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Social Media in Healthcare

What are the Effects of the Use of Social Media on Patients' Health and Care: an Explorative Study



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Management summary

This report describes the approach to and results of an exploratory research into the effects of the use of social media by chronic patients on the quality of their health and care. To answer the main question of this study (What are the effects of the use of social media on patients' health and care?) the meaning to patients of the term 'social media' had to be determined. What part do the terms social computing, Web 2.0, Health 2.0 and Medicine 2.0 play in relation to social media? What are the possible effects of the use of social media and how can it play a role in improving the quality of health and care of patients?

Because a direct relationship between social media and the quality of patients' health and care has never been established, the concept of patient empowerment was included in this study as an intermediate variable. The conceptual framework in this study defines patient empowerment as: "The extent to which patients are equipped to help themselves with respect to their own health management". Five aspects were taken into account: (1) Health knowledge, (2) Self-confidence and acceptance, (3) Self-care and Self-management skills, (4) Self-efficacy and (5) Motivation.

The most important result of this study was the establishment of a linear relationship between the use of social media by chronic patients and satisfaction with their current care. A significant linear relationship was also discovered between the use of social media and the level of health-related knowledge, self-confidence and acceptance level and the motivational level of chronic patients.

This study concludes that for social media to affect the quality of healthcare it should be understood primarily as 'visiting and consuming social health content', where the information is made available mainly by other users. In this way social media contributes to the improvement of a patient as a conversation partner. This can lead to a better relationship between a chronic patient and his or her health care provider / professional, and to more loyalty towards his or her therapy.

Finally, the use of social media will enhance confidence, acceptance and motivational levels of chronic patients, making them less likely to become socially isolated. Their social network will remain intact or might even expand. Furthermore, the use of social media by patients may increase efficiency and may have a cost reducing effect through a reduction of absenteeism and lost working days, less rapid calls on a professional or healthcare provider and increased awareness which can result in earlier detection of problems which decreases the number of hospitalizations.

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Special thanks goes out to my family, friends and fellow students for the support they have given me to bring this thesis to a successful conclusion.

Below you will find a quote from one of the world's greatest politicians that I certainly do not want to deny you. He believed that new medical discoveries are “the inheritance of all” and was one of the first to support a national health care system.

Kind regards

Bert Tage

Enschede, april 2011

*‘A pessimist sees the difficulty in every opportunity;
an optimist sees the opportunity in every difficulty’*

Winston Churchill

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1 Introduction

1.1 Research background

In the Netherlands the term 'healthcare' covers a broad range of activities. Besides a concern for physical health there exists a focus on personal or social problems. This involves care for the elderly, the disabled, the homeless and youth and children's day-care centres. The healthcare sector provides both housing for social purposes and social support for those who need it. In this study the term 'healthcare institutions' refers to those institutions that only provide social support, but no housing. Clients or patients are defined as follows: 'People who use services offered by healthcare institutions' (Smulders and Kerkhof 2005). The nature and extent of care for a patient may vary greatly. Some clients only receive a daily hot meal; others need continual care due to a disability. Furthermore, this report defines chronically ill as: 'an irreversible illness, with no prospect of full recovery and a long average duration of illness' (Van den Bos 1989).

Healthcare providers are facing many important changes. According to Sofaer and Fiminger (2005) the twentieth century saw a transformation of individuals' attitudes in relation to their health and healthcare. The term 'consumer' appeared and was used to describe a variety of new roles and responsibilities for lay people who receive health services and who are often the target of health promotion and disease prevention interventions (Sofaer and Gruman 2003). Nowadays patients have more information about their illnesses and treatment options than ever before. Through various websites patients can exchange information on the effectiveness of certain products and treatments, and that diffusion of knowledge is having a substantial impact on the industry (Urban 2004). It has also begun to change consumers' relationship with their traditional touch points in healthcare: physicians, health plans, suppliers and pharmacists (Sarason-Kahn 2008).

To accelerate these changes, health care has been evolving away from a disease-centred model towards a patient-centred model (Laine and Davidoff 1996; Stewart et al. 2000; Tinetti and Fried 2004). In the disease-centred model all treatment decisions were based heavily on clinical experience and data from various medical tests. In a patient-centred model, patients become active participants in their own care and receive services designed to focus on their individual needs and preferences, in addition to advice and counsel from health professionals. For example, medical providers honour 86 per cent of patients' requests for specific prescriptions (Urban 2004).

