’s efforts with easy access to health information, manned HSs and individual consultations with a participatory individual-centred approach shaped opportunities for empowerment processes and support of individuals’ capacity to take responsibility for their own health. These efforts are in line with the local HSs’ policies and the national public health [3] which stresses empowerment and support as important components for public health improvements [30]. Support of such empowerment processes for increased control over decisions and actions for health [31] requires a professional empowerment approach, based on the beliefs of its philosophic assumptions and skills to use them as foundations for health communication [32].

The vague awareness of health promotion concepts that emerged in the analysis could weaken the foundations for a professional empowerment approach that is essential for improvement of health literacy. These include; personal, cognitive and social skills, and the ability to get access to, understand and use information for promoting and maintaining health [19,33]. Nutbeam [18] points out health communication as essential in modern health promotion and the improvement of health literacy in a population. The need for supportive environment like the HS, will probably increase in the future as demands on people to take more responsibility for their personal health increases [2]

Multi-strategy

The HS’s strategy with a variety of activities and approaches corresponds well with a narrow interpretation of the health promotion “multi strategy” principle [12]. The organisational change to a HS with intentions to increase community collaboration, several activities, population and individual approaches, health information and health counselling, and promotion and prevention, gave a wide range of efforts. This requires a committed and composed health promotion approach among HS’s managers and personnel to be a health promoting setting [28]. Health promotion concepts were not used in a consistent mode, which implicates a diffuse or insufficient understanding of the concepts, its origins, values and meaning. This affects HSs’ actors’ interpretation of approaches, roles, efforts and activities, and chances for a joint approach.

Health communication is a vital part of the HSs’ activities and their visitors have a wide choice of health information materials, opportunities to discuss the information with HS’s personnel and possibility for scheduled individual health counselling. HSs’ personnel work with both “population based, expert led health communication” and “individual based health communication focusing on individual’s needs, health literacy and request of support”. This double mission stresses the need for awareness of differences in approaches and how to synthesise them in the HS meetings [34]. Lack of awareness of the different
approaches among HS personnel could result in a dominant expert lead “individual health advice giving” - contrary to the empowerment health promotion approach [35].

Holistic
The principle of “holistic” [11] takes account of physical, as well as mental, social and spiritual health and its interactions. Local policies and surveys show ambitions for a holistic settings based approach [36] for the HS’s activities and its role as an important actor in the community health promotion context. In practice, this holistic approach was not so apparent. An example is HS’s collaboration with other local settings such as schools and workplaces were mentioned but not elaborated upon. Such collaboration between settings is important in order to achieve a holistic approach, because people belong or move between different settings [13,36]. Within HSs most described HS’s activities focused on physical health and lifestyle changes. This implicates a traditional bio-medical preventive approach, despite the expressed ambitions in the documents to work with a more holistic settings based approach. This could be attributed to the diffuse understanding of health promotion foundations, and its relation to disease prevention in practice [37].

Equitable
In relation to the health promotion principles of equity and social justice [12] the HSs’ local policies emphasise health on equal terms for entire population in conformity to the overall national public health goal [3]. Working with both a population and an individual approach put the interpretation of equity to the fore; “equal in the sense that same efforts for all and after each individual needs” [ibid]. The accessibility to HS’s services and health information, free of charge for all HSs’ visitors, and opportunities for individual support was seen as a way to meet this call of equitable health promotion request. Frohlich and Potvin [38] argue that intersectorial collaboration and participation are important for a vulnerable population approach In the case of HS community members or patient representatives were not involved in the implementation of HS’s and as such demonstrate that this approach is not well integrated into the implementation of HS despite the opportunity available in their collaboration.

Sustainability
Sustainability i.e. “bringing about changes that individuals and communities can maintain once initial funding has ended” [12] was a noticeable issue for several HSs. HS’ long term activities; effectiveness and sustainable efforts were discussed as a strong predictor for further development of health square activity, but not much time was used for follow-ups, evaluations and developmental work.

A weakness that could make it difficult to plan for further development of existing HSs and implementation of new ones nationwide, is the lack of standards for assessment of HS activities. A set of standards to guide the HS evaluations and quality development can be useful, in the initial stages of planning of any project [39]. Hence it is important to incorporate formative, process and outcome evaluations to shed more light on HS’ practical work.

Development of policies are important for creation of supportive environments [40], the scarcity of health promoting policies amongst involved sectors weaken maintenance of newly established settings such as HS. The analysis of the contextual factors shows that different internal and external factors influenced the implementation and activities in HS. Earlier studies have also shown that contextual, internal and external factors as well as organisational capacities and conditions influence the adaption of a new approach and the implementation process [18,41,42].

Limitations
The electronic survey questionnaire was only piloted once. Additional pilots would probably have increased the validity and reliability of the study. Furthermore, the policy and other documents attained were few compared to the number of existing HSs. Hence, the results may not reflect all varieties of HSs. However, it could be argued that since the documents represented more than half of the established HSs, the result is fairly representative. This shortcoming, nevertheless, has been taken into consideration in the analysis. The authors avoided making comparisons between county councils/regions and from drawing far reaching conclusions about how the local documents gave legitimacy to HS implementation and transformation of HSs from project to integrated activities in their respective practices.

Conclusions
The study contributes to an understanding of the new setting HS, as well as the HS’s policy processes, its actors and context, and how this could be better framed to support implementation and sustainability. The Walt and Gilson policy analysis triangle [21] was a useful tool for the policy analysis of local implementation, although the analysis model is discussed by the authors as a tool for understanding more exhaustive policy making processes. The health promotion principles used as basis for the analysis contributed to a deeper understanding of the policy implementation and practice of HS.

The analysis suggest that HS has potential to be a valuable health promotion setting as the findings show
that there are keen intentions to organise HS using health promotion and empowerment building approach. However, this is not so apparent nor is it shared among the actors. Recent deregulation of Apoteket AB [43] makes sustaining or further development of HS activity in the original collaboration, uncertain. On the other hand this changed circumstances, can be seen as a window of opportunity for the PHC to boost its health promotion efforts by taking over the responsibility for HS activity. This would contribute to a more health promoting health services as stipulated in the new public health policy [2]. To facilitate this process there is a need for a better understanding of health promoting settings approach among the HS’s actors, politicians as well as HS workers. Furthermore, to be able to sustain HS, there is a need to understand implementation process and the importance of carrying out systematic evaluations in the practice.

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Author details
1School of Health Science, Blekinge Institute of Technology, SE-371 79, Karlskrona, Sweden. 2Department of Public Health Sciences, Karolinska Institutet, SE-171 76, Stockholm, Sweden.

Authors’ contributions
The individual contributions of authors to this manuscript are; LW, EO, BH, AIJM conception and design; LW, ED acquired the data; LW, AIJM, EO, BH analysed and interpreted the data; AIJM, EO BH drafted and revised the article. All authors read and approved the final version of the manuscript.

Competing interests
The authors declare that they have no competing interests.

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Health communication in primary health care - A case study of ICT development for health promotion

Amina Jama Mahmud1*, Ewy Olander1, Sara Eriksén2 and Bo JA Haglund3

Abstract

Background: Developing Information and Communication Technology (ICT) supported health communication in PHC could contribute to increased health literacy and empowerment, which are foundations for enabling people to increase control over their health, as a way to reduce increasing lifestyle related ill health. However, to increase the likelihood of success of implementing ICT supported health communication, it is essential to conduct a detailed analysis of the setting and context prior to the intervention. The aim of this study was to gain a better understanding of health communication for health promotion in PHC with emphasis on the implications for a planned ICT supported interactive health channel.

Methods: A qualitative case study, with a multi-methods approach was applied. Field notes, document study and focus groups were used for data collection. Data was then analyzed using qualitative content analysis.

Results: Health communication is an integral part of health promotion practice in PHC in this case study. However, there was a lack of consensus among health professionals on what a health promotion approach was, causing discrepancy in approaches and practices of health communication. Two themes emerged from the data analysis: Communicating health and environment for health communication. The themes represented individual and organizational factors that affected health communication practice in PHC and thus need to be taken into consideration in the development of the planned health channel.

Conclusions: Health communication practiced in PHC is individual based, preventive and reactive in nature, as opposed to population based, promotive and proactive in line with a health promotion approach. The most significant challenge in developing an ICT supported health communication channel for health promotion identified in this study, is profiling a health promotion approach in PHC. Addressing health promotion values and principles in the design of ICT supported health communication channel could facilitate health communication for promoting health, i.e. ‘health promoting communication’.

Keywords: Health communication, Health promotion, Case study, Health promoting, Communication, EHealth, Information communication technology, Primary health care

* Correspondence: amina.jama.mahmud@bth.se
1School of Health Sciences, Blekinge Institute of Technology, Karlskrona, Sweden
Full list of author information is available at the end of the article

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Background

Primary Health Care (PHC) has been singled out as the most suitable health care setting to meet the increasing need for health promotion interventions and to curb the rising number of chronic diseases [1-3]. A majority of people depend on health care services for health information, yet PHC is poorly equipped to provide this service [4]. Developing Information Communication Technology (ICT) supported health communication in PHC could contribute to increased health literacy and empowerment, which are foundations of health promotion and the notion of enabling people to increase control over their health and its determinants, and thereby improve their health [5,6]. It is however essential to conduct a detailed analysis of the setting and context prior to implementing an intervention in order to “avoid murky water and increase the likelihood of success” [7] (pg 506). The aim of this study was to gain a better understanding of health communication for health promotion and factors affecting such communication in a PHC setting, as a first phase in the development of an ICT supported health channel.

Health communication

The development of health communication for promoting health has mainly taken place outside the health care services [1]. When health communication does occur within the health care services, it lacks a broad socio-ecological health promotion approach, needed to tackle lifestyle related ill health and health inequalities [8,9]. An ecological health promotion approach addresses socioeconomic and cultural factors that determine health as well as providing information and life skills to make appropriate health decisions. Such an approach includes both promoting health and preventing diseases [10], and is referred to as a health promotion approach in this paper.

Consistent with this health promotion approach, health communication in this article is defined as ‘the art and technique of informing, influencing and motivating individuals, institutional and public audiences about important health issues’ [11]. The communication adopts a participatory approach whose main aim is empowerment through dialogue and mutual learning; the process is as important as the outcome [12].

Participatory communication could facilitate collaborative learning for both provider and receiver of health communication [13]. Health communication providers can learn about receiver’s needs and preference for health communication through collaboration process; an insight that could enable them to construct health communication resources that is relevant and accessible to intended receivers. Likewise, receivers may gain more knowledge on health and health management as well as relationship between health and lifestyle through the same dialogue process. Raising health literacy of both parties is important for sustainable health care services [14].

Improving health literacy is critical to empowerment [15]. As a concept, health literacy encompasses more than transmitting health information and developing skills. It entails improving people’s access to health information and support capacity to use it effectively; in order for them to make informed choices, reduce health risks and increase quality of life [14,16]. In this light, health literacy is an important public health goal to reduce inequity [6]. The Ottawa Charter identified creation of supportive environment, developing of personal skills and reorienting health services as important action areas [17]. These action areas are incorporated in the Swedish Public Health policy [18], whose overarching goal is ‘to create societal conditions to ensure good health, on equal terms, for the entire population’. To achieve this, eleven goal areas have been identified, two of which are; to enable citizen participation in social and health care services; and to re-orient health care services into a more health promoting health services [18].

ICT-mediated health communication

ICT mediated health communication media, with internet at the forefront, are increasingly becoming an accepted strategy for communicating health. Internet’s flexibility and accessibility through different channels makes it an ideal platform for communicating health [19,20]. Health channel in this paper is defined as a mode of transmission that enables messages to be exchanged between “senders” and “receivers.” In the context of internet, senders of the communication may have to contend with participants who engage, contest, reframe and deepen the messages in the communication process. This may take place either in an on-going dialogue in real-time or via other feedback avenue [21]. Implementation of ICT for health communication or aspects of ICT in health communication, as in eHealth applications, is essential to meet growing demands for cost-effective, appropriate and individually tailored health care as well as to increase accessibility to health services [22], improve population health outcomes and to achieve health equity [19]. Yet the implementation of ICT supported health communication for health promotion within health care services has been slow in uptake [8,19].

Criticism has been leveled at the existing ICT mediated health communication in health care as it is perceived to be predominantly individual based and pro-medicine in its approach [4,23], lacking a holistic approach and ability to address determinants of health [22]. Thus there is a need to rethink health promotion in planning for ICT mediated health communication [8,22] for a holistic approach in conceptualization and design of ICT systems in health care [24]. Innovative ways to design ICT systems in health care can contribute to individual wellbeing and quality of life,
and achieve improved public health and sustainable e-services in general [25].

In the light of the challenges facing PHCs and opportunities presented by ICT in health care services outlined in the background, there is need to conduct a feasibility study prior to implementation of a new ICT supported health communication tool; in order to situate practice in its context and increase the likelihood of success [7]. Implementation of ICT is expensive, time consuming and often quickly outdated [8,26]. In order to develop sustainable ICT systems that fulfill health promotion goals in PHC, there is a need for both the system developers and health personnel to understand what functions the system is supposed to fulfill and the contexts in which it is to function [27]. This need informs the aim of this study which is to gain a better understanding of health communication for health promotion and factors affecting such communication in a PHC setting. This study has the potential to guide researchers and PHC managers in future feasibility studies and/or the implementation of ICT systems.

Study setting
The study was conducted within a county council owned PHC and its health promotion center ‘Hälsotorg’ in the southeast of Sweden which provides health services to approximately 10,500 inhabitants. The PHC center houses several units: General Practitioner (GP) and District Nurse (DN) consultations services, Child Health Services (CHS), Hälsotorg Pharmacy; Dental and Psychiatric Clinic.

The Hälsotorg was partly owned and managed by the PHC. Hälsotorg emerged in several county councils in the 1990’s as a collaboration between the then, state owned, pharmaceutical company and PHC in a bid to increase health promotion within the PHC services [28]. According to local evaluation reports, the concept and ambitions of Hälsotorg were appreciated by health personnel as well as visitors [29]. As it contributed to the alliance building with other actors working in the field of health, opened up PHC to the non patient segment of the society and thereby increasing citizens’ accessibility to and participation in health care as stipulated by the national public health policy [18]. This makes PHC a natural entry point in health care as stipulated by the national public health policy [18].

To improve accessibility to health promotion initiatives for the local community, a research and development project entitled ‘Virtual Hälsotorg’ (VHT) was initiated to make Hälsotorg activities more accessible to the local community through an internet supported interactive health channel. The main objective of the VHT project was to develop an interactive digital health channel for health promotion, a virtual “meeting place” for health issues between community members and health care personnel in PHC. According to the project goals, VHT channel was to be specifically adapted to the socio-cultural context of PHC and the local community. The VHT project was part of an EU funded research and development project exploring how ICT can be used to increase citizens’ accessibility to and participation in health care, and development of health care services.

Methods
Study design
The Virtual Hälsotorg (VHT) research project adopted a Participatory Action Research (PAR) approach [31]. A model, entitled Spiral Technology Action Research (STAR) [27], was used to guide the design process. The STAR model combines health promotion and social theories, PAR approach, critical pedagogy and ICT systems design approaches using rapid cycle of change strategies [27]. The iterative nature of the STAR model allowed continuous feedback and dialogue between partners in the research project which resulted in action/improvement of the product thereby making it a tangible method for realize the PAR approach of the project. The STAR model consists of five developmental cycles entitled; Listen, Plan, Do, Study and Act. For the VHT project, these cycles were combined to form three developmental phases; phase 1; Listen, phase 2; Plan and Do, phase 3; Study and Act. This article covers the first phase Listen; which entails ‘scanning the setting’. This article had a dual purpose. First, to familiarize with the setting for the intervention. Second, to assess health communication needs and identify subject’s interaction with technology. The goal of this phase in the VHT project was to ensure that the development of the system was guided by the users, both health professionals and the local population, needs as expressed by them [27].

A qualitative exploratory case study [32] methodology with multiple data collection methods; field study with participatory observations, document studies and focus groups were applied in the study to facilitate a holistic view of health communication practiced at Hälsotorg and PHC (Table 1). PAR approach, provided possibilities to understand individual and organizational factors as well as the relationships between these factors [32,33]. Since the boundary between Hälsotorg and its context (PHC) were not clearly evident, the whole context was treated as a single case study [32]. The case and unit of analysis was the phenomenon ‘health communication’ in the context of PHC in general and Hälsotorg in particular. According to Yin, use of multiple sources of evidence allows the investigator to address a broader range of issues comprehensively thereby contributing to convincing and accurate findings or conclusions [32] hence increasing credibility and trustworthiness of the results [33].
Table 1 Summary of data description, sources and methods used for data collection

<table>
<thead>
<tr>
<th>Data source</th>
<th>Sample description</th>
<th>Data collection methods</th>
</tr>
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<tbody>
<tr>
<td><strong>Field study</strong></td>
<td>A total of 251 visitors were registered during the 3 week period of field studies.</td>
<td>Participatory observations with a field manual to guide data collection under 3 months; 2 days a week in 2008–2009. A manual was used to guide data collection</td>
</tr>
<tr>
<td><strong>Documents</strong></td>
<td>One National Public Health Policy 2007/08:110</td>
<td>National policy documents identified and attained during previous study in the same project.</td>
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<tr>
<td></td>
<td>One National pharmacy (Apotekets AB) Action Plan 2002.</td>
<td>County council documents retrieved through manual and internet searches through County Council website. using the terms “Hälsotorg”, “Health promotion AND Sweden”, “Primary Health Care” and “Policy”. Combinations of these terms were also used.</td>
</tr>
<tr>
<td></td>
<td>One Hälsotorg evaluation report 2008</td>
<td>Monthly Hälsotorg reports kept by personnel under the field study period documenting</td>
</tr>
<tr>
<td></td>
<td>Three Hälsotorg network Meeting protocols 2008–2009</td>
<td>Hälsotorg activities and visitor’s statistics</td>
</tr>
<tr>
<td></td>
<td>Four Monthly reports covering the period of field study from the four Hälsotorgs in the region 2008</td>
<td>Health information materials at Hälsotorg</td>
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<tr>
<td></td>
<td>Printed materials on lifestyle health problems from Hälsotorg.</td>
<td>collected during the field study</td>
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<tr>
<td></td>
<td>Information on Hälsotorg activities.</td>
<td></td>
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<tr>
<td><strong>Focus groups</strong></td>
<td>Total (N=30) persons took part in 5 groups of 3–9 persons/group</td>
<td>Focus group discussions, using semi-structured interview guide.</td>
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<td></td>
<td><strong>Group 1 and 2:</strong> DN from PHC (n=9)</td>
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<td></td>
<td><strong>Group 3:</strong> Hälsotorg network group consisting of 6 (3 pharmacists, 3 DN’s) Hälsotorg personnel from the other three Hälsotorgs in the region, 1 PHC manager, 1 Regional public health strategist, 1 Psychiatry clinic manager and 1 Dental clinic manager (n=10)</td>
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<td></td>
<td><strong>Group 4:</strong> Immigrants at a Swedish language instructions class (n=8; 6 women, 2 women), ages 26–50. Length of stay in Sweden 6 months – 8 years</td>
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<td></td>
<td><strong>Group 5:</strong> Hälsotorg Personnel in PHC setting of the case study (n=3)</td>
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</table>
Case description

Hälsotorg in this study was managed by health professionals from the PHC and the Pharmacy. It offered a range of health promotion activities including health information in print and electronic media, individual health counseling on lifestyle-related health problems like stress, physical inactivity, overweight and chronic diseases such as hypertension and diabetes. It also offered group activities such as: open public lectures, ‘power walking’ and aerobics for people with physical disabilities. A customer computer placed at the Hälsotorg provided access to free, trustworthy Internet-based health information sites and self-administered lifestyle tests. All activities were open to all citizens free of charge.