The study of Sulik and Eich-Kroh (2008) speaks of a medical consumer who has an individualized role that shifts attention away from the general quality problem in healthcare and towards the ability of the person as a medical consumer. The best medical consumer can be characterized as optimistic, proactive, rational, responsible and informed. It is essential that healthcare providers promote informed decision making and facilitate actions designed to improve the personal capacity to exert control over factors that determine health and improve health outcomes. By sharing ideas, discussing symptoms, and debating treatment options together, all of the stakeholders gain knowledge that can ultimately improve patient care (Sarason-Kahn 2008).

The healthcare system has had an ongoing focus improving access to care, quality of care and cost reduction. A patient's health information and support system that incorporates self-management and empowerment has proven to enhance quality (Hibbard et al. 2004) and cost-effectiveness (Gustafson et al. 1999). The study of Gustafson et al. (1999) concludes that a computer-based personal health support system can improve a patient's quality of life and promote more efficient use of health care. They suggest that computerized health support

systems have the potential to combine the economies of wide-scale mediated dissemination of rare professional expertise with the depth and specificity of individual information-seeking, and add social support and decision tools. Gustafson et al. (1999) see the Internet as the effective tool to program and manage such a system. In this study the use of such an online health support system by patients is referred to as 'social health computing'.

1.2 Research motivation and aim

Between now and 2020 the number of sufferers from common chronic diseases like asthma, diabetes, cancer and heart failure will increase by fifty per cent in the Netherlands, according to Nyfer, a research institute that applies scientific and economic research to public policies, in their report 'Van patient tot partner' (2009). In this report, Nyfer predicts that government policy to increase the working life of people is doomed to fail. The lack of good care for the increasing number of people with a chronic disease will mean those people will not be able to work more years.

Furthermore, Nyfer states that if the health system fails to adequately respond to this situation, chronic diseases will not only cause a growing loss of quality of life, but will also develop into the most cost-intensive healthcare problem and will form an economic threat. As a solution, the Nyfer researchers deem it necessary to turn the patient into a partner in healthcare. The patient should be encouraged to stay as healthy as possible despite his or her chronic disease.

Through a better lifestyle, self-care and loyalty towards treatment, chronic patients should become 'co-producers' of their own health. The use of social media should increase the quality of life of patients by deeper understanding of the diagnosis, treatment and recovery and influence their course of illness and reduce psychological distress. Furthermore use of social media, according to Gustafson et al. (1999), by patients should maintain the cost-effectiveness of mass communication in technologically multiplying high-quality professional expertise to serve many receivers, while providing the equivalent of individual professional attention by tailoring content to serve individuals with different needs and situations.

Social media can help patients, following Gustafson et al. (1999) to (1) access exactly the information they need, whenever they have questions, (2) ask questions too embarrassing to ask, (3) deal with complicated decisions at their own pace, (4) electronically seek sources of support to help them deal with emotional responses to health problems and (5) examine how others have survived similar problems.

This study is of an explanatory nature and explores the relationship between 'the use of social media of chronic patients and the quality of their health and care. This study aims to further develop this theory and to provide a better understanding of this (possible) relationship. This is measured with an online questionnaire. With these results statistical claims are made and clear recommendations are given.

1.3 Research problem

The main question of this explorative research is: What are the effects of the use of social media on patients' health and care? To answer this main question the following research questions are stated according to the theoretical framework of this study:

- ✚ **RQ1:** What is the empowerment level of chronic patients in the Netherlands?
- ✚ **RQ2:** Does the use of social media have a positive effect on patient empowerment?
- ✚ **RQ3:** Which empowerment aspects are positively affected by patients who use social media ?
- ✚ **RQ4:** How does patient empowerment affect the perceived quality of patients' health and care?
- ✚ **RQ5:** Does the use of social media have a positive effect on the perceived quality of patients' health and care?
- ✚ **RQ6:** Are there any demographic characteristics that moderate the relation between the use of social media and the perceived quality of patients' health and care?

1.4 Research structure

This research has started with a clear motivation, goal and problem. Subsequently, the exploration has taken place based on the theoretical framework from which the research questions are formulated. The research questions are answered through field research by using an online questionnaire. Within this method, the data were collected, where after an analysis was made. From this analysis a recommendations rapport was developed. Thus, chapter 2 describes the theoretical framework and the research model of this study. Chapter 3 contains the method of research. The results are discussed in Chapter 4. Chapter 5 will discuss the research question of this study and will provide clear conclusions and recommendations.