The term ‘visitor’ was used to describe all who visited Hälsotorg, regardless of how or why they came, in contrast to ‘patients’ in other PHC units. Hälsotorg personnel did not have an obligation to document visitors in the electronic patient record, thus all visitors had the right to be anonymous. Hälsotorg had two types of clientele: visitors, who visited of their own accord and visitors who came on referral from GP, DN or CHS.

The case was expanded to include experiences of personnel from the other three Hälsotorg in the region to get a broader perspective of health promotion services offered and to solicit input on the content and development of a VHT model usable in all county council owned PHC in the region. The GP and DN consultations services, CHS and Hälsotorg belong to the same organization and will henceforth be referred to collectively as ‘PHC’ in this paper, likewise, personnel from respective units will be referred to as ‘health personnel,’ unless the need to separate them arises.

Fields study

To familiarize with the setting for the intervention, find and assess needs, and identify how subjects interacted with technology, a field study was conducted under a period of three months, twice a week, in 2008–2009. AJM took part in Hälsotorg activities and staff meetings in the PHC, collecting data using participatory observations [33]. A total of 251 people visited the Hälsotorg during the period of the field study, some of whom took part in the informal interviews which formed part of the field notes.

Participatory observation as a method contributed to a better understanding of the context, its actors and their interrelations. Thereby a nuanced understanding of the context as a basis for understanding data collected through other methods such as focus groups and document studies [33]. Furthermore, findings from the participatory observations were used to identify key actors (study sample) and to design questions for the focus group. Participatory observation was useful as expression of needs, especially for technology based resources, is often tacit and hard to deduce for the majority of the people [31,34].

A field study manual covering activities conducted at Hälsotorg, participants and reason for participation. The manual also focused on how health communication was framed and communicated as well as tools and strategies used to communicate health. The interaction between health personnel and between health personnel and Hälsotorg visitors were also covered. The manual observations notes, impromptu conversations and personal reflections were recorded in field notes. The notes were then expanded when the situation allowed or at the end of the day to identify assumptions, make sense of the data, and record personal insights that might have affected the data [34] and discussed with the DN at Hälsotorg.

When Hälsotorg visitors allowed it, AJM actively participated in the activities which gave the opportunity to closely observe the activity and ask questions in an unobtrusive way [34,35]. Similarly, AJM, helped in the planning of two public lectures during the field study, thus giving insights on how health communication via mass-media was articulated and executed. Field notes were read repeatedly to make sense of the collected data and get a sense of whole. The data was later coded and categorized using qualitative data analysis [34].

Document studies

Purposive sampling was used to identify documents, printed materials and records [34] that were of importance to health communication and health promotion in PHC. A total of 13 documents and other printed materials used at Hälsotorg were identified as crucial to understand how health promotion in PHC was articulated in text and how it is interpreted in praxis as basis to understand the what, how and why of health communication for health promotion practiced in PHC and factors influencing it (Table 1).

The national documents; the public health policy 2007/8:110 and pharmacy (Apoteket AB) Action plan 2002, were identified through an earlier study of Hälsotorg implementation analysis [28]. The county council documents were identified during field studies data collection period and obtained through internet searches on the county council website. The rest of the documents included; an evaluation report of Hälsotorg in the region, meeting protocols, monthly reports (mainly activities offered and statistics of visitors) kept by all Hälsotorg during the field study. All the documents related to the development, visions and goals for health promotion in PHC. Qualitative content analyses were conducted whereby phrases describing health promotion, health communication in PHC as well as PHC’s missions, role and responsibility in health promotion were highlighted and coded [34].
Focus groups
To explore the knowledge and experiences [34,36,37] of the different actors in the PHC, focus groups were conducted with actors involved in health promotion in PHC (Table 1). Purposive sampling was used to identify potential information rich sources and main actors [37] among health care personnel in PHC and local community members. To gain a better understanding of health communication for health promotion in PHC and capture perspectives and experiences of the different actors who affect or are affected by it, effort was made to include providers, receivers and decision makers of health communication in PHC.

Focus group participants were recruited using snowball methods [38] where PHC manager and DN in Hälsotorg played a key role in identifying and recruiting of informants. A letter containing project information and a request for participation was sent out to prospective informants in PHC and to a Swedish language class for immigrants. Respondents to the letter, were later contacted to decide on dates and places for focus groups. Five focus group interviews were conducted. Group 1 and 2 consisted of DN in PHC (n=9). Group 3, was Hälsotorg’s network (n=10) consisting of PHC managers, a pharmacy manager, dental clinic manager, psychiatric clinic manager, Hälsotorgs personnel across the region, and a public health strategist. Group 4 consisted of immigrants from a Swedish language school while group 5 was made up of Hälsotorgs’ personnel in the PHC of this case study. The total number participants in focus groups was 30 (Table 1).

The immigrant group was a strategic choice as Hälsotorg personnel recounted that from their experience, immigrant groups had low health literacy and were hard to reach. During the period of this study, Hälsotorg had contact with immigrants in the Swedish language instruction school (SFI). The immigrants were informed about the study and requested to participate.

Data was collected using semi-structured, open ended interview guide [34,39] divided in two parts. The first part pertained informants’ personal experiences of designing, delivering / receiving health information/ health communication in or from PHC. The second part concerned informants’ knowledge and experience of ICT supported tools for health information and suggestions for improvements of health communications for health promotion.

The interview guide was modified to adapt to the different groups of informants in order to capture the varying perspectives, experiences, roles and needs. Focus groups with health personnel were conducted in private rooms within the PHC, while focus group with the immigrant group was conducted in their classroom which was a familiar environment [31]. AJM functioned as the principle moderator in all the focus groups assisted by EO who took notes. A post meeting analysis of the session was held by the researchers at the end of every session to compare notes and identify new ideas (if any) that needed to be explored in the next focus group [37]. Focus groups discussions were audio taped and transcribed per verbatim [34]. Data was read repeatedly to achieve immersion and obtain a sense of whole, then coded and categorized using inductive qualitative content analysis [34].

Data analysis
Data from focus groups, participatory observations and document analysis were analyzed, coded and categorized separately using inductive qualitative content analysis [34]. Emerging categories from the different data sets were constantly compared to each other and integrated into themes (Table 2) to form a rich description of the case [32]. Coding was initially done by AJM and thereafter negotiated and checked for comprehension with the other co-authors. The derived results were then presented to the DN in Hälsotorg for validation. Two main themes emerged from the data analysis namely; communicating health and environment for health communication.

Ethical considerations
The informants were informed on the nature of the study, in accordance with the Swedish Ethical Review Act (SFS 2008:192) and informed consent was obtained from participants. Permission to a conduct field study was granted by the PHC manager. One of the main aims of PAR is to create equality between the researcher and research subjects [31] as well as making explicit the researcher’s assumptions, values and motives [40]. To achieve this kind of transparency, AJM kept the participants informed of the project through; talking to the personnel, taking part in workplace meetings and holding debriefing sessions with the other research members to ensure that personal values and motives did not affect

<table>
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<tr>
<th>Subcategories</th>
<th>Categories</th>
<th>Themes</th>
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<tbody>
<tr>
<td>Empowerment Behavior change</td>
<td>Strategies for communicating health</td>
<td>Communicating Health</td>
</tr>
<tr>
<td>Channels Methods Competencies</td>
<td>Tools for health communication</td>
<td>Environment for health communication</td>
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<tr>
<td>Interpersonal Group ICT mediated</td>
<td>Types of health communication</td>
<td></td>
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<tr>
<td>Organisational positioning Physical positioning</td>
<td>Strategic Positioning</td>
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<tr>
<td>Interests Resources Trust Collaboration</td>
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the outcome of the study. Debriefing sessions provided useful arena to discuss difficulties caused by AJM’s dual role of a researcher and health worker when actively taking part in the activities in Hälsotorg. However, since the participatory element of enquiry was limited to participatory observation, few problems were encountered as the researcher was sensitive to the participants’ wishes [31]. AJM would always seek their permission prior to engaging in any activity. The study was approved by ‘The regional ethical committee for Lund/Malmö region,’ at Lund University in Sweden. Diary number 2009/120.

Results
The overall analysis shows that health communication is an integral part of health promotion practice in Hälsotorg and PHC but there was a dearth of consensus among health professionals on what a health promotion approach is, causing discordance in approaches and practices of health communication. Two main themes emerged from the analyzed data: Communicating health and Environment for health communication (Table 2). The results are presented in these themes with their categories and sub-categories. Quotations are included to illustrate how the interpretation is grounded in the data.

Communicating health
Communicating health was identified as a major function for PHC by all informants. This theme captures how health was communicated, understood and practiced. Health personnel identified a number of strategies and tools used for health communication as well as types of health communication carried out in PHC.

Strategies for health communication
This category mirrored two different approaches used by health personnel to accomplish objectives for health communication; empowerment and behavior change strategies. Empowerment was indicated in the policy documents, and acknowledged by health personnel, as the ultimate goal for health communication in PHC. Field studies and focus groups indicated however that the empowerment strategy was more evident in Hälsotorg and in CHS compared to the rest of the PHC units.

In the empowerment strategy, health personnel assumed the role of a dialogue partner and facilitator for the learning process of patients and visitors. Decision were made based on the receiver’s understanding of the information. This approach was commonly referred to by DNs as ‘meeting the clients where they are, in order to guide them to where they want to go in terms of better health’. In most Hälsotorg this empowerment strategy mostly focused on building capacity and providing tools for visitors to make informed decisions or creating solutions to health problems or lifestyle changes through a dialogue, while in CHS, it focused on facilitating empowerment of parents and creating a supportive environment for families. As one Hälsotorg visitor expressed:

“Here (in Hälsotorg) I can discuss different things at the same time, I was referred here by my Doctor because of my high cholesterol but then, I ended up discussing my sleep patterns that is more disturbing to me really more than high cholesterol (laughter). . . You can’t do that at the PHC” (Hälsotorg visitor 1).

Or as another informant expressed:

“That’s how we work all the time, promoting health and preventing ill health in the home now we focus a lot on unhealthy drinking and we routinely ask both mothers and fathers about their drinking habit not just mothers. It is important that children are safe and parents who need help, feel they can get it” (FG 1).

In contrast to the empowerment strategy, the behavior change strategy focused on disease and risk prevention. Health personnel were more or less authoritative and ‘instructed’ the patient/visitor, assuming the role of expert, who ultimately informed the patient/visitor, what was best for them. One of the (health) personnel explained the health communication process as follows:

“We normally go through their (patients’) eating habits and daily exercises together if any and then I show them what they are doing wrong. Then I “teach them” the right diet and tell them that they have to exercise at least half an hour per day. Some do not follow our advice but that’s their own responsibility” (FG 2).

Comparison of data from interviews and field studies showed that the different strategies could be traced to health personnel’s understanding of the health promotion concept and the exhibited discrepancy between their intentions to promote health and the existing praxis for health communication in their respective units.

Tools for health communication
This category included tools as channels, tools as methods, and tools as competencies.

Tools as channels for health communication included telephones, printed and electronic materials, and Internet-based resources. These were used for health communication with patients/visitors/separately or in combination, depending on the nature or purpose of the activity and the desired outcome. According to informants and observations, telephone, printed and electronic materials were common channels for health personnel’s communication with patients and visitors. Health personnel used Internet
mostly to search for health information for the purpose of updating their knowledge or to retrieve health information materials for their clients/visitors. Patients and visitors used telephones mostly for health communication with health personnel, while Internet was used to seek knowledge in an area of interest or concern; mainly chronic diseases and self care.

*Tools as methods* included questionnaires, brochures, and electronic or printed health tests. Almost all individual counseling sessions were initiated using a printed or electronic health questionnaire followed by a dialogue. Health personnel were positive towards these tools, as they gave structure to health communication activities. However, according to health personnel and visitors these methods could potentially encourage an expert-laymen driven approach, reducing health communication to filling of questionnaires instead of having a dialogue between partners. Health personnel acknowledged the shortcomings of the questionnaires as an effective tool for promoting health as follows:

“...yaaa (hesitating) ...we don’t produce them (questionnaires) ourselves. ...they are standardized and most people have more than one health concern, there is a risk that you focus too much on the questionnaire instead of listening to the patient” (FG 2).

*Tools as competencies* for health communication encompassed knowledge, abilities and pedagogical skills for health communication, which were perceived as necessary tools for imparting or working with health promotion. Knowledge and abilities refer to skills necessary for health personnel to impart health related knowledge that influences individual health choices and self-care. Pedagogical skills refer to health personnel’s ability to apply those skills appropriately and in a way that fosters empowerment in their clients/patients. DNs, in particular, expressed a desire for internal courses to improve their pedagogical skills and capacity to act as health promotion agents. As expressed in one of the focus groups:

“...of course we can be better at communicating when it comes to health promotion and disease prevention...but it is not always easy. For instance, when you get a patient with hypertension who is a bit fat, you can talk about diet...but to apply it generally in the day to day activities is hard....that needs a different kind of structure, skills and knowledge...pedagogical skills that unfortunately are not there in us...” (FG 1).

**Types of health communication**

Three types of health communication were identified from the data: *interpersonal, group* and *ICT mediated* health communication. *Interpersonal communication* was the most common type of communication used in PHC and at Hälsotorg as the majority of activities/services targeted individuals. Motivation Interview (MI) was the recommended method for individual health counseling in the county council policy document and also acknowledged and used by the DN’s. Face-face verbal communication between patients/visitors and health personnel in either planned individual counseling or during ‘drop in’ sessions. The patient/visitor’s needs and abilities were the main focus of interpersonal communications. According to health personnel, it is important to identify patient’s source of motivation as opposed to health personnel’s. As exemplified in the following quotation by health personnel:

“...it is hard for people to change their habits...but we try to help them identify things that would make them want to change, for example if a visitor is diabetic and overweight...to us it is natural to say diabetes is the problem, but maybe the person wants to lose weight because they want to look beautiful...(all informants nod in agreement)...then beauty is that person’s motivation but in the end the results (of losing weight) would be good for their diabetes too” (FG5).

*Group communication* was mostly used at Hälsotorgs during group activities such as physical training and open lectures on different lifestyle related ill health. Different kinds of physical training sessions were offered for example; aerobics for physically challenged persons (including wheelchair-bound persons) and power walking. Open lectures also varied in content, from stress to cardiovascular diseases. These activities paved way for group communication and facilitated dialogue on varied health issues between health personnel and community members.

Findings show that group activities were appreciated by both Hälsotorg personnel and visitors. Hälsotorg personnel saw these sessions with group discussions, as opportunities to communicate health to a larger population, something that is not always easy to accomplish in the day to day work. For visitors, these sessions were more than just an opportunity to exercise or get health information; they presented an opportunity for collaborative learning and opportunity to act on the knowledge acquired for health gains. This would not have been possible if Hälsotorg had not created supportive and inclusive environment for all citizens, regardless of health condition. As expressed by a Hälsotorg visitor:

“Hälsotorg has saved my life...I come every Tuesday and walk with this group...it is nice...I made some friends...and the DN can see when somebody is having difficulties...I have a bad heart and I would
never dare go on long walks like this if I didn’t know there was somebody to help me if I collapse. She sometimes tells me and the whole group to reduce our pace. Because she “sees” when I am struggling…” (Hälsotorg visitor 6).

ICT mediated health communication, especially the Internet, was regarded as an important media for health communication by all informants. Younger Hälsotorg visitors and immigrant informants were more positive to the use of internet as a source of health communication; they reported using Internet for health information needs more extensively than health personnel and older Hälsotorg visitors. Younger Hälsotorg visitors and immigrants reported using internet to search information on lifestyle related illness. Mainly information on weight loss, diet, smoking cessation and stress as well as cardiovascular diseases. Information on how to contact the local PHC clinics and hospitals was also reported. Immigrant informants used both Internet and digital television, as these channels offered health information in their native languages. Hälsotorg personnel frequently used web based-lifestyle questionnaire on the Pharmacy’s website apoteket.se to test the visitors’ diet, sleep, exercise, smoking and drinking habits.

Results from the web based-lifestyle questionnaire was used as a basis for individual counseling sessions regardless of what health problem the visitors came in for. A clear irritation was noted among some of the visitors who did not see the connection in for example the hypertension control they came in for and answering the long questionnaire while others appreciated the questionnaire, noting that it has helped them realize that they need to eat better balanced diet or stop smoking for example.

A common phenomenon noted during the field studies was the number of Hälsotorg visitors coming in with health information acquired from the Internet, wanting to discuss the content and validity with the personnel. A DN expressed criticism of the Internet as a source for health information as follows:

“…patients come with all kinds of information, sometimes wrong information and it’s hard to counter that kind of misinformation. The new health channel would be good because we will be able to give them access to health information that we know is correct” (FG 3).

Environment for health communication

The environment for health communication was seen as both a facilitator and barrier to health promoting communication efforts in PHC. Two important factors affecting the environment of health communication were identified: Strategic positioning and Collaborating for health communication. Positioning of Hälsotorg within a PHC center affected health communication at the PHC units and Hälsotorg, as well as the collaboration efforts between the different actors.

Strategic positioning

According to the analyzed policy documents, Hälsotorg were strategically placed both organizational and physically within the PHC context to provide local citizens with health promotion and disease prevention services; and to help them navigate the health care system using health information and health communication as strategies. Provision of these services was aimed at increasing health literacy and capacity for self-care among the population, which was supposed to reduce pressure on the PHC medical services.

Organizational and physical positioning were identified as important factors shaping health communication practice in PHC. Organizational positioning referred to the placement of Hälsotorg within the PHC administrative organization. According to the National Pharmacy Action plan, placing Hälsotorg within the PHC and the pharmacy organizations was a strategy to profile health promotion and disease prevention services in order to involve local citizens in a health dialogue, help people manage their health problems and stay healthy. The Pharmacy, which already had counseling services and a large flow of mainly healthy customers, could play an important role in promoting health at population level in collaboration with PHC. The county council plans also highlighted the importance of adopting a health promotion approach and the creation of a supportive environment for health within the health care services. Hälsotorg was pinpointed as an important setting for realization of these esteemed goals in the first plan (2007–2009) but was not mentioned in the second plan (2008–2010).

PHC was associated with being sick in most people’s minds, according to DNs. ‘Healthy people’ rarely visited PHC, a statement that was echoed by immigrant informants and Hälsotorg visitors. They only contacted or visited PHC when they were ill, prior to their knowledge of Hälsotorg’s existence. The most frequent visitor was a middle-aged woman or an elderly male pensioner with multi-health problems. Some of the health personnel perceived the clientele as being the ‘wrong type’ for health promotion interventions. They expressed a wish to relocate Hälsotorg in order to attract a ‘younger’ and healthier clientele. As expressed below

“It is perhaps about the kind of people who walk through our walls (referring to the PHC building). . . am I being mean? It is the wrong target group. I feel like . . . maybe we ought to go to schools, year 7, 8, 9, those are the ones we should be aiming at” (FG 2).
However, not all health personnel held the same view. Some regarded the placement of Hälsotorg within PHC context as perfect as related by other health personnel

“...we cannot only target the healthy, we have an obligation to help those who already experience ill health like those with diabetes, they really consume a lot of resources and the best place to “capture” them is in PHC where they come for regular controls. If we can help them prevent further health deterioration like kidney failure, then it is worth the effort” (FG2).

In ambition to reach out to a larger and 'different' audience with health communication, Hälsotorg personnel conducted ‘Hälsotorg on wheels week’ where they set up camps in the town centre and offered their services to the general public, a move that was much appreciated by both the personnel and the public, according to Hälsotorg personnel’s own documentation. The DNs’ opinion about the positioning of Hälsotorg was not shared by informants in FG 3, who regarded Hälsotorg’s positioning to be the best location to intercept people suffering from minor health problems with services geared towards primary and tertiary disease prevention.

DNs in the focus groups (FG1 and 2), indicated that the organization leadership promoted the image of PHC as a setting for ‘sick care’ through policies on the physical environment of the clinics. An example given by informants was a policy where no posters or information leaflets with health information were allowed in the GP waiting rooms while it was allowed in the CHS and Hälsotorg. This differentiation caused frustration among the personnel, as one of them expressed:

“Sometimes, I feel like we could be more proactive and put up information pamphlets and posters on HEALTH! But no, we are not allowed, no reasons or discussions! ”(FG2).

Another informant suggested that the PHC management thwarted their efforts to use health communication proactively, expressing disappointment as follows:

“...we don’t have notice boards here, I tried to put up some notices on health promotion activities but was summoned and told that I cannot do that by the management! ...I don’t understand how they reason” (FG 5).

Physical positioning refers to the placement of Hälsotorg in the entrance hall of a PHC and/or a Pharmacy or a hospital. Field study observations revealed that Hälsotorg’s physical position made it easy for people to stop by and discuss health concerns, obtain help to navigate the health system e.g. to find the appropriate health clinic at which to seek help. On arrival at the Hälsotorg, curious passersby and referral patients from PHC were introduced to a variety of free services offered. These included universal health information, individual health counseling and access to trustworthy Internet-based health information sites for health promotion.

For visitors with a high risk for lifestyle-related diseases like diabetes and cardiovascular diseases, disease prevention services such as hypertension control, lifestyle tests and group physical activities were offered. The most popular group activity was aerobics for people with physical disabilities.

A disadvantage of the openness of Hälsotorg was the surrounding noise and lack of privacy during consultations and individual counseling. This was observed during field studies and later acknowledged by the informants. The noise often led to irritation and disgruntlement, thereby affecting the quality and outcome of the sessions. Hälsotorg personnel expressed that the planned Hälsotorg channel would partly solve this problem:

“This virtual Hälsotorg channel can be good for us; it presents a totally new way of planning individual counseling we can offer a quieter, individual based counseling in the comfort of their homes” (FG 3).

Adding that the privacy presented by the VHT would enable them to increase the range of services offered to their clients as follows:

“We can even put up programs (in VHT) where clients can work at their own pace and convenience, without stress or worrying about being disturbed” (FG 3).

Collaborating for health communication

Collaboration within and outside the health care services such as NGO’s, churches, local communities and municipalities was highlighted as very important for promoting health and providing a supportive environment for health (County Council plan 2007–2009). Hälsotorg was specifically pointed out as a significant converging arena for the different actors to collaborate in creating a supportive environment to achieve health services’ health promotion goals, a setting for communicating health with both patients and local citizens (ibid).

Locating Hälsotorg within the organizational and physical boundaries of health care services resulted in successful collaboration between different professionals and health care organizations for many years, according to the informants and document analysis. Informants acknowledged that making use of the available resources within the different sections of the PHC organization would benefit patients/visitors especially, in health services where
lack of resources and time constraints was the norm. However, different structural and organizational factors served as facilitators or obstacles to collaboration efforts. Three categories; interests, resources and trust were identified as factors affecting collaboration efforts and thereby health communication for health promotion purposes.

Collaboration between organizations/professions depended on shared common interest in terms of either the same target group and/or similar organizational demands. PHC organization in this study was made up of specialized units; CHS, GP and DN consultation. Each unit was allocated resources to work with specific or prioritized target groups. Hälsotorg personnel expressed a feeling of marginalization, which they attributed to the fact that they targeted ‘healthy clients’ as opposed to sick/ill patients targeted by the other PHC units. During the field study it was noted that Hälsotorg personnel unsuccessfully tried to enlist the help of DNs with special competencies such as diabetes or incontinence, to give a public lecture at Hälsotorg. Promoting health was conceived as ‘non-urgent’ and was not prioritized, which explained the difficulty of establishing collaboration with Hälsotorg.

Organizational demands of “need-based” prioritization resulted in prioritization of curative and risk-disease prevention in most PHC units. External organizational demands such as national directives and policies were also cited by health personnel as factors affecting interests and, thereby collaboration. For example prioritization of child and geriatric health in the policy years 2008–2010, led to PHC units prioritizing collaboration around these two target groups. Since Hälsotorg did not have a specified target group, it experienced difficulties finding collaborating partners in PHC. In an effort to bridge the gap between Hälsotorg and the other PHC units, all the hypertension controls were relocated to Hälsotorg. This was a decision that was not popular among Hälsotorg personnel as it was seen as ‘medicalization’ of their services, as expressed below:

“...it undermines the whole purpose of my work...I don’t mind them coming but I have to document in their medical journal...I have to talk about their medical history, diseases...that becomes the focus!... Hälsotorg becomes the extended arm of their medical clinic...” (FGS).

Availability of resources was identified as pre-requisite for communicating health to the public. However, resources were scarce in PHC according to the health personnel. Thus lack of or poor collaboration between different professions and organizations was attributed by the DNs to the scarce resources. Two types of resources were identified from the data: time and economy. Lack of time was attributed to a high workload and little time allocated to each patient, often ageing and multi-morbid patients. However, some DNs suggested that unwillingness to think ‘outside the box’ and negative attitudes towards collaboration more than workload contributed to poor collaboration. Lack of economic resources was also cited by health personnel as a hindrance towards engaging in activities outside the prioritized areas. Health personnel pointed out that they operated on a tight budget, with constant cutbacks which forced them to focus on ‘their’ areas of responsibility. Trust was identified as an important collaboration factor in and for health communication between health personnel and visitors; and between health personnel in different PHC units. Hälsotorg visitors related that they came to Hälsotorg and took part in the activities because they had confidence in the professionals who worked there. The information they received was perceived as trustworthy, correct and evidence based as it came from a health care authority. DNs in other PHC units also expressed that it was easier to collaborate with Hälsotorg when it was managed by ‘one of them’, meaning a DN

“...We try to refer our patients to Hälsotorg they are not used to it but we explain that it is one of our own that will help them and the only difference is that there are no medical records. Once they hear they’ll meet a District Nurse, they go willingly...” (DN 8).

The planned VHT was regarded as an opportunity to overcome some of the collaboration obstacles faced by health personnel. According to health personnel, VHT could be a converging “virtual space” where PHC units could work together but at the same time profile their specific services and communicate with respective target groups.

Discussion

The aim of this study was to gain a better understanding of health communication for health promotion and factors affecting such communication in a PHC setting, as a first phase for developing the ‘Virtual Hälsotorg’ (VHT), an interactive health channel. According to Kreps [8], understanding the context is central to planning of health communication interventions, especially within the health care services, where a myriad of individual, organizational and societal factors influence health related decisions and practice. Findings from this study highlight the interrelation between individual and organizational factors, tools and strategies that affect framing of health communication and, how health communication is communicated, received and understood. These factors need to be addressed by researchers and PHC actors in the planning and designing an ICT mediated health channel for health promotion [8,24], to achieve its goal of improving health literacy.
and to realize the national public health goal of re-orienting health care services into a more health promoting services [18].

PHC in this study is expected to act as a single organization; working towards the same goal of preventing diseases and promoting health for individuals and the community, according to the health policy documents. However, analyses show that the studied PHC faces challenges of catering for a clientele of different ages and health status, as well as serving both individuals and the community as a group. Furthermore, the PHC units were assigned different target groups and adopted different strategies for health communication, making it difficult to achieve the cohesive organization and stated goals. This study therefore highlights a discrepancy between what is stated in policy documents and expressed intentions by health personnel, from the health communication in practice at the PHC.

Collaboration between different actors within and outside the health care settings is an important principle in health promotion. to increase effectiveness and validity of programs [41]. Division of the PHC into specialized units, each with a given target group, ear marked resources for the target group and prioritization were important factors in contributing to the poor adaptation of a health promotion approach in PHC. This demarcation affected content of, and approaches to health communication as well as collaboration between the different PHC units and other partners. Similar results were reported in Johansson et al. [42], where health personnel exhibited both the will and skills for promoting health but lacked the chance to implement them due to perceived lack of opportunity or support from the organization. Thus, organizational structures play an important role in creating a supportive environment to enable integration of health promotion [43]. Health promotion in the PHC studied was regarded as a non-urgent service and as such was not prioritized, which confirms findings from earlier studies showing that health promotion in PHC is sidelined from the rest of PHC activities [42-44].

Health personnel in PHC possess competencies of working with a range of strategies, tools and types of health communication; competencies that could contribute to better ICT based health communication channels such as the planned VHT. DN’s in this study have experience of, and skill for working with individual counseling, knowledge and experience that can be used to inform the design of interactive services of the VHT channel; such as tailoring of health information to better suit the intended end users. Tailoring of health information is believed to be one of the most effective strategies for health promotion and lifestyle-changing interventions [23,45,46].

The results also revealed a need for skills development in health promotion approach among health personnel in this study. Majority of informants equated health promotion to primary prevention, disease prevention and/or prevention of risk for diseases. Prevention was the dominant approach in health communication strategies and health professionals’ repertoire. This despite policy documents clearly stated the need for a health promotion approach in PHC and Hälsotorg even when working with primary, secondary and tertiary disease prevention. Similarly, health promotion was understood as activities to promote health as opposed to an approach to health promotion. According to Irvine [47], health professionals in primary care settings, including nurses, lack adequate knowledge to integrate health promotion in their daily work in an effective and planned manner. Thus there is a need to prioritize education and training of health personnel in health promotion knowledge and skills. By involving them directly in the development process of the planned health communication channel, collaborative learning could be facilitated through dialogue between different professionals and lay people.

Allocating Hälsotorg within the PHC context resulted in a symbiotic relationship between Hälsotorg and PHC. Hälsotorg contributed to a more health promoting PHC services through its health promotion activities while PHC’s narrow and “reactive” prevention approach were forced upon Hälsotorg despite protests from Hälsotorg personnel, like the hypertension controls. However, results also show that Hälsotorg and PHC collaborated in the planning and hosting of theme weeks and public lectures despite their differences. Establishment of VHT could benefit from this existing mutual relationship as it aims to promote health by providing accessible and empowering health communication, and creating a supportive environment for health for individuals and the community. VHT could be a potential and ideal converging point for PHC and Hälsotorg’s health promotion and prevention approaches. This collaboration could further strengthen the PHC’s health promotion ambitions as stated in the policy documents.

DN’s in this study blamed the poor adaptation of health promotion approach in PHC to the lack of support and interest from the management. Similar results were displayed in Johansson et al. study [42], where health personnel had both the will and skills but lacked the chance to show them due to perceived lack of opportunity or of support from the organization. In this study however, there seems to be contradictions, as participatory observations and meetings with the PHC leadership revealed a willingness among PHC leaders to create infrastructures to improve health communication for the purpose of promoting health. These different perceptions could be the result of the lack of dialogue between PHC leadership and DN’s.

According to previous studies [19,45,48], trust can be a defining factor for health information seekers’ use or rejection of the content of health information on the
internet. Trust in content and professions were also cited as two most important factors for choosing health communication resources by local citizens in this study. Pilemalm et al. [45] suggest that involving end users in the design process increases trust among them and thereby probability of their using the system. There is therefore a need to involve all the actors; from PHC managers to DNs in a dialogue during the process of developing VHT; in order to create trust between PHC actors, facilitate sense of shared ownership and sustainability [45,49].

Communicating health is given as an important function in PHC however; results show that there was a lack of synthesis in approaches, strategies and tools to achieve this common goal of promoting health and preventing diseases at individual and community levels. Similarly, empowerment was stated as the ultimate goal of health communication initiatives in PHC but results show that behavior change was the most common approach. Earlier studies have shown that health communication for the purpose of promoting health within health care services, lack a broad socio-ecological health promotion approach [8]. An approach that is necessary to increase individual and population health literacy in order to tackle the determinants of health and the growing burden of chronic diseases [46,8]. In order to identify a common health promoting approach and strategies based on health promotion values and principles, a participatory design involving both end users and providers throughout the design process will be used. Participatory design is attributed to contribute to capacity building as participants learn with and from each other while working towards the same goal, making it an appropriate method for development of VHT [24,45].

Data analysis revealed that PHC personnel face a growing challenge of addressing health queries from informed patients and visitors who are more versed with internet use than themselves. In order to meet this, and other future health communication challenges, health personnel need to improve their capacity for using internet-based information [19,50]. Lack of health information in other languages, besides Swedish, is another aspect that needs to be taken into consideration as studies indicate that immigrants generally experience poorer health than native Swedes [43]. According to the Swedish board of statistics, immigrant communities in Sweden increased from 95750 in 2006, to 96467 in 2011. Prognoses indicate that this trend will continue [51]. An accessible Internet-based health communication could be a strong motivation for immigrants to seek health information frequently and manage their own health. One of the major challenges to introducing a new technology in PHC is the need to increase the capacity of health personnel’s ability to use ICT resources effectively while paying attention to the eminent risk for contributing to communication inequalities and digital divide [19]. Equity and inclusion of the needs of non-Swedish speakers will need to be considered by enabling participation of these groups in the design process of health promoting services.

**Study strengths and limitations**

Use of triangulation of methods and involving other researchers and informants in the data analysis process provided a rich description of the case and context. Furthermore, this study revealed that a multi-method approach unearths more details that are difficult to identify using a single method, for instance, the discrepancy between policy and what is practiced. This provides readers with information to make their own judgments on the study’s applicability in similar contexts, thereby increasing the study’s transferability [52].

Prolonged participatory observation of three months increased the study’s credibility [53] and enabled the researcher to study not only what was present but also what was ‘missing’. Two important observations made were; the lack of communication between PHC and Hälsotorg personnel and absence of pharmacy personnel at Hälsotorg [34]. Participatory observations also gave a detailed documentation of the methodology used for health communication and transparency of decisions, which increases the dependability of this study [52].

By familiarizing with the target groups, the researcher also gained ‘access’ to the field as well as an opportunity to recruit participants for the continued VHT project. According to Smith et al. [40], the success of a PAR research project, like the VHT, depends upon the establishment of an environment for trust between the researcher and the subjects of the study. Furthermore, this phase resonated well with the ‘listen’ phase of the STAR model [27] which entails interacting with the target groups, familiarizing with the context, identifying how target groups interact with technology and carrying out a needs assessment.

A limitation of the study is that it is built on one Hälsotorg and one PHC, and as such, based on a small number of informants. This may have had an impact on the results, as the experiences of the other Hälsotorg have not been explored fully.

Confining the field study to only one Hälsotorg may have narrowed the results as a previous study [28] showed that Hälsotorg offer different services and some had existed longer than others. However, expanding the case to include workers from the other Hälsotorg, was an effort made in order to compensate for the above mentioned limitations.

Exclusion of GP’s and other health professionals, like dieticians and physiotherapists, from the study is a shortcoming as they could have contributed with valuable information to the study. However DNs, included in this study, was the professional group in PHC who were responsible for health promotion services. Including GP’s
was considered, but was not feasible as a majority of the GP’s working at the PHC, at the time of the study, were hired on temporary assignment basis.

Conclusions
This study identified challenges facing the development of health communication for health promotion in PHC. Understanding the opportunities and obstacles for health promotion and health communication in PHC makes it possible to start a dialogue with the different actors identified in the study i.e. health care personnel, PHC managers and local citizens. Engaging the actors in a dialogue could facilitate a consensus on common strategies to overcome the hindering factors and capitalize on the opportunities.

The most significant challenge in developing an ICT supported health communication channel for health promotion identified in this study is profiling a health promotion approach in PHC. To achieve VHT’s health promotion intentions, the development of VHT channel will have to be based on health promotion values and principles of empowerment, participation, holistic and intersectoral approach, equity, sustainability and multi-strategy. There is a need for a shift of focus from individual to a more population-based orientation, placing emphasis not only on people at risk but also directed at health determinants [22,23,25]. Furthermore, there is a need for a combination of different strategies, aiming at effective participation of all stakeholders on equal terms, and on professionals taking an enabling role instead of an expert role when communicating with patients/PHC visitors [8,23,45]. Finally equity issues need to be addressed through the creation of accessible health communication to improve literacy [14], even for non-Swedish speakers as well as those with low literacy [53]. By addressing these factors in the design of e-Health services, health communication via an ICT supported channel could be health communication for promoting health, i.e. ‘health promoting communication’.

Although this study provides valuable insights to factors that need to be taken into consideration prior to development of an ICT supported health channel, there is need for further research to better understand the needs for health communication among non-Swedish speakers and to further explore the relationship between the different organizational and social factors affecting health communication.

Abbreviation
ICT: Information Communication Technology; PHC: Primary Health Care; VHT: Vertueht Hälsotorg (Virtual Health Channel); WHO: World Health Organization; STAR: Spiral Technology Action Research; PAR: Participatory Action Research; GP: General Practitioner; DN: District Nurse; CHS: Children Health Services.

Competing interests
Authors declare no competing interests.

Authors’ contributions
AJM, EO and BH contributed to the conceptualization and design of the study. AJM conducted data collection, analysis and drafting of the manuscript. AJM, EO, SE and BH contributed to interpretation of the results and critical revision of the manuscript. All authors have read and approved the final manuscript.

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Author details
1School of Health Sciences, Blekinge Institute of Technology, Karlskrona, Sweden. 2School of Computing, Blekinge Institute of Technology, Karlskrona, Sweden. 3Department of Public Health Sciences, Karolinska Institutet, Stockholm, Sweden.

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References


Design and evaluation of a collaboratively developed health promotion website - A qualitative study

Author(s) Amina Jama-Mahmud¹, Ewy Olander¹, Sara Eriksén², Bo, J.A. Haglund³

Affiliation(s)
1. Blekinge Institute of Technology, School of Health Science.
2. Blekinge Institute of Technology, School of Computing
3. Karolinska Institutet, Dept. of Public Health Sciences

Contact addresses aminajama0@gmail.com, Tel:+46-(0) 76455-385427, Fax: ewy.lander@bth.se, sara.eriksen@bth.se, bo.haglund@ki.se

Abstract
eHealth technologies have the potential to provide universal accessibility to timely, tailored health information, create innovative opportunities for learning and online social support. However, these benefits have not been fully utilized due to mismatch between the available eHealth applications, and users’ needs and skills. The aim of this study was to collaboratively design and evaluate a web-based health channel ‘Virtual Hälsoförr’ for health promotion and health literacy in Primary Health Care context. Methods: A multi-phase with Participatory Action Research approach was applied in this study. An iterative developmental model entitled “Spiral Technology Action Research which integrates Information Communication Technology development and health promotion theories was used to guide the design process. A total of 140 participants consisting of professionals from health care services, information technology and academia, and laymen, participated in the different phases. Data was collected using an electronic survey, document analysis, questionnaires, focus groups, field notes and individual interviews. First a formative evaluation was used scan the context for the planned Virtual Hälsoförr and user’s needs for health communication. This was followed by a process evaluation where functions specifications, prototyping and continuous improvement of the prototype were carried out. Finally an outcome evaluation was carried out where the user adaptive prototype was tested to determine its relevance, accessibility, usability and impact on user’s health literacy. Qualitative and quantitative content analyses were used to analyze data from each phase separately. Results: The different evaluation phases yielded valuable results that built into each other and contributed to the development of a health portal that was perceived as accessible, user friendly and relevant to the local people’s need for health communication. Results also indicated improved health literacy among the test persons regarding navigation and retrieving skills and knowledge of health resources on the internet. Conclusions: Integrating health promotion values and principles in design and evaluation process of health promoting eHealth applications contributes to systems that take into consideration the context of people’s everyday life, the wider determinants of health and ways to support people in making healthy decisions. This holistic approach could contribute to eHealth resources whose content enhance health literacy, nurtures and enables health promotion, and ultimately people’s confidence to take greater control over their health.

Keywords
eHealth, eHealth literacy, health communication, health literacy, health promotion, ICT, web
Introduction

There is a growing tendency to actively involve patients and citizens in their own health [1]. In Sweden, this tendency is reflected in the new policies such as a new ‘person centered’ public health policy introduced by the right wing government in 2008 [2]. Consequently in 2009, a new “free choice of care act” transferring the choice of care provider from the health care system to individuals [3] was introduced in Primary Health Care (PHC). This growing shift of responsibilities from society to individuals without corresponding support systems disregard socio-economic and other determinants of health that are beyond individuals’ control [4]. The consequences may be unnecessary burden on the individual to take full responsibility [5] and resulting consequences for health choices [6].

Taking responsibility for health is not an easy task in today’s information society where patients and the general public receive a plethora of health information from actors in different health care and allied sectors [7]. Furthermore, availability of health information does not necessarily lead to adoption of healthier lifestyle as many health practitioners tend to assume [8]. People need a set of cognitive skills to access, understand, assess and use health information in their everyday life contexts [9] as well as to navigate complex health care systems [10-12]. These set of skills have been conceptualized as ‘health literacy’ [9] and are seen as critical to empower people and enable people take responsibility for their lives [13].

In our modern, Information and Communication Technology (ICT) intensive society, individuals also need an addition set of ‘eHealth literacy’ skills, to be able to seek, find, understand and appraise health information from electronic sources and apply the knowledge to address or solve a health problem [14].

Studies indicate a mismatch between existing ICT applications and people’s abilities to interact with them effectively [14-16], there is therefore a need to explore methods to design ICT or eHealth resources that match the people’s needs and abilities. This paper proposes and investigates the use of health promotion values and principles as a logic for design of web based health promotion resources as a way to achieve a better fit between eHealth applications, and people’s needs for health communication and skills to interact with them.

The notion of empowerment and taking control over one’s health is central to health promotion concept which is defined as the process of enabling people to increase control over the determinants of health and thereby improving their health [17]. Enhancing health literacy is regarded as both a means and an aspired outcome of health promotion activities [18].

A recent European health literacy survey conducted in eight countries, revealed that almost half of the adults had inadequate health literacy skills [19]. Similar results were also noted in studies conducted in USA [20] and Australia [21]. Poor health literacy skills is one of the motives behind public health and other sectoral authorities call for actions to strengthen people’s health literacy in broader perspective, beyond reading and understanding medical instructions to focusing on health literacy friendliness of settings in which people live, play and work [18]. Including tools, strategies and resources used in the process [11, 22]. Health care sector, specifically PHC services, has been identified as an important setting for health promotion to meet the challenges posed by the rising number of preventable chronic diseases [23-25]. To this effect, improving health communication in PHC services is crucial to enhance health literacy among the population [11, 22, 26]. In Sweden, the county councils and regions have been mandated to provide a supportive environment for individuals to make informed health related choices in order to achieve the national public health goal of equitable health for all [2].
The aim of this study was to collaboratively design and evaluate a web-based health channel for the purpose of promoting health and enhancing health literacy in PHC context.

Study setting

The study was conducted in a county council owned PHC and its health promotion center ‘Hälsotorg’ (health plaza) in the southeast of Sweden with an uptake of approximately 10,500 inhabitants. Hälsotorg emerged in several county councils in the 1990’s as collaboration between the then, state-owned, pharmaceutical company ‘Apoteket’ and PHC in a bid to increase health promotion within the PHC services. Hälsotorg offered free health promotion services, including health counseling and access to reliable internet based health resources [27]. To improve accessibility to Hälsotorg’s health promotion services for the local citizens, a research and development project entitled ‘Virtual Hälsotorg’, (henceforth VHT) was initiated in 2008. VHT was part of a larger European Union sponsored project entitled ‘Sister Gudrun full scale lab for health and social care (SGF)’. SGF’s main objective was to explore the use of ICT to improve citizens’ accessibility to and participation in health care services. As part of this initiative, the VHT project developed an interactive internet based health portal ‘Virtual Hälsotorg’. According to the SGF project goals, Virtual Hälsotorg was to be specifically adapted to the socio-cultural context of PHC and the local community it serves. This paper describes the design and evaluation process of the Virtual Hälsotorg and discuss how integration of health promotion values and principles affected the content and layout of the health channel.

eHealth communication in Primary Health Care

Use of ICT supported health communication, or ‘eHealth’, in health care services has grown exponentially in the last three decades[28]. eHealth in this paper is defined as the use of ICT, especially internet, to improve or enable health and health care services [29-30]. The growth of eHealth in health care services has mainly occurred within the field of medicine as opposed to health promotion [31-32]. When eHealth system for health communication is implemented in health care contexts, it is often narrow in scope and targets behaviour change initiatives for example; increased physical activities[33], smoking cessation [34], chronic disease management [35] which are inefficient for addressing challenges facing population health such as increasing lifestyle related diseases, health care costs and expanding health inequalities [28, 32, 36]

eHealth technologies have the potential to provide access to timely, tailored health information to patients and other health consumers [37-38], to create innovative opportunities for web based health communication, universal access to health information and health decision support, electronic records, on line social support networks and anonymity [12, 30, 39]. These attributes make eHealth attractive strategy for promoting health and enhancing health literacy [22, 40]. Availing eHealth resources will not necessarily lead to adoption of healthy lifestyles, the recipients need skills and capacity to engage with the eHealth resources [41]. Consequently, providers/owners of the eHealth resources need health literacy skills to design health communication resources that enhance health literacy and decision support [42]. Studies indicate a mismatch between available eHealth resources and the context for its functions [43], as well as a gap between eHealth resources and consumer’s skills to engage with it [11, 22]. Both are potential barriers for the uptake, implementation and sustainability of eHealth technologies in health care services.
Theoretical framework

To overcome potential barriers to eHealth use and implementation, a shift of focus from the technology to contexts for implementation [34, 44], and adoption of multi-disciplinary and holistic approaches to the design of eHealth systems was suggested [43]. To achieve the study aims, a settings based approach [45] was adopted as a theoretical framework to the design of eHealth communication application i.e. The Virtual Hälsotorg. The concept of setting is fundamental to the theory of health promotion as it defines boundaries for understanding context for health promotion intervention and views the physical, organisational and social contexts in which the people are found as part of the enquiry and intervention [45]. According to Dooris [46], settings approach is characterized by three interconnected dimensions: First, an ecological model of health promotion which stresses on a holistic approach to health promotion intervention addressing determinants of health, and providing information and life skills to make appropriate health decisions. Such an approach includes promoting health and preventing diseases [47], and is referred to as a health promotion approach in this paper. This approach is a critique to reductionist focus on single issue such as risk factors as in the case of many health communication strategies in PHC [40, 48]. Second, the approach adopts a system perspective which acknowledges that settings are unpredictable complex and open systems that interact with other settings [46]. The capacity of the health care sector to improve population health and health equity is strongly influenced by other sectors, it is therefore important to involve actors from within the health sector and outside of the health sectors. Third, settings approach adopts a whole systems thinking and development [46]. This approach involves organizations and communities to introduce, manage and sustain change within the setting in its entirety. The approach also involves carefully considerations of norms, values and interrelationships to ensure relevant interventions to the context.

Health promotion interventions entails empowering people to take control over their health and lives through either facilitating their access to needed resources or helping them to develop personal or collective capacities address factors affecting their health [23]. To address the underlying values in the health promotion concept, Rootman [49] pointed out guiding principles focused on, empowerment participation, holistic and intersectoral approach, equity and multi-strategy to guide health promotion policies and activities. These principles, with the exception of multi-strategy, were integrated in the design process to guide the development of Virtual Hälsotorg.

Empowerment in health promotion refers to the process through which people gain greater control over decisions and actions affecting their health. Empowerment may be a social, cultural or political process through which people are able to express their needs and devise solutions to meet the expressed needs [50]. Health communication for health promotion aims to provides information and life skills to make appropriate health decisions [41] and could raise awareness of the social determinants of health to enable people to act on them [9]. Hence designing health communication that improves people’s health literacy in the electronic media can contribute to empowerment of both individuals and the community [9]. However, the health professionals need to be sensitive to potential low health literacy levels among sections of the populations as empowerment demands meaningful participation of the people concerned in the planning, implementation and evaluation of the interventions intended to improve their health and wellbeing [9, 23]. Participation in this sense refers to the process by which those people who will use or be impacted by the intervention are involved in its design and conduct [51]. Genuine participation tends to foster ownership and increase relevance of the intervention which is a pre-requisite for empowerment and key concern for sustaining programs after projects end [52].
Holistic approach refers to fostering different dimensions of health; physical, mental, social and spiritual. A holistic approach calls for collaboration between different sectors or settings that people move in such as schools, in the homes or other public institutions. Intersectoral refers collaboration of relevant sectors [53]. In Sweden, the municipality and county council share the responsibility for citizen’s public health provision. The responsibility is generally understood along the divide of, health promotion-disease prevention respectively. However within health promotion, this division is not feasible as the two approaches complement each other [54]. Following the holistic approach adopted in this study, health promotion demands a combination of health promotion and disease prevention strategies to advance public health [45], hence it was necessary to bring together the county council, the municipality and the public. According to Axeslsson and Axelsson [55], inter-organizational collaboration can be fragile and volatile it therefore necessary to create supportive conditions to facilitate collaboration across the municipal - county council jurisdiction in pursuit of better health for the population who are also represented in the design process by the local citizens.

Equity in health refers to unjustified inequality and health promotion is concerned with removing barriers to equitable participation in activities that influence health and quality of life, including access to health care services [23]. To achieve equity in health promotion and health communication, interventions, people’s needs should guide the distribution of opportunities for well-being [53]. Hence good health communication that is accessible and relevant to its recipients, can contribute to enhance health literacy and empowerment at individual and community levels [41]. Assessing needs can be tricky [56], especially in the development of eHealth applications which demands a technology savviness that an ordinary citizen may not possess thus there is a need for a multi-strategy approach to unearth both expressed and unexpressed needs.

Using health promotion principles as foundation for the design process of developing eHealth resources for health promotion, takes into consideration the everyday context of people and the socio-technical contexts of workplaces while engaging the different stakeholders in a dialogue, which can result in a better system and a sense of ownership based on shared values, and mutual interest for all parties [22, 32, 34, 57]

Methods

Study design

This study applied a multi-design [57] and Participatory action research (PAR) approach. A multi-design approach provides an overarching methodological framework for a multi-layered project that calls for multi-phases to develop an overall program of research or evaluation. In this respect, multiphase design is governed by the research question or objective and suits projects that employ multi-professional teams of researchers with different world views and assumptions[57]. A multi phase design was deemed suitable for the study of the development Virtual Hälsotorg since the design process of the channel was envisioned as a collaborative process involving different stakeholders and carried out in phases in accordance with health promotion planning process [58], that entails needs analysis, design, implementation and evaluation of the process and impact/ outcome. PAR’s cyclical process of enquiry, reflections and action in a continuum, and its emphasis on participation and democracy [31, 59] complemented the multi phase design chosen in the VHT project.
A model entitled ‘Spiral Technology Action Research’ (STAR) [46] was used to guide the design process of the development of Virtual Hälsotorg. STAR model is a developmental process model that combines health promotion behavioral theories, PAR approach; Freire’s (1970) “critical pedagogy” with ICT systems design approach [46]. STAR consists of five cycles; *Listen, Plan, Do, Study and Act* [34] (Fig 1). These cycles represent an incremental improvement approach for rapid cycle change that is used to design, test and disseminate the eHealth program. The process also divides the technical development process into a series of smaller decisions and development, each subject to improvement, evaluation and reflection. This iterative process is referred to as ‘rapid prototyping’ in the STAR model; where design and evaluation are integrated and build on each other. The STAR model was originally developed to suit programs with behavior change approach [34], but was considered to be applied in an empowerment approach [50, 60] adopted by the VHT-project. To adhere to the health promotion values and principles which are the cornerstones of an empowerment approach, a participatory evaluation approach [61] was adopted whereby the five STAR-model cycles were combined to form three phases (Figure 2); *Listen, Plan and Do, Study and Act*, representing formative, process and outcome evaluation [62].

Figure 1: Over view of study design

**Materials and Methods**

A total of 140 participants took part within the three phases of the study (Figure 2). A multi-methods data collection and analysis were adopted throughout the three phases. Each phase examined a topic/problem through iteration of a mix of methods, each phase built on outcome of the previous to address the project objective to develop an accessible web based health channel for promoting health and enhancing health literacy in PHC.
Table 1. Participants characteristics.

<table>
<thead>
<tr>
<th>Phase 1:</th>
<th>Phase 2</th>
<th>Phase 3:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pharmacy personnel</strong></td>
<td><strong>Project group</strong> (PG) (n=5) all females. 1 health and lifestyle DN, 2 researchers, 1 interaction designer 1 project manager Ages 28-60yrs</td>
<td><strong>Test group 1</strong> (T1) (n=15) 4 men, 11 women. local citizens. Ages 17-71 yrs.</td>
</tr>
<tr>
<td>(n=26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Group 1-2</strong> (FG1 and FG2) DN from PHC (n=9)</td>
<td><strong>Work group</strong> (WG) (n=13) 4 men, 9 women. 6 local citizens, 2 DN + project group Ages: 28-71 yrs.</td>
<td><strong>Test group 2</strong> (T2) (n=17) women DN from Child Health Care, DN consultations, GP and Geriatrics.</td>
</tr>
<tr>
<td><strong>Group 3</strong> (FG3) Hälso-torg network group (n=10)</td>
<td><strong>Reference groups:</strong> (n=33)</td>
<td><strong>Test Group 3</strong> (T3) (n=6) 5 men, 1 woman local citizens of migrants. Age 23-43 yrs.</td>
</tr>
<tr>
<td>Hälso-torg – DN, 1 PHC manager, 1 regional public health strategist, 1 psychiatry clinic manager and 1 dental clinic manager</td>
<td><strong>Reference 1</strong> (R1) (n=4) women 2 PHC managers, 2 physiotherapists.</td>
<td></td>
</tr>
<tr>
<td><strong>Group 4</strong> (FG4) Immigrants (n=8) 6 women, 2 men</td>
<td><strong>Reference group 2</strong> (R2) (n=10) 6 men, 4 women Immigrants. Ages: 21-56 yrs.</td>
<td></td>
</tr>
<tr>
<td><strong>Group 5</strong> (FG5) Hälso-torg personnel from PHC centre (n=3)</td>
<td><strong>References group 3</strong> (R3) High School students (n=13) 9 men, 4 women. Ages 18-19 yrs.</td>
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<td></td>
<td><strong>Reference group 4</strong> (R4) (n=6) Pensioners. Ages: 65+</td>
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</table>

Phase 1: Listen
The first phase *Listen*, corresponded to the cycle “listen” in the STAR-model and represented the formative evaluation. It focused on scanning the context, interacting with target groups and conducting a needs assessment. Two studies were conducted to ensure that Virtual Hälso-torg adapted to the context for its use and stakeholder’s needs; and that appropriate methods and materials were used to inform the design of the prototype [34, 63-64]. Study one explored ‘Hälso-torg’ phenomenon and its potential as a health promotion setting [27] from a policy perspective [65]. Study two investigated health communication as practiced in the PHC, factors affecting it and use of ICT by health personnel and local citizens [40] Both studies are published in separate papers [27, 40].
Participants and procedure
In study one, 26 key personnel at Hälsotorg participated. In study two, participated 30 PHC personnel representing the actual PHC setting for the planned Virtual Hälsotorg, pharmacy and district nurses from other PHC units and local citizens in the PHC jurisdiction (table 1).

Data collection
Study 1: Data was collected using a national electronic survey distributed to 30 Hälsotorgs managers in Sweden. The survey consisted of questions covering four domains; Hälsotorg’s intentions and objectives, collaboration and agreements, personnel and activities. Secondly, a purposive sampling was used to identify documents, printed materials and records actual for Hälsotorg [63]. A total of 13 documents and other printed materials used at Hälsotorg were identified as crucial to understand how health promotion in PHC was articulated in text and implemented in praxis as basis to understand its potential as a heath promoting setting. Study 2: A case study was conducted [40] with a multi methods approach in which participatory observations [61], document analysis and focus groups [63] were applied.

Data analysis
Data from study one was analyzed using qualitative and quantitative data analysis [63] while an inductive content analysis [63] was used to analyse the data in study two.

Phase 2: Plan and do
This phase corresponded to ‘plan and do’ of the STAR model and represented the process evaluation of the design of Virtual Hälsotorg. The study focused on the collaborative development process of the web based application from idea to final prototype and how the collaborative design and evaluation processes, affected the end product i.e. the Virtual Hälsotorg prototype.

Participants and procedures
Three distinct groups participated in this phase; a project group with five participants, a work group of 13 participants and reference groups with a total of 33 participants (Table 1). The project group participants were recruited through a purposive sampling [63] and consisted of a district nurse working as a health and lifestyle consultant in the PHC clinic, a senior researcher, doctorate student, and an interaction designer from the university and a project manager from the county council’s PHC administration body. To ensure that the needs and views of potential users were met in the design process [66], the project group was expanded to include local citizens and other PHC personnel. These were recruited through an advertisement in a local paper, snowball methods (local citizens) and purposive sampling (district nurses and a public health strategist from the municipality) [67]. The new recruits and the project group together formed a workgroup sharing responsibility for the development of Virtual Hälsotorg and were directly involved throughout the design-evaluation process.

The reference groups (R1-R3) were recruited after the formation of workgroup using purposive sampling and snowball methods [62]. R1 represented professionals and potential providers whose opinions was valuable to ensure the planned Virtual Hälsotorg was relevant to the PHC policies and activities. They were identified by the DN in the workgroup who also facilitated the recruitment. R2 consisted of immigrants and R3 of youth, both represented hard to reach groups according to DNs. They were identified through the workgroup members own networks. R4 consisted of pensioners, were also identified by workgroup’s own social network who also facilitated the recruitment process. Identifying and actively seeking their
inclusion is in line with the VHT project health promotion action area of strengthening community action for health and the principle of equity. The reference groups participated in the design process as consultants (fig. 2) and were contacted by the workgroup at different points to test and give feedback on the different versions of the prototypes.

The test groups (T1-T3) participated during a test period of five weeks; they each conducted accessibility and usability test and gave subjective opinions of the final prototype of Virtual Hälsotorg. As in the reference groups, the test groups were also carefully selected to represent the general population (T1), the professionals/system providers (T2) and marginalized groups (T3).

**Data collection**

A “design workshop”; a physical meeting place for the workgroup to meet once a week over a period of 1½ years was established in the PHC center. A project website accessible to all members was also created to complement the physical meeting place. The initial workshops focused on; defining potential aims, function of and target group(s) for the planned Virtual Hälsotorg. Quality criteria for a ‘good’ health website, and the participants’ reflections on their own needs based on their roles as citizens/end users, providers/professional user or decision maker, were also discussed. The workgroup contributed through mini-studies and dialogue in the workshops; each was regarded as a designer and a co-researcher in accordance with PAR principles [59]. Workshop outcomes were documented in meeting minutes, mock ups, web prototypes and reflexive field notes [34, 63]. At the end of each workshop, new problems/challenges’ were identified and solution were devised in the following meeting, the new ideas or features were then tested and new problems identified and so on. Meeting minutes were sent to all participants in the workgroup by e-mail or regular post.

As part of the mini-studies; a systematic literature review was conducted by AJM to explore published quality criterion and methods for web-based health communication for health promotion. The searches were conducted in databases; Medline, CINAHL, Pubmed, ACM, IEEE, Academic Search Elite, Science Direct and Google Scholar. The results indicated that most tools and measurement criterion for health websites were content and target group specific. For example, resource for cancer patients, diabetes, mental health or youth; thereby inadequate in evaluating the Virtual Hälsotorg with its broad scope of content and target groups.

Since learning is an important and desired outcome of PAR, an eHealth literacy tool “eHeals” [68] retrieved in the literature review, was used to test participants health literacy. eHeals tool was first translated it into Swedish, piloted and validated through a collaborative process in the workshops, then re-tested by six independent evaluators recruited through workgroup’s personal networks. eHeals was chosen because it was validated and simple to use and had a broad scope that suited Virtual Hälsotorg, according to the work group [68-69]

Results from the literature from the literature review and mini-studies were used as a guide to develop a 14 item usability questionnaire (Appendix 1). Usability refers to the ease with which users can use a particular tool or object to achieve a specific goal [70]. The tool contained questions on participants’ socio-demographic status, computer using habits, user satisfaction, prototype’s relevance, accessibility and eHealth literacy competence; with possibility to comment each response. The questionnaire was used as a research protocol by the work group members in phase 2 and 3. In phase 2, the workgroup used it as a guide for
other data collection methods such as interviews and think aloud protocols [70] to better suit their respondents. Think aloud protocol in combination with task performance tests is commonly used to conduct usability tests to identify problem areas and devise suggestions for improvements [71] prior to implementation. Ideas and feedback were then discussed and a consensus would be reached on which ideas to incorporate into the prototype. The county council’s Information Technology (IT) department was also consulted for expert opinion to ensure Virtual Hälso
torg’s compatibility with County Council’s web policy, especially the domain of “readability”.

**Data analysis**
Data from the different sources was analyzed using qualitative content analysis inspired by Creswell and Clark’s [72] guidelines. Using the objective of the workshop or mini-study as a guide, each dataset was summarized-after-each-session. Qualitative [63] data analysis of workshop minutes and reference groups evaluations were conducted simultaneously after every session. Data analysis was first conducted by AJM and then collaboratively discussed and acted upon by the workgroup in the workshops. The results/outcomes was used to feed back to the design process [34]. Reflexive field notes [63] kept by AJM were used to compliment this process.

**Phase 3: Study and act**
The third phase Study and act corresponded to the outcome evaluation and focused on evaluation of the user adaptive (final web prototype) to determine if and how the collaboratively designed Virtual Hälso
torgy had achieved its goals for providing relevant, usable, accessible health communication. As well as to determine the channels’ effect on test persons’ eHealth literacy [68].

**Participants and procedure**
Three tests groups with a total of 40 (Table 1) people participated in this phase. Test group 1(T1) consisted of 15 local citizens. An information meeting was held at the test site in PHC where the participants were briefed on VHT objective, how Virtual Hälso
torg was developed and their role in the design process. They were provided with logg on which they could share with family members. Test group 2 (T2) represented experts/administrators; consisted of 17 district nurses from the PHC centre working in child health care, geriatrics, district nurse and GP consultations clinics. Test group 3 (T3), consisted of sex immigrants from a Swedish language school and was a strategic choice as they represented a “hard to reach”, vulnerable group [59, 73] not represented in test group 1, but an important target population for Virtual Hälso
torg’s equity objective.

The test persons were recruited through advertisement in the local newspaper (T1), and purposive and snowball methods (Test group 1, 2 and 3) [63].

**Data collection**
Test group 1(T1) tested the user adaptive prototype of Virtual Hälso
torg during a five week test period in October-November 2010. The PHC offered a package of interactive services during the test period including health and lifestyle tests whereby test persons had access to live interaction through appointment booking system, chat and forum. Other services offered during the test period included; open lectures on health issues at the PHC centre advertised on
Virtual Hälsotorg, access to instructional videos on physical activities. Apart from the interactive functions, test persons were asked to explore Virtual Hälsotorg content and layout, as well as links to other reliable health resources including the national health website, municipality among others. A technical support team from the county council’s IT customer support was deployed to administer the system during the test period.

Data for the evaluation was collected through questionnaires, focus groups, diaries kept by test persons, individual interviews [63], think aloud protocol and log statistics [34]. Three questionnaires were administered. The first was a pre-test, administered prior to exposing the website. The questionnaire was divided into two parts; one part with the same questions as in phase 2 contained socio-demographic information (age, sex gender and occupation) and attitudes towards internet, general internet use patterns and internet as a health resource. The other part, contained the translated eHeals tool for self-appreciation of eHealth literacy skills [68]. The second questionnaire was administered 2 ½ weeks into the testing period. It contained questions on test person’s subjective evaluation of the Virtual Hälsotorg prototype regarding usability, relevance, accessibility of content, interface and aesthetics. The third, post-test, questionnaire was administered in the last week of the test period. It focused on test persons’ final evaluation of the prototype. It consisted of a combination of the pre-test questionnaire and questions on user satisfaction of Virtual Hälsotorg [74] and spaces for suggestions for improvement.

Two focus groups consisting of 3-4 persons, and six individual interviews were conducted at the PHC 1-2 weeks after the test period to get a richer data on test persons’ user experience and recommendation for future development [63]. Focus groups lasted between 45 to 60 minutes, while individual interviews lasted between 30-60 minutes. The interviews were recorded and transcribed per verbatim. Since the logs were not unique to individual users and test persons were asked to share their logs, statistics from web log frequencies were also collected to form objective data as a complement to the subjective data collected.

*Test group 2* (T2) tested an “inactive” version of the final web-prototype. The tests were conducted in a computer room at the PHC centre with two groups of district nurses. They reviewed the user interface, contents, links and interactive functions and evaluated using the same quality criteria as test group 1 but from a professional/administrators perspective and without the interactive functions. Each participant tested the Virtual Hälsotorg individually for 30 minutes and related their opinions in a group discussion with two representatives from the work group who compiled the outcome into a list of what was positive/negative and recommendations.

*Test group 3* (T3) tested the “inactive” final web prototype like T1 without the interactive functions. The test was conducted in a library, after work hours, where the informants sat in pairs in front of computers and reviewed the Virtual Hälsotorg prototype using a think aloud protocol containing tasks to be performed [74]. The tasks included finding specific types of information, make an appointment for individual counselling, link out to other web resources in addition to exploring the content in relation to their own needs for health communication.
This method was particularly useful for collecting data in this group as it enabled us capture due to language difficulties.

**Data analysis**

Data analyses in phase 3 focused on the test groups’ subjective evaluation. Quantitative analysis was used to analyze data from the questionnaires while qualitative analysis were used for the data from focus groups, think aloud session and individual interviews [72]. Underlying quality attributes derived in phase 2; credibility, currency, relevance, usability of content and aesthetics, as well as Virtual Hälsotorg’s effect on participants’ health literacy and eHealth literacy were used as framework for the analysis. Data from the different sources were analyzed separately. All data related to quality evaluations such as expression of appreciation, critic pertaining content and user interface were extracted. Similar data were grouped, coded and categorized [63]. The qualitative and quantitative data were then integrated to form two major categories “participants’ internet use patterns, and participants’ subjective evaluation of Virtual Hälsotorg”. Data from log statistics and electronic diaries were used to corroborate the established themes Coding was initially done by AJM and thereafter negotiated and checked for comprehension with the co-authors.

**Ethical considerations**

Participants were informed on the nature of the study, in accordance with the Swedish Ethical Review Act (SFS 2008:192). All participants received written and/oral information about the project and the voluntary nature of their participation. Informed consent was obtained from all participants. Informed consent pre-supposes accurate information. However, given the evolving nature of PAR projects where neither the researchers nor the participant know where it will end, traditional concept of informed consent may not be adequate [75]. The participant could only consent to participation in the project as a whole, given as accurate information as possible [76]. The workgroup received information on the objective of the study and they consented to participate in an evolving project where they were to be part of the process. The reference and test groups were involved periodically and performed specified tasks and received comprehensive information of what their involvement would entail.

Ensuring confidentiality and anonymity of the workgroup participants was a challenge in VHT project due to the small number of participants and the collaborative - interactive nature of the project [76]. To address this aspect, an *inside-outside* [77-78] and confidentiality perspective was practiced. This entailed a transparent process within the group and ensuring participants anonymity when reporting outside of the workgroup. A transparent communication strategy was adopted where participants were informed on every step of the process to encourage engagement and made it possible for participants to validate research findings [79] prior to dissemination. Secondly, no identifiable details are given in the reports shared with people outside the project. Reporting the results from workshops, focus groups and individual interviews, none identifiable description was used or the whole group was cited instead of the individual.
Results

Results from phase 1: Listen

Study 1 indicated that the physical Hälsotorg had great potential to be a health promotion setting. Hälsotorgs offered health promoting activities and brought together stakeholders from different sectors while the studied policy documents contained health promoting intentions. Moreover, the existence intersectoral collaboration between the identified stakeholders; the state owned pharmacy, county council owned PHC services, the municipality as well as local communities acting in a concerted effort to improve population health, presented a unique opportunity for a participatory project such as the VHT. However, the survey also revealed power imbalances between different stakeholders and lack of a common understanding of the concept health promotion resulting in activities that promote health but not a coordinated health promotion approach. Study 1 gave a better understanding of Hälsotorg concept as well as revealing a positive policy climate that supported the development of health promoting health communication while shedding light to potential barriers that needed to be addressed in the next phase.

Study 2 highlighted PHC managers and personnel’s willingness to work towards a more health promoting health care services. Study 2 further confirmed findings from study 1 concerning opportunities and challenges for Virtual Hälsotorg. Opportunities included; positive national and local health policies, strong network of collaboration between Hälsotorg and local citizens including other non-governmental organizations, good knowledge of interpersonal communication and good computer skills among health care personnel in PHC. Four additional challenges that needed to be addressed in the design process of Virtual Hälsotorg were illuminated in study 2: (1) A need to extend health promotion and disease prevention services to a wider group of preferably younger, “non-patient segments” of the community and hard to reach groups like migrants, as expressed by DN. (2) Low priority accorded to health promotion services in comparison to the curative services in PHC. (3) The need for a dialogue to improve poor communication between different PHC actors, which impaired collaboration and finally, (4) the need to improve health promotion skills among DN; the personnel group primarily in charge of health promotion services in PHC.

Results from phase 2: Plan and Do

Phase 2 contributed to the VHT prototype with demand and functions- specifications for Virtual Hälsotorg, mockups from the workgroup, power point based prototype from two groups of high school students and two prototypes from professional web designers in collaboration with the workgroup and the IT department.

All participants were briefed on the results obtained in phase 1. This dialogue was important to ensure that participants shared a common understanding of health promotion approach, which was important in their role as designers. The first three workshops with the workgroup were dedicated to understanding the aim, the participatory theoretical assumptions and health promotion principles framing the VHT project. This was followed by workshops on needs
assessments which resulted in systems specification for the planned health channel: (1) It should cater for a broad population i.e. not specific to age group, gender or health problem. (2) It had to be a local health channel informing people of health activities and resources in the region. All local actors in health fields such as private gyms and podiatrists actors should be allowed to feature on the website. (3) It should have a broad scope “from medical information, management of specific chronic diseases, provide maps showing jogging trails in the town”. This in order to cater for the narrow lifestyle-disease prevention approach advocated by PHC while broadening the concept of health and moving it away from the realm of health care context to the larger community. (4) It should focus more on health, not disease and this should be reflected in the chosen images, topics and resources. (5) It should be compatible with county council’s IT system and work practice, to enable integration of health promotion in to the rest of PHC services. To this effect, the IT department suggested the web as a platform for Virtual Hälsotorg instead of digital TV as initially suggested by the workgroup. Human and material resources needed for VHT were identified; an IT expert in the workgroup, a district nurse, a computer and a television set. The workgroup then proceeded to turn these ideas into a demand and functions specifications and handed it to the SGF project leader.

The functional specifications were constantly adjusted and documented, first as sketches, mock-ups, paper prototypes and finally web-prototypes. The participants affected both the content and layout of the web resource as well as the focus of content. The first sketches focused more on the digitalizing the physical Hälsotorget’s services, more medical oriented and offering resources in other languages including Arabic, English, Serbo-Croatian and Somali. In 2009 the physical “Hälsotorg” in the actual county council was closed as a result of privatization of Apoteket. With the closure of the physical Hälsotorg, the focus turned to PHC in general and its lifestyle unit. As the new web application started to take shape and more people were involved in evaluation processes, a gradual shift was noted towards health orientation and opportunities of eHealth technology towards facilitating healthy living. To mark Virtual Hälsotorg health orientation, the first page read “Your portal to a good life” and, the youth and immigrants requested information on how to navigate the health care system in Sweden. While the pensioners voiced concern on the font size and more links to self-management resources with chronic diseases as well as notices on upcoming social activities in the region. Interactive functions requested included; opportunity to ask health care personnel questions in real time through the channel, get counseling, take part in activities from the comfort of their homes and enable discussions with fellow citizens. This process demanded constant negotiations between the different stakeholders participating in the design process. New ideas were continuously hatched, negotiated between participants and implemented in the workshops.

The High School students R1, were the first reference group to implement the initial ideas into a prototype using power point program (figure 2). The R1 technology students’ prototype focused more on medical information, interaction with PHC personnel using IT solutions; interactive apps such as electronic training and diet diaries, blogs, and quizzes to test different substance dependencies including alcohol, drugs and pain killers. The aesthetic groups
focused more on wellbeing and relaxation, mobilizing community members by providing a notice board where local citizens could advertise planned physical activities for free. Common to both was the vibrant colors, fun approach to share information and the need for interaction with health personnel. Both were well received by the workgroup and the professional web designer as fun and innovative. The color scheme, especially the green and red was not compatible with the County Council’s graphics design according to the professional web designer. The workgroup was concerned with the demands for human resources to maintain such a website. The student’s prototypes demonstrated the difficulty of writing demand/function specifications as students interpreted them in totally different ways. Thus proves the importance of co-creation and dialogue which facilitate a common language to express technical concepts in an easy everyday language understood by all.

Fig 2: High school students presenting their prototypes and screenshots of the prototypes.

After the discussions in the workgroup, the professional web designer integrated some of the youths’ bright colors, fun ideas such as quizzes and recommendations from the work group in the second power point prototype below (Fig 3). Prototype 2 was mainly a template containing a layout of modules and headlines of the proposed contents; diet, training and exercise, feel good and ‘how to find us’ the last one proving contact information and map to the PHC center. The interactive functions were; chat, ask an expert, bulletin board, forum and ‘make an appointment’.

Fig 3: A screenshot of the second power point prototype:
The workgroup agreed that the second web-prototype corresponded well to their system specifications but wanted to further test the user interface for relevance and accessibility. The IT department raised concerns about the bright colors used and the graphics, which didn’t adhere to the guidelines for people with disabilities. Other identified potential areas for improvement included font size, cumbersome scrolling and need for more links to other web resources such as English-language based websites and websites with information on “private” actors such as gym facilities in the town.

After more input with IT personnel joining the work group the final prototype (figure 4) was implemented. Both the IT department and workgroup had to compromise on both content and user interface. For example, the IT department agreed to use the red color whereas the workgroup agreed to remove quizzes and limit the external links to only websites approved by the county council. It contained a bar menu covering all the five towns in the region but only Ronneby was active. The contents were divided into five modules; Diet, feel good, physical activities, lifestyle clinic in the actual PHC setting and contact us.

Fig 4: A screenshot of the final prototype:

Results from Phase 3: Study and Act

This outcome evaluation phase focused on assessing if and how the collaboratively developed Virtual Hälsotorg had achieved its aim of providing relevant, accessible health communication for improving health promotion and health literacy in PHC context. The login statistics revealed that the most popular information on the health channel was physical activities and exercise with 32%, traffic followed by feel good 28%, diet 22% and lifestyle clinic 16%. The statistics shows an interest in other health topics besides medical and disease specific information. Hence the Virtual Hälsotorg showed that it had potential to be a health promotion setting for health communication for both patients and the community as a whole as it provided a broad range of health resources through its many external links.

Test group 1

The results show that the web application functioned well during the five-week test period, with short periods of net disturbances which caused delays in the booking systems. Data from
the district nurse manning the health channel during the test period, reported an increase in
visitors to lifestyle clinic, high turnout for the public lectures 40 attendees, 12 hour chat
sessions, 9 bookings for blood pressure controls and 9 for health counseling sessions.
All 15 participants completed the first pre-test questionnaire Six of the participants in group 1,
were gainful employed, 3 were pensioners, 2 fulltime students and 1 was on parental leave.
Two of participants doubled as local politicians. Results from the first questionnaire indicated
that all respondents used internet regularly with 10 of 15 using internet several times a day.
Google was reported as the main search engine.

Data analysis revealed differences between the older and younger participants in the test
group pertaining to internet use, trust and preferences. Older participants expressed
difficulties in finding health information on the internet compared to the younger. Older
participants more than the younger ones stated lack of trust for web-based health information
as the primary reason for the low utilization of internet as a health resource. The search
patterns and content also varied; younger participants mainly sought information and
resources on fitness, diet and wellness in Swedish and English language websites. While the
elderly, mainly sought information on self-care, specific diseases, prescription drugs and
alternative drugs in primarily Swedish language websites.

Internet was an important health resource according to the participants in T1, the participants
reported using almost exclusively Google engine to search for specific health information and
then decide the website to visit from the resulting hit list. Data analysis revealed poor
knowledge of state owned (or sponsored) websites among test persons. Only two of 15 knew
of or had visited the national health website 1177.se, three of 15 knew of or visited the county
council websites, three of 15 knew of the Swedish Institute of Public Health and three of 15
knew of the National Board of Health and Welfare. Similar results were noted regarding test
groups’ knowledge of the web-based services offered by the county council such as the
service to renew prescriptions on line. This finding indicated a ‘disconnect’ between health
care services and the local citizens which explains the informants’ (in phase one) views of
health care services as a ‘service for the sick’.

After the test period 13 of 15 test persons in T1 completed questionnaire number 2. Two test
persons dropped out due to lack of time and computer problems. Results of the second
questionnaire revealed a high rate of user satisfaction among respondents. Virtual Hälsotorg
was perceived as easy to use, attractive and relevant to the needs of the health communication
needs of the local population. Table 3 shows examples of the participant’s responses and
suggestions for improvement.

Data analysis of the focus groups and interviews supported the views expressed in the
questionnaires 1-3. All participants regarded Virtual Hälsotorg as a valuable resource for
supporting people’s effort to make informed choices. According to the analyzed data, the
presence of professionals ‘behind’ the web application, collection of validated health
resources in one portal, the strong local ties to the local context and opportunity to influence
the content were the most appealing attributes of Virtual Hälsotorg. Lack of trust and access to professional health personnel were obstacles to a wider adoption of web-based health resources, according to the participants.

Virtual interaction with qualified health personnel and an application to facilitate increased physical activities/rehabilitation at home, such as an interactive training diary with the help of physiotherapists were some of functions participants requested. Participants also proposed a ‘suggestions box’ in the final version of the channel to ensure continues participation and influence for users.

Data from the pre-test eHEALS showed that all participants regardless of age or socio-economic status, had a high literacy levels as they scored quite high (4.0 pre-and post-test) on knowledge on factors affecting health, how to apply health information in everyday life and could evaluate health information retrieved from the internet (Table 2). Participants related that taking part in the test increased their awareness of good health resources on the internet. Data analysis indicated exposure to Virtual Hälsotorg, contributed to a slight enhancement of participants’ health literacy. Comparison of eHEALS median scores pre and post-test questionnaires, revealed a slight increase in various dimensions of eHealth literacy among participants i.e. internet as a useful health information resource, awareness of existing internet based health resources and skills to find and use them (Table 2).

Test group 2
Results from the district nurses’ evaluation of Virtual Hälsotorg, showed that the participants regarded Virtual Hälsotorg relevant to their work. They identified potential areas for development with regards to their own areas of specialisation. These included; information on fall prevention for the elderly, securing the house for children and information on incontinence among others. T1’ subjective evaluation of the content and layout showed that the health channel was regarded as accessible and engaging. They described the health channel as “clear, simple and easy to navigate”. According to the district nurses, the first page was well organized with a clear view of the variety of its contents. The district nurses could clearly see how the interactive functions such as forum; video counseling could be used however, they also raised a concern for resources needed to maintain/update the health channel. Similar concerns were also raised by the district nurse manning the Virtual Hälsotorg during the test period. The district nurses expressed doubts about the practicality of the chat function which they felt could result in “lag time”, stress for the nurses and eventually a risk for patients’ safety. According to the DN’s, Virtual Hälsotorg channel could be an important setting to which each unit in the PHC center could contribute to thus Virtual Hälsotorg could facilitate greater collaboration between the different units in the PHC center.

Test group 3
The immigrant’s evaluation of Virtual Hälsotorg gave also mainly a positive outcome regarding the health channel’s relevance and usability of the content, however they had issues with the accessibility of the health channel. During the test, the participants were able to
accomplish the given tasks including; finding information, link out to other resources, find different icons and book time with district nurses among others. On the downside, the group complained about the use of complicated Swedish words and terminologies such as the use of *egenvård* (self-care) icon instead of a text that explains the content of the booklet. Furthermore, this group suggested the use of other languages like English and Arabic.

Table 3: A sample of excerpts from test group’s evaluation of *Virtual Hälsotorg*:

<table>
<thead>
<tr>
<th>Domain</th>
<th>Participants comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>I like the fact that you get into this “portal” and then you can choose where to go from there. I really like the “what is happening in town”. I would never have associated some of the events advertised here as a “health event” for example the spa week. I like the fact that you use photos that show people riding a bicycle and others walking on the beach…these are images people of all walks of life can identify with instead of people working out on the gym. It is very clear that Virtual Hälsotorg sets out to cater for the local population. I wish photographs of health personnel working in PHC. It would be nice to see the face of the person you made an appointment to prior to the visit, it would make the meeting more relaxing. I miss other private actors who work with promoting health like health coaches, masseur. There was not much happening on the website…I honestly lost interest after the first week.</td>
</tr>
<tr>
<td>User Interface</td>
<td>“Very good! well designed and balanced” “The pages feel “airy” not too congested” “It is easier to navigate through the pages” “You always know where you are on the website, which makes it easier to track your way back if need be” “The colors are very soothing to the eye, not like ‘epileptic’ inducing bright colors that some websites use”. “I am missing a magnifying glass on the webpage. I have poor eyesight and the text is too small”</td>
</tr>
<tr>
<td>Links</td>
<td>The links are very useful…it is good that you linked to other website instead of reproducing the same information…The icon for “egenvård” (booklet with information on self-care) is too small. If you didn’t ask me to find it in the questionnaire, I would never have noticed it! It gives me a sense of security knowing that the linked websites are trustworthy, because you (the PHC professionals) have endorsed it.</td>
</tr>
<tr>
<td>Interactive functions</td>
<td>It worked well…this is the best feature on this site! I couldn’t imagine that they would be sitting somebody on the other end .I tested writing a question on the chat and plop! I got an answer…normally you would queue on the phone line to get an answer to a simple question. Booking time for health counseling was the best function for me and my family…I used it, at first there was a delay but it worked quite well on the whole. I appreciated the instructional training video with the physiotherapist; normally you have to pay for such services.</td>
</tr>
</tbody>
</table>
Table 2: Results of the eHEALS test (T1)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MEAN SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Post-test</td>
</tr>
<tr>
<td>How useful is internet as a resource to help you make decision</td>
<td>3.6</td>
</tr>
<tr>
<td>concerning your health?</td>
<td></td>
</tr>
<tr>
<td>How important is it for you to access health resources via internet</td>
<td>3.7</td>
</tr>
<tr>
<td>I know which health resources are available on the Internet</td>
<td>3.7</td>
</tr>
<tr>
<td>I know where to find helpful health resources on the Internet</td>
<td>3.6</td>
</tr>
<tr>
<td>I know how to find helpful health resources on the internet</td>
<td>3.7</td>
</tr>
<tr>
<td>I know which factors are detrimental to my health</td>
<td>4.0</td>
</tr>
<tr>
<td>I know how to use the internet to answer my questions about health</td>
<td>3.7</td>
</tr>
<tr>
<td>I know how to apply the health information I find on the internet</td>
<td>3.3</td>
</tr>
<tr>
<td>in my everyday life</td>
<td></td>
</tr>
<tr>
<td>I have the skills I need to evaluate the quality of health resources</td>
<td>3.3</td>
</tr>
<tr>
<td>I find on the internet</td>
<td></td>
</tr>
<tr>
<td>I feel confident in using information from the internet to make</td>
<td>3.4</td>
</tr>
<tr>
<td>health decision</td>
<td></td>
</tr>
</tbody>
</table>

Discussions

The aim of this study was to collaboratively design and evaluate a web-based health channel for the purpose of promoting health and enhancing health literacy in PHC context. The results indicate that each of the design and evaluation phases; Listen, Plan and Do, Study and Act in the development of Virtual Hälsotorg yielded valuable outcomes that built into each other and contributed to a health portal that was perceived as innovative and engaging. The collaboration process of professionals and laymen enriched the content of the health channel resulting in an interface that was perceived as easy to navigate, accessible and user friendly while the content was deemed relevant to the local people’s need for health communication.

Results also indicate that Virtual Hälsotorg has potential to enhance health literacy as results indicated an increased in navigation, retrieving skills and increased awareness of health resources on the internet among the participants. Increase in trust and positive attitudes towards the internet as a health resource among the test persons was noted in the analyzed data. However, the collaboration process was challenging for all participants involved as it brought uneven participants with diverse backgrounds, technical skills and knowledge of
health care services. The workgroup had to contend with the demands and restrictions of both PHC and IT department; demands, which sometime entailed compromising their demands to attain a health resource that fits into the existing IT systems and practice the county council. Adopting a holistic approach and integrating health promotion principles in the design process facilitated genuine participation of users and producers. To assess Virtual Hälsotorg’s health promotion capacity, the results are discussed against health promotion principles of participation, empowerment, holistic approach, intersectorial collaboration, sustainability and equity.

Participation and empowerment

Participation and empowerment were recurrent concepts in the analyzed policy documents and interviews in phase 1. Data analysis showed that participation and empowerment were often used interchangeably, which is a common mistake within health care services according to earlier studies where patient participation is equated to patient empowerment [8, 80]. Empowerment pre-supposes participation but participation does not necessarily lead to empowerment [8]. Empowerment in health promotion entails sharing the power with the concerned people and supporting the process by providing skills, if needed, to facilitate action and decision making [58]. Thus sharing the responsibility of developing of Virtual Hälsotorg with the workgroup as co-researchers was a prerequisite for developing an eHealth resource to promote health. Workgroup’s participation and the resulting knowledge exchange between participants’ direct involvement in the decision making throughout the design process, contributed to participants’ better understanding of values underlying health promotion approach as through hands on learning process. The, learning process’ main function is to sensitize the participants [81] on health promotion approach in order for them to take appropriate action. In the case of this study it entailed, applying the acquired knowledge to develop an eHealth resource to promote health Participation of professionals; PHC personnel, IT among others ensured that the organization’s interests were taken into account and that both content and interoperability with the overall IT systems in health care services were taken into account to ensure sustainability. Wilhemsson and Lindberg’s study showed that DN often found themselves caught between disease oriented and health promotion divides of their work with little support for the health promotion work [82] and as such it is important to highlight the empower the DN. Chambers and Thompson suggest that empowering and capacity building of DNs, would help showcase health promotion in PHC and boost their confidence as health promoters [83]. In VHT project, this new found confidence among the DNs, new insight on what the people look for in a website among the IT-personnel led to the exploration of social media such as Facebook; as well as implementation of new eHealth projects.

Holistic approach

The increased awareness of health promotion approach among the workgroup contributed to a better understanding of the importance of holistic approach to health. This understanding is reflected in the variation in the content of Virtual Hälsotorg. The workgroup was able to cater for the narrow lifestyle-disease prevention advocated by PHC using different links, while at the same time adding a broader focus to health and moving health away from the realm of health care services [84] for example by providing maps for city walks and other local
attractions for ‘body and soul’. There was a concern, especially among researchers and District Nurses in Hälsotorg that the deficit behavioral model which characterized the framing and health communication practice revealed in phase 1 [27, 40], would dominate the content of Virtual Hälsotorg. Some researchers argue that a focus on mainly illness and deficits tends to reinforce the patient’s experience of illness and disability [85], an approach the DN in Hälsotorg wanted to change; and focus on the healthy and factors that contribute to well-being [82]. All participants emphasized the local contexts with the motivation that people adapt and adopt to system that are relevant to the local values and norms, which is in line with the ecological health promotion model approach [46]. This is an illustration of how collaborative processes contribute to insights into what is important to the people within the context of everyday life.

Intersectorial collaboration

Collaboration was highly valued in the PHC according to results from phase 1 [27, 40]. However, the collaboration was more established between the county council and the Apoteket AB (Pharmacy) while the other actors; the municipalities and NGO’s were considered as important actors but were not involved in the decision making process. Given the important role of the municipality in public health [2], a concerted effort was made to involve the municipality in the design process to prevent power imbalances experienced in phase 1 [27, 55]. Similarly existing collaborations with civil society were later expanded during the development of Virtual Hälsotorg to include workers from the other units in the PHC/County council, civil societies and schools. The mobilization of organizations and people within the different settings towards a common goal; to create an eHealth channel to promote public health, contributed to the broad and diverse content of the health channel. At the organization level, the municipality and county council who bear the responsibility for health [2] together with the local citizens, negotiated on how the new eHealth resource would best serve their respective organizations in the best way possible without compromising the existing practices which led to linking of municipality’s health promotion department to Virtual Hälsotorg. Wilkin suggest that communities form a vital sector of society and as such involving community members contributes to cultural congruent communication infrastructure which can increase the utility of the communication towards marginalized groups and contribute to sustainable health communication infrastructures [86] and empowerment.

Sustainability

Sustaining a health promotion intervention after the project period is always a challenge [53]. The Virtual Hälsotorg was a unique website in Sweden in the sense that it was owned and run by a public owned PHC, it presented direct contact to health professional through the interactive functions, it offered free of charge services and contained local information on health promotion activities/resources/sites in the region. Conducting a needs analysis [53] and involving the concerned people throughout the design process contributes to capacity building [31]. A review carried out by Whitelaw et al [87] revealed that embedding of capacity building activities in health care services, contributes positively to achieving sustainability of programs and the goal of health promoting health care services. The short time frame in which the VHT project was implemented makes it difficult to make far reaching conclusion.
about the sustainability of the Virtual Hälsotorg application. However, previous studies have shown that direct involvement of stakeholders in the design process of eHealth applications increases sustainability of the system as the process fosters ownership and result in systems that meet people’s needs [28, 31-32, 43].

Equity

Equity and social justice are the pinnacles of health promotion practice [4, 6] and the overall goal of the Swedish public health policy [2]. Studies suggest that limited health literacy is not limited to people with low education levels, it affects people from all walks of life [19, 88] but it affects mostly the elderly and those that do not speak the majority’s language [19, 88-89]. The formative evaluation in this study show that even youth could be added to this category as they had limited knowledge on how the health care system functioned. In this study, equity was addressed by recruiting a workgroup from the local community and consciously seeking minority groups, youth and senior citizens. These are groups that do not readily participate in research projects [90-92]. These targeted groups provided valuable insights on what was important for their peers such as need for other languages besides the Swedish language and the use of concepts that are not obvious to all but are frequently used in the health care contexts such as “self-care”. The youth sensitized the workgroup on the need for vibrant colours and engaging content in order to attract engage the younger generation. In this study, the diverse participant’s contributions translated into a health portal with accessible language and a simple user interface that appealed to a broad range of ages. The results showed that the Virtual Hälsotorg was accessible to all those who tested it, regardless of age, health literacy level or gender. Thus ‘inclusion’ and power sharing with the concerned people was used in this study to avoid perpetuating the digital divide that is often a risk when designing eHealth resources [90, 93]. The Virtual Hälsotorg channel did not offer information in any other language than Swedish, due to lack of resources. From an equity perspective, the decision to exclude other languages potentially limits the non-Swedish speakers from fully accessing and interacting with content and services offered by the channel. However simplifying the language could mitigate understanding according to Zarcadoolas [11] which could explain the relatively good result achieved by T3.

Limitations

In phase 1, the electronic survey questionnaire for study one was only piloted once. Additional pilots would probably have increased the validity and reliability. Hence, the results may not reflect all varieties of HSs that existed at the time. This shortcoming, nevertheless, has been taken into consideration in the analysis. The authors avoided making comparisons between county councils/regions and from drawing far reaching conclusions about how the local documents gave legitimacy to Hälsotorg implementation and transformation of Hälsotorgs from project to integrated activities in their respective practices. In study two, only the DN were involved and excluded other personnel categories like General Practitioners, Physiotherapists and Dietician. These groups could have contributed valuable information to the study. The decision to exclude was motivated by time constraints and that majority of the GP’s were hired on temporary basis.
The primary emphasis of this study was to develop a robust interface and to establish feasibility with a small sample of potential end users and providers. A small scale study with a limited number of participants both in the workgroup and test group may not be representative of the population. This limitation was compensated through recruitment of different reference groups and test groups. According to Skinner et al five people are sufficient to conduct usability tests of prototypes. The combined participation of workgroup members, the reference groups provided a system of check and balances; and a better quality system [63].

Conclusion

This paper illustrates how setting based approach and integrating of health promotion principles can contribute successfully to the development of a web-based health promotion channel. The results suggest that integrating health promotion values and principles in design and evaluation process of health promoting eHealth applications contribute to eHealth systems that take into consideration the context of people’s everyday life and the wider determinants of health. Thus both the development process and the end product are health promoting.

Holistic approach to design of eHealth application is innovative and has shown potential to contribute to eHealth resources whose content enhance health literacy, nurtures and enables health promotion, and ultimately people’s confidence to take greater control over their health. The health Virtual Hälsotorg channel presents an opportunity for continued intersectoral collaboration between PHC, Municipality and the community i.e. a seamless new setting health for health promotion. Further studies on a larger scale, is needed to improve the framework presented and test the impact of Virtual Hälsotorg on health literacy before it can be permanently implemented.

Conflict of interest

None declared

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Collaborative design for health promotion websites: experiences from a Participatory Action Research workgroup

Author(s) Amina Jama-Mahmud², Ewy Olander¹, Sara Eriksen², Bo, J.A. Haglund³

Affiliation(s)
1. Blekinge Institute of Technology, School of Health Science.
2. Blekinge Institute of Technology, School of Computing
3. Karolinska Institutet, Dept. of Public Health Sciences

Contact addresses aminajama0@gmail.com, Tel: +46-768538021 ewy.lander@bth.se, sara.eriksen@bth.se, bo.haglund@ki.se

Abstract
The use of Participatory Action Research (PAR) has increased within health care system, as a way to empower people to take more responsibility for their health and to develop health programs that respond to the peoples’ needs. However, participation as a concept is poorly defined and discussed in studies beyond its instrumental part to achieve a goal or as a moral imperative. There is therefore a need to explore the concept of participation if we are to build on lessons learned in various projects. The aim of this study was to explore participant’s experiences of collaboration in the development of an interactive ICT supported health communication channel for health promotion in the development of an Interactive Communication Technology supported health channel Virtual Hälsotorg for health promotion in a Primary Health Care setting. Multi-phase and Participatory Action Research approach and methods were applied. Materials included individual interviews with 11 participants from a workgroup members and project documentation including field notes, meeting minutes, project reports and newsletters. Results show that both professionals and local citizens reported positive and educative experiences of Virtual Hälsotorg as a result of the collaborative process in which they participated. Data analysis revealed that motivations for participation, sense of inclusion and sense of ownership and learning were categories which reflected factors that influenced participants’ experience of collaboration. It is concluded that adopting a PAR and a holistic health promotion approach to the development of an interactive eHealth application addressed health equity issues, contributed to skills and capacity building among participants and enhanced participants’ health literacy and eHealth literacy.

Keywords: eHealth, eHealth literacy, health communication, health literacy, health promotion, Participatory Action Research.
Introduction

The use of Participatory Action Research (PAR) has increased within health care system, (Bradbury-Huang, 2012) for a variety of reasons, the most cited being the need to empower people to take more responsibility for their health and to develop health programs that respond to the peoples’ needs (Henwood et al., 2011, Schulz and Nakamoto, 2012). Similarly, different forms of participatory research such as participatory design (PD), have increased in the development of eHealth systems, where inclusion of potential users in the design process of eHealth systems is associated with increase in the systems’ usability and accessibility (Nijland et al., 2008, van Gemert-Pijnen et al., 2011, Evers, 2006, Kreps and Neuhauser, 2010). Hence, involvement of health care users in both health and design of eHealth system is of great importance In order to empower the people to take more responsibilities and develop systems that respond to the people’s needs (Henwood et al., 2011, Schulz and Nakamoto, 2012). This paper presents results from a PAR workgroup who participated in a collaborative design of an eHealth communication channel for health promotion in Primary Health Care (PHC) context.

eHealth in this paper, is defined as “the use of emerging ICT such as Internet and related technologies to improve or enable health and health care services”(Pagliari et al., 2005). As the demands for individual responsibility for own health increases in health care systems (Laverack, 2013, Vallgård, 2011), so does the demand for improved accessibility to health care services (Ziglio et al., 2011, Mahmud et al., 2013, Govern, 2008) and creation of supportive environment to support people in their efforts to make healthy decision (Dooris, 2009, Directions, 2007, Watson, 2008). Participation of concerned parties in the planning, implementing and evaluation of health promotion programs is key to achieving a holistic approach as people are experts of their own environments (Marent et al., 2012).

eHealth communication technologies have the potential to provide access to timely, tailored health information to patients and other health consumers (Suggs, 2006, Rimal and Lapinski, 2009), create innovative opportunities for web based health communication, universal access to health information and health decision support, electronic records, on line social support networks and anonymity (Street et al., 1997, Pagliari et al., 2005, Ahern, 2007). These attributes make eHealth attractive strategy for promoting health and enhancing health literacy (Ratzan and Parker, 2006) Baker et al (Baker et al., 1998), point out that the role of health communication is to create a receptive and favorable environment in which information can be shared, understood, absorbed, and discussed by the intended audience. Freimuth and Queen (2004) argue that health communication without substantiated supportive environments is ineffective to sustain behaviour change, communicate complex messages or compensate for lack of access to health care. Hence, for health communication to be effective, it needs to adopt a holistic approach and aim to create a supportive environment for health (ibid.). Similarly Information System’s researchers are calling for a holistic approach to the design of ICT systems especially, eHealth systems due to the gap between the existing eHealth systems and people’s ability to engage with them (Neuhauser and Kreps, 2011, van Gemert-Pijnen et al., 2011, Koh et al., 2013).
There is a consensus among researchers on the need for a holistic health promotion approach to enable people gain control over the determinants of health and thereby improving their health (WHO, 1986), with more focus on determinants of health, instead of the medical preventive approach with focus on risk factors (Marmot et al., 2008, Rohde et al., 2008). Underlying the call for holistic approach is a criticism against the narrow and fragmented individual lifestyle and disease prevention approach dominating health promotion programs in health care settings (Dooris, 2009). The narrow preventive approach is considered inadequate to address the increasing lifestyle related ill health, escalating health care costs and increasing health inequalities within and between nations facing countries throughout the world (Health, 2008, Ahern, 2007, Nutbeam, 2000, Parker et al., 2003). Ottawa Charter emphasized a holistic approach that focuses on structural factors and the need for intersectoral collaboration, creation of healthy public policy focused on everyday living (Nutbeam, 2000). The Ottawa Charter further identified five main action areas: building healthy public policy, creation of supportive environment, strengthening of community actions, developing of personal skills and reorienting health services. The underlying values for health promotion with focus on participation, empowerment, holistic and intersectoral approach, equity, sustainability and multi-strategy are principles are pointed out to guide health promotion policies and activities (Rootman, 2001). These values and principles which advocate for a strong bottom up approach (Tones and Green, 2004), were integrated in the design process of an interactive ICT supported health communication channel for health promotion that is, the Virtual Hälsotorg, presented in this paper.

Participation as a concept is poorly defined and discussed in studies beyond its instrumental part to achieve a goal (Marent et al., 2012) or as a moral imperative. Participatory methodologies have been criticized for empowering the already powerful (Frahsa et al., 2012), misapplying the concept of participation to enhance tyranny (Cooke and Kothari, 2001, Ferreday and Hodgson, 2008) and using participation as convenience of to secure funds (Kesby, 2005). Despite the large number of studies applying participatory research methods, few of them explore participants’ experiences and impact of participation or collaboration (Bergold and Thomas, 2012). Thus, careful planning and evaluation of participation is essential to ensure genuine participation and to document the valuable lessons learned. The aim of this study was to explore participant’s experiences of collaboration in the development of an interactive ICT supported health communication channel for health promotion that is, the Virtual Hälsotorg.

Study Setting

Setting for this study was a PHC-centre in the South-East of Sweden and the project entitled the Virtual Hälsotorg (VHT-project). The project aim was to develop an interactive health communication channel to provide reliable, relevant, accessible health information and decision support to enable citizens make healthy decisions about their own health and that of their families. VHT-project emerged from the “Hälsotorg”, a health promotion setting in PHC that offered universal health information and individual health counselling on life style related issues for free. The Hälsotorg was initiated nation-wide in the early 1990’s in collaboration
between PHC, the then government owned Pharmacy and the municipalities (Mahmud et al., 2010).

**Study Approach and theoretical framework**

The PAR approach used in this study (Whyte et al., 1991) is influenced by Dewey’s philosophy of pragmatism (Dewey, 1925) and Freire’s pedagogy of the oppressed (Freire, 1972). Miettinen (2006) maintains that the worth of Dewey’s theory is determined by testing it in real life (Miettinen, 2006). While Freire’s pedagogy perceives learning as social interaction that can be achieved through experience. He proposes conscientization (consciousness raising) through a dialogical process where participants can acquire the confidence, skills and knowledge they need to improve their situation. Both Dewey and Freire advocate for collaboration and action as strategies for learning. PAR is a systematic and democratic research process that involves potential project/intervention benefactors in order to develop practical knowledge to tackle problems that are pressing to them (Reason and Bradbury, 2001). Underpinning essence of PAR are the notions of equity and social justice (Whyte et al., 1991). PAR functions on the principle that local communities are experts of their own lives (ibid), and as such ought to be full partners in interventions or programs that affect them (Whitehead et al., 2003).

Participation fosters capacity building and empowerment, which together with equity, form core principals of health promotion interventions (Laverack, 2004). PAR in this sense, fulfils empowerment, enabling and capacity building goals of health promotion thereby lending itself excellent as an approach to realise health promotion goals (Whitehead et al., 2003). To increase and maintain participation, Wicks and Reason (2009), propose the creation of communicative spaces where people feel safe to open up, discuss and share ideas without fear for repercussions or feeling of inadequacy (Wicks and Reason, 2009).

To achieve the health promotion goal of the VHT-project, it was important to involve potential users and providers. the Virtual Hälsotorg in the design process (Baskerville, 1999, Timpka et al., 2008) to define needs and decide the content and layout of the channel in this way the process is as important as the outcome (Whitehead et al., 2003). Hence, PAR has a double mission: firstly, to produce knowledge through reflective inquiry which results in an action to improve practice or situations in which the concerned people find themselves in and want to change. The action is then evaluated iteratively and further action is collaboratively decided and the cycle repeated as long as it is necessary (Baum et al., 2006). In the case of VHT-project, the reflective inquiry was directed at improving health communication in PHC by developing an interactive health channel. Secondly, to bring about change in health literacy in both health personnel and local citizens, change that are relevant to the context and culturally acceptable (Ibid.).
Methods and materials

A multiphase design (Creswell, 2013), were applied in this study. According to Creswell and Clark (2013), a multiphase design offers flexibility of methods, governed by the research objective and suits projects that employ multi-professional teams with different world views and assumptions. The design and evaluation process followed the development of the Virtual Hälsotorg channel from idea to the final prototype, i.e. a model or sample built to test a concept or process which can later be replicated or learned from (Piairo et al., 2013). A developmental process model entitled ‘Spiral Technology Action Research’ (STAR) (Skinner et al., 2006) was used to guide the process. The STAR model combines health promotion behavioural theories, PAR approach and Freire’s (1972) critical pedagogy with ICT systems design approach.

The STAR model (Skinner et al., 2006) consists of five cycles; Listen, Plan, Do, Study and Act. These cycles represent an incremental improvement approach for rapid cycle change to design, test and disseminate the eHealth program. The process also divides the technical development process into a series of smaller decisions and development, each subject to improvement, evaluation and reflection. The cycles dovetail PAR process and allow continuous feedback and dialogue between project participants, enabling learning and subsequent design refinements of the prototype. This process is referred to as ‘rapid prototyping’ in the STAR model (ibid.). The STAR model was originally developed for programs with behaviour change approach (Skinner et al., 2006), hence incompatible with VHT-project’s holistic and empowerment approach (Baum, 2008, Nutbeam, 1998). To steer STAR from the behaviour approach, health promotion values, and principles on participation and empowerment were integrated into the design process to achieve participatory evaluation approach (Springett, 2001). Participatory evaluation has its roots in PAR and involves all stakeholders in the research process and knowledge production, to produce knowledge that can be acted upon and is relevant for the people concerned (ibid.). The five STAR cycles were combined as follows: ‘Listen’; ‘Plan and Do’ and ‘Study and Act’, to form three evaluation phases representing formative, process and outcome evaluation (Figure 1) respectively (Bowling, 2002).

VHT-project participants

A total of 146 participants took part in the VHT-project. (Table 1). In phase one, the Listen phase, 26 participants were involved as respondents in a survey and 30 participants in focus groups (table 1). In phase two, the Plan and Do phase, the participants were members in a workgroup with 18 participants or in references groups, which involved 33 participants. In phase three, the Study and Act phase, they were 38 participants in three test groups.

The work group which this study focus on consisted of both professionals and local citizens. The multidisciplinary professionals were recruited, using purposive and snowball methods (Patton, 2002), from the local PHC centre, the municipality public health departments and the country council. The professionals formed a project group and were later joined by local
citizens (laymen) who were recruited through advertisements in the local newspapers and complemented by snowball methods. The Project group and local citizens formed a ‘work group’. The workgroup consisted of the five multidisciplinary professionals and 11 local citizens. The professionals consisted of a district nurse working as a health and lifestyle consultant in the PHC clinic a senior researcher, a doctoral student, an interaction designer from the university and a project manager from the county council’s PHC administrative body. The local citizens consisted of four men and four women who were recruited through an advertisement in two local papers and complemented with a snowball method, whereby new recruits were asked to recommend others who could be interested in participating in the project (Patton, 2002). The first author, acted as principle investigator and the second author, a senior researcher, who is an adviser with years of experience in conducting participatory research in PHC.

Design and evaluation process of the Virtual Hälsotorg Channel

Formative evaluation was used in the planning stage of the VHT-project to ensure that the planned Virtual Hälsotorg-channel was developed according to participants needs and that appropriate methods and materials were used to inform and improve the final Virtual Hälsotorg prototype (Skinner et al., 2006). Participation and empowerment formed the locus of VHT-project. Process evaluation was used to assess and explain the development progress and how participants understood how and what had worked in the project. Outcome evaluation was carried out to determine if and how the VHT had achieved its goals and objectives of providing relevant, accessible, health communication and its impact on health literacy (Patton, 2002, Skinner et al., 2006, Nutbeam and Bauman, 2006).

The first Listen phase, focused on scanning the context, interacting with target groups and conducting needs assessment to ensure that VHT adapted to the context for its use and stakeholder’s needs; and that appropriate methods and materials were used to inform the design of the prototype (Patton, 2002, Nutbeam and Bauman, 2006, Skinner et al., 2006). Two studies (Mahmud et al., 2010, Mahmud et al., 2013) were conducted to analyse the context of the planned Virtual Hälsotorg channel prior to embarking on the design of the eHealth application, that is Virtual Hälsotorg (Skinner Harvey et al., 2006).

The second phase, Plan and Do which this paper is based on, focused on ways to address and implement the identified needs in phase one, and to specify technical and organizational requirements for Virtual Hälsotorg channel. The participating groups in this phase were; the work and reference groups. The collaborative design process deciding on the medium, content and design of Virtual Hälsotorg was also carried out in this phase. Hence the design process was a learning process (Reason and Bradbury, 2001) for all involved. The interaction designer served as a technical support for the workgroup.

A room on the PHC centre was converted into a “design workshop”; a physical meeting place for the workgroup to meet once a week over a period of 1½ years. The initial workshops focused on; defining potential aims, function of and target group(s) for the planned Virtual
Hälsotorg. Quality criteria for a ‘good’ health website, and the participants’ reflection on their own needs based on their roles as citizens/end users, providers/professional user or decision maker, were discussed. Workgroup members contributed through mini-studies and dialogue in the workshops; each was regarded as a designer and a co-researcher in accordance with PAR principles (Whyte, 1991). Every workshop was documented in meeting minutes, graphic layouts (sketches) and reflexive field notes (Patton, 2002, Skinner et al., 2006). At the end of each workshop, new problems/challenges’ were identified and plans to solve/overcome were devised in the following meeting. Meeting minutes were sent to all participants in the workgroup by e-mail or regular post.

The design workshop was open to all workgroup members, health personnel and the general public. When necessary, the workshop was moved to schools and residential areas to get input from a broader larger population. Maintaining an open, flexible physical place of communication, facilitated participation, made it easier to maintain the workgroup as well as get a broader input on the content and design of the Virtual Hälsotorg.

The study and act phase focused on the testing of the final prototype (Skinner Harvey et al., 2006). A five-week test period was set up. Local citizens were invited through an advertisement in the local newspaper and snowball methods (Patton, 2002) to test the prototype. Prior to the test period, all professionals working in the project were offered a half day training in “web writing and publishing”. During the test period, the PHC clinic offered individual health counselling services, open public lectures on prevention/management of chronic diseases such as hypertension and diabetes. All the activities were offered free of charge and the live lectures were recorded and uploaded to the Virtual Hälsotorg channel.

Data Collection

In this study, which explores the workgroup participant’s experiences of collaboration in the development of the Virtual Hälsotorg, multi-methods (Creswell and Clark, 2007) were used for data collection which included in-depth interviews and various documents collected throughout the VHT-project (table 1). The project documentation included: field notes, monthly reports, project reports, workshop documentation, reflexive notes and project newsletters. A total of 11 workgroup members took part in the in-depth interviews two to four weeks after the project ended. One of the interviews was conducted via telephone as the participant had moved to another part of the country. Each interview session was initiated by asking an open ended question (Patton, 2002): “How would you describe your experience of taking part in the development of Virtual Hälsotorg?” The participants were also asked, if possible, to give concrete examples of factors that have influenced their experiences and what they would do differently, if they were to repeat the same process. As learning is a desired outcome of PAR (Whyte et al., 1991), participants were asked to share what they had learnt from their collaboration process. Since the interviewing researcher was part of the work group, field notes kept throughout the design process was used as a tool to critically reflect upon the researcher’s role and draw upon lessons learned.
Data analysis

A qualitative analysis was conducted (Patton, 2002), using the study aim and the interview questions as a framework for analysis. Data from the interviews were analysed separately and coded. The codes were then compared and contrasted, similar codes were later integrated to form categories (ibid) which reflected factors that influenced workgroup members’ experiences of participation. The data from workgroup interviews form the main source of results section while data from project documentation were used as compliment to these data and as a source in the researcher reflections section of the paper. This layout is motivated by the importance of reciprocity accorded PAR as an approach (Ben-Ari and Enosh, 2013).

Each data set from project documentation were summarised and read several times to get a sense of the whole. Each data set was then coded separately; similar codes were grouped together and categorized. Interviews were audio taped and transcribed per verbatim (Patton, 2002).

Results

On the whole, the data analysis revealed that workgroup participants had perceived their participation in the collaborative design process as positive. One of the participants summed up his experience, as follows:

“It was like sitting in a boat full of strangers in a stormy sea, all rowing in different directions with determinations and belief but not really knowing where were heading. We did get to our destination in the end but it wasn’t really what we expected... We set out to build a castle and we ended up building a kennel, but it was OUR kennel!” (A male participant)

Several work group participants shared the same the sentiments expressed above. The interviewed participants expressed a sense of accomplishment for building a health portal together with complete strangers. At the same time, they acknowledged the difficulties faced during the process, symbolized by the stormy sea. These difficulties were framed in terms of ‘lack of direction’ and a ‘mixed feeling of disappointment and pride’. The data analysis revealed following categories; motivations for participation, sense of inclusion, sense of ownership and learning. These represented factors that influenced participants’ experiences of participation.

Motivations for participation

The interviewed workgroup participants got involved in the VHT for several reasons. Data analysis revealed that all the participants were primarily curious about the project and wanted to contribute to the development of health or ICT for health. However, other factors motivated them to join the project at that particular time.

Interview data analysis revealed two main types of motivation: personal development and purposeful action. The personal development could further be divided into job-related and
knowledge related. For the participants whose motivation was job-related, saw participating in VHT-project as an opportunity get employment in the project, broaden personal network or a possibility to get access to the county council’s owned health website to market privately owned health services. Participants motivated by knowledge-related motivations, saw their participation as a way to advance their knowledge on whether health and health care systems or gaining knowledge on Internet and computer related skills. Common to both groups, motivated by personal development and purposeful action, is they approached participation as a way to gain something for themselves, initially but as the project proceeded, data from the field notes show, that changes occurred from focusing on self gain, to focusing on what to do for the community.

Participants driven by purposeful action were mainly older and experienced in getting involved in community of research project, according to the project documentation. In the interviews, they explained their motivation in terms of a sense of civic duty and wanting to contribute to the society with their skills and personal experiences. Civic duty involved wanting to bring about change, seeking to influence political and community decisions. As mentioned earlier, these purposeful action motivated individuals were older and felt they have skills and experience and felt a sense of citizen duty to contribute to the society. Likewise, the professional participants saw themselves as possessing instrumental knowledge and skills to contribute towards enhancing public health. However, the professionals in the workgroup also had an interest of wanting to advance health promotion activities in PHC practice.

**Sense of inclusion**

In their accounts, participants in the workgroup who attended the physical workshops were commended the “openness” and “inclusivity” of the VHT project. Data analyses of workgroup interviews revealed three factors that contributed to increased sense of inclusion among themselves; communication, participation and innovation.

The project communication and dialogue contributed to workgroup participants’ sense of inclusion. Multi-channels; e-mails, monthly reports, workshop minutes and use of the project webpage were used to communicate the research process and results between the different participants in the project and contributed to a sense of inclusion. According to the workgroup participants, they explicated that the VHT-project was well documented, which made it easy to follow the project process, even when they were unable to attend the physical workshops. The adoption of dialogue and negotiation as a design tool in the development of Virtual Hälsotorg, contributed to increased sense of inclusion for the citizen participants in the workgroup. The professionals, especially from IT department, were “forced” to explain technical terms in a way that the lay persons could understand. At the same time every change had to be negotiated which benefited the citizens and reduced the professional’s power to dominate.

Data from both the interviews and project documentation showed that allowing open and different levels of participation contributed to a sense of belonging among the workgroup members. They were able to participate when it suited them and if they miss a workshop, they
could always catch up through the project documentation that was communicated using multi-channels.

Participants related that the VHT-project was an innovative project, due to the focus that was given to human activities instead of the design process and adaptation of test methodologies to suit diverse participants. The physical workshop was pointed out as an innovation. According to the workgroup members, the physical workshop with its homely feeling, decorated with flowers, cakes, snacks and coffee offered during workshop sessions contributed to a relaxed physical and homely atmosphere. The atmosphere, defused the myths of ICT design as a technical “architectural” process to a normal development process, according to the participants.

**Sense of ownership**

According to the data analysis, assigning meaningful roles, participants’ willingness to take responsibility and power sharing contributed to workgroup participants’ sense of ownership of VHT-project and consequently the Virtual Hälsotorg. According to the participants, assignment of tasks that corresponded to their competence or interest, made their participation more meaningful and enhanced their engagement in the project. The DN with health promotion and disease prevention experience contributed with her knowledge on health care system and health in general. The interaction designer contributed with technical skills in the design process and acted as a link between Virtual Hälsotorg project and the IT department. A sense of ownership manifested itself in several ways but it became more visible when visitors or other groups visit the design workshop and the participants would talk in terms of “our” website. The participants also took active part in the design process, conducting own tests, reporting their findings to be discussed in the workshop. The participants also sent e-mails to the workgroup members when they discover health resources which they shared with the rest of the group. In this sense, participant emerged themselves fully in the design and evaluation process as co-researchers while the researchers acted as facilitators of the process.

**Learning**

Results of data analyses revealed that participants perceived their participation and collaboration with others as positive, enriching and a learning experience. Professional participants expressed gratitude over the rich experience of web-design but at the same time lamented over the increase of workload without corresponding increase in resources. Local citizens were positive about the experiences gained from others as well as from conducting their own mini studies. Two types of learning could be deduced from the data; learning as experience and learning as increased awareness.

Learning as experience included practical skills and referred mainly to eHealth literacy. These skills included knowledge on how to design health communication to benefit a wider range of people, including people with disabilities. Skills to surf the Internet search and find relevant health resources. Skills to assess quality of health websites, hence participants improved their eHealth literacy capacity to interact with eHealth systems through the collaboration design
process of Virtual Hälsotorg. Learning as increased awareness referred to tacit knowledge or awareness of existing resources in one’s own environment. The interviewed workgroup members reported enhanced awareness of eHealth resources on Internet on topics of interest such as alternative medicine and their side effects. The most appreciated discovery however, was the increased awareness of existing health promotion and eHealth resources in their localities; availability of recreational resources in their local town, opportunities for physical activities in their communities and interactive eHealth services such as renewing of prescription drugs on their local PHC clinic’s websites and the national health website (1177.se).

**Researcher’s reflections and Lessons learned**

According to Adili and Higgins (Adili et al., 2012), focusing on the strengths of the participants, enables them to take control over the development process, which in essence is the goal of the health promotion activities (Tengland, 2007a). Active participation fosters ownership and facilitates empowerment (Wicks and Reason, 2009) which can be crucial for usability and credibility of eHealth resources (Skinner et al., 2006). In the VHT-project, focusing on participants’ strengths was done through the assignments of responsibilities in accordance with the participant’s interest or expertise. Everybody was given an equal chance to participate, participants who expressed an interest was given an opportunity to learn. By exploring innovative ways of facilitating participation such as the physical workshop and the project website, it was possible to sustain authentic participation of local citizens and hopefully legitimacy (Byrne and Alexander, 2006). Sustaining motivation among the workgroup was one of the challenges we faced as researchers in the VHT project, which is characteristic of PAR projects with long period of engagement (Jacobs, 2010).

Ari and Enosh (2013) contend that power differential and knowledge control shift in unexpected ways in PAR process due to “twists and turns” in the research process and that should not necessarily be considered to be negative. This pattern of power shift was clearly evident in VHT project. Even though the design process was a collaborative endeavour guided by democratic principles (Whyte, 1991), power relations varied depending on the task at hand. Power shifts within a PAR project, if done for the right reason like in the VHT-project, can be an effective way to carry the project forward, but it could also be detrimental to the participation of the other groups who are not active at that moment in time. As seen in the VHT-project, workgroup participants became passive due to lack of activity for them. Passiveness or drop-out of community members undermines the sustainability of the eHealth application as community members should be involved throughout the development process, from idea to evaluation of the final product.

The researchers assumed the role of facilitators in both phase 2 and 3 when required. Although the power differential described above were motivated by the research process, the power exerted by the steering group of SGF project (Arnesson and Albinsson, 2013) through decisions such as threats of discontinuation of the VHT project without consulting the workgroup, was often hard to motivate as a researcher. The top-down decisions demonstrated
by the steering committee undermined the mandate and legitimacy of the VHT project, which had promised workgroup members full participation, including decision making. The VHT-project experienced member dropout towards the end partly due to lack of control of the decision concerning its existence.

During the VHT project, it was obvious, that health care services are in constant change (Kreps and Neuhauser, 2010). A number of structural changes took place affected by endogenic factors (leadership changes, budget cut-backs) and by exogenic factors (privatization of PHC, and the pharmacies, and establishment of the national health website 1177.se). These factors undermined the need for Virtual Hälsotorg, put forth the question on who and where the financing of the Virtual Hälsotorg. The shadow cast by these factors, together with the culture of low prioritization of health promotion in health care services (Mahmud et al., 2013, Mahmud et al., 2010), could partly explain the lukewarm support VHT project received by the steering committee. The lesson is, that even though a PAR- approach is flexible and pragmatic (as applied in this study), it is hard to predict or even accommodate some of these changes. Could this be a failure on the researcher to “educate” the decision makers? How long should the process of creating communicative spaces go on in a project where many actors are involved and the participation is fluid?

Creating places and spaces of communication (Wicks and Reason, 2009) facilitated differential participation, communication and transparency, environment for co-learning, and thereby increased democratisation of the research, which is a precondition for PAR (Whyte, 1991). These communicative spaces were regarded as safe to air views, however controversial they seemed to be. The close interaction between participants in the workgroup, created a sense of “we” in the group such that when the project was put on hold while the steering committee was contemplating discontinuing the project, one of the citizens in the work group volunteered to go to the local politicians to try to reverse the decision. Thus participants were not only exercising their democratic right through participation in the research project but also outside in the “real world”. It can be argued that by adopting PAR approach, we succeeded in strengthening participants’ actions in the ownership process through genuine participation (Laverack, 2004) and avoided the criticism of practicing participation as tyranny (Ferreday and Hodgson, 2008).

Conclusions

Adopting PAR and holistic health promotion approach in the development of interactive eHealth applications addresses health equity issues, contributes to skills and capacity building among participants. The results confirm, that adoption of health promotion approach to the design of eHealth communication facilitates participants empowerment, enhances their eHealth literacy skills through experiential learning (Mason, 1997), and increases awareness of health resources in the local communities. The research process itself becomes a health promoting intervention, which increases the chances of the planned health communication becoming more health promoting in its content and design.
Ethical considerations

Participants were informed on the nature of the study, in accordance with the Swedish Ethical Review Act (SFS 2008:192). The study was approved by ‘The regional ethical committee for the Lund/Malmö region’ at Lund University in Sweden, Diary number 2009/120.

Informed consent was obtained from all participants. Informed consent pre-supposes accurate information. However, given the evolving nature of PAR projects where neither the researchers nor the participants know where it will end, the traditional concept of informed consent may not be adequate (Williamson and Prosser, 2002). The participant could only consent to participation in the project as a whole, given as accurate information as possible (Löfman et al., 2004). The work group received information on the objective of the study and they consented to participating in an evolving project where they were to be part of the process.

To ensure confidentiality and anonymity of the work group participants was a challenge in the VHT project, due to the small number of participants and the collaborative - interactive nature of the project (Löfman et al., 2004). To address this aspect, an inside-outside aspect (Houghton et al., 2010, Tengland, 2007b) and a confidentiality perspective was practiced. This entailed transparency of the process within the group and insurance of participants’ anonymity, when reporting outside of the work group. A transparent communication strategy was adopted, where participants were informed on every step of the process to encourage engagement, and which also made it possible for participants to validate research findings (Reason and Bradbury, 2001) prior to dissemination. No identifiable details are given in the reports shared with people outside of the project. When reporting the results from workshops, focus groups and individual interviews, non-identifiable descriptions were used or the whole group was cited instead of the individual.

Acknowledgements

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Conflict of interest

None declared.
References


for physical activity promotion with women in difficult life situations. *Health Promotion International*.


Table 1: Participants in the VHT-project

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pharmacy personnel</strong></td>
<td><strong>Project group (PG)</strong></td>
<td><strong>Test group 1 (T1)</strong></td>
</tr>
<tr>
<td>(n=26)</td>
<td>(n=5) all females.</td>
<td>(n=15) 4 men, 11 women.</td>
</tr>
<tr>
<td><strong>Group 1-2 (FG1 and FG2)</strong></td>
<td>1 health and lifestyle DN, 2 researchers, 1 interaction designer</td>
<td>Local citizens. Ages 17-71 yrs.</td>
</tr>
<tr>
<td>DN from PHC (n=9)</td>
<td>1 project manager</td>
<td><strong>Test group 2 (T2)</strong></td>
</tr>
<tr>
<td><strong>Group 3 (FG3)</strong></td>
<td>Ages 28-60 yrs.</td>
<td>(n=17) women DN from Child Health Care, DN consultations, GP and Geriatrics.</td>
</tr>
<tr>
<td>Hälsotorg network group (n=10)</td>
<td>6 local citizens, 2 DN + project group</td>
<td><strong>Test group 3 (T3)</strong></td>
</tr>
<tr>
<td>3 pharmacists, 3 regional Hälsotorg –DN, 1 PHC manager, 1 regional public health strategist, 1 psychiatry clinic manager and 1 dental clinic manager</td>
<td>Ages: 28-71 yrs.</td>
<td>(n=6) 5 men, 1 woman Local citizens of migrants. Age 23-43 yrs.</td>
</tr>
<tr>
<td><strong>Group 4 (FG4)</strong> Immigrants (n=8) 6 women, 2 men</td>
<td><strong>Reference groups:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Group 5 (FG5)</strong> Hälsotorg personnel from PHC centre (n=3) women</td>
<td><strong>Reference 1 (R1)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n=4) women</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 PHC managers, 2 physiotherapists.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Reference group 2 (R2)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n=10) 6 men, 4 women Immigrants. Ages: 21-56 yrs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>References group 3 (R3)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High School students (n=13) 9 men, 4 women. Ages 18-19 yrs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Reference group 4 (R4)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n=6) Pensioners. Ages: 65+</td>
<td></td>
</tr>
</tbody>
</table>
ABSTRACT

Increasing lifestyle-related ill health, escalating health care costs, expanding health inequalities within and between nations, and an aging population are challenges facing governments globally. Governments, especially in industrialized countries like Sweden, are investing in health promotion and health communication, especially in ICT-supported health communication as a way to increase health literacy and empowerment at individual and population levels. Studies show that many eHealth communication efforts are narrow in scope, medical oriented and therefore not enough to address the complexity of lifestyle-related ill health and equity issues.

This thesis proposes integrating health promotion values and principles in the design process of eHealth systems for health promotion in order to develop usable, sustainable, engaging, eHealth resources that are adaptable to their context of use and user’s skills. The overall aim of this thesis was to study the participatory development process of an interactive ICT-supported health communication channel for health promotion and enhancing health literacy in PHC context.

Participatory Action Research (PAR) with a multi-phase and multi-method approach was used in this thesis. A model entitled Spiral Technology Action Research’ (STAR) was used to guide the development of the health channel. This design process was framed in three developmental and evaluation phases corresponding to formative, process and outcome evaluation. A total of 146 participants consisting of professionals from primary health care services, information technology and academia, and local citizens participated in the project’s different phases. A triangulation of methods was used to collect the data; survey, document analysis, participatory observations with field notes, individual interviews, focus groups, think aloud protocols and log statistics. Qualitative and quantitative content analyses were used to analyse data.

The results revealed that integrating health promotion values and principles in the design process proved to be valuable not only to the content of the channel, but also in PHC practice. The different design phases yielded valuable results that built into each other and contributed to an eHealth channel that was perceived as relevant to the local people’s need for health communication; accessible and user friendly. The results also indicated that an Internet based interactive health channel, could be a valuable resource for enhancing health literacy if users are involved in the design.

Key words: eHealth, eHealth literacy, empowerment, health communication, health literacy, health promotion, Internet, participatory action research, primary health care