2 Theoretical Framework

2.1 Introduction

To answer the main question of this study (What are the effects of the use of social media on patients' health and care?), theoretical understanding and consensus should be established about the term 'social media and what this means for patients. How do the terms social computing, web 1.0, web 2.0, web 3.0 and health 2.0 apply to social media? What are the most important social media applications and technologies? What on-line resources and media do patients use? Which effects occur when patients use these applications and technologies and, finally, what are the consequences for the quality of healthcare? Based on these findings the main research questions of this study will be formulated.

2.2 Social Media

2.2.1 Social media and Web 2.0

Experts in the field are still unable to find any consensus on the precise definition of social media. Sometimes social media is referred to as social computing, social software or computer-mediated communication. Social media is creating a new class of digital creators, curators and watchful observers who are bridging time and space in ways only an always-on globally-connected network can provide, to express their opinions and to belong to or create interest groups. This social networking approach revolutionized the way people communicate with each other, collaborate, and identify potential collaborators or friends and information that is relevant to them (Eysenbach 2008).

In a broad sense all terms have to do with supporting any sort of social behaviour in or through computational systems. The term 'social media' is defined best by Boyd (2008). Boyd (2008) defines social media as an umbrella term that refers to the set of tools, services, and applications that allow people to interact with others using network technologies. Social media encompass groupware, online communities, peer-to-peer and media-sharing technologies, and networked gaming. Instant messaging, blogging, micro blogging, forums, email, virtual worlds, texting, and social network sites are all genres of social media.

In theory there are three stages of social media/social computing, namely: (1) Web 1.0, (2) Web 2.0 and (3) Web 3.0. Web 1.0 refers to the World Wide Web during its first phase of operation. According to Sarashohn-Kahn (2008) Web 1.0 is the early era of the Web before blogs, social networks, and wikis, which are part of Web 2.0. Web 2.0 is seen by experts as more or less the umbrella term for the second wave of the World Wide Web. Web 2.0 applications are nowadays often imbedded in social media and must be seen as the development that facilitated the growth of these media.

Web 2.0 in a narrower sense is carried out by groups of people whereby each user/individual can create, share and value media content. The following definition based on the earlier work of T. O'Reilly, who coined the term Web 2.0, is very distinctive; Web 2.0 is a collection of interactive, open source and user controlled Internet applications enhancing the experiences, collaboration, knowledge and market power of the users as participants in business and social processes. Web 2.0 applications support the creation of informal user networks facilitating the flow of ideas, information, and knowledge and promoting innovation and creativity by allowing the efficient generation, dissemination, sharing and editing of content (Constantinides et al.

2008). All together it can be said that the occurrence of Web 2.0 technologies realized the shift of online media from mass communication to interpersonal communication.

The third wave of social media is Web 3.0. According to Sheth and Nagarajan (2009), the Semantic Web, a collection of machine-understandable documents and data, will soon merge into the social Semantic Web, or as it is mostly referred to, Web 3.0. Sheth and Nagarajan argue that Web 3.0 will use rich domain knowledge and document-level metadata to organize and analyze social media content. They predict that a vital success factor of Web 3.0 will be how much the Semantic Web can enrich the social Web, which includes not only data or Web pages and the links between them but also people, the connections among them, and the connections that people make with data.

2.2.2 Web 2.0 applications

Web 2.0 applications, are becoming increasingly relevant to health and wellness. This allows common people, not just whizz kids, to create content online. This user-generated content takes the form of photo-sharing, video-uploading, music-downloading, and personal blogging, among other activities supported by social networks. The term User-generated content (UGC) is also known as consumer-generated media (CGM) and user-created content (UCC). All terms refer to various kinds of media content that are produced by end-users (Sarashohn-Kahn 2008). The following web 2.0 application categories, mentioned by Constantinides et al. (2008), are the most important platforms to create online content:

- **Blogs:** Short for Weblogs: online journals, the most well-known and fastest growing category of Web 2.0 applications. Blogs are often combined with Podcasts and Video casts, i.e. digital audio or video that can be streamed or downloaded to portable devices.
- **Social Networks:** Platforms allow users to build personal websites accessible to other users to exchange personal content and to communicate.
- **Communities:** Websites that organize and share particular types of content.
- **Forums:** Sites for exchanging ideas and information usually focussed on a particular topic.
- **Content aggregators:** Applications allowing users to fully customize the web content they wish to access. The user is a vital factor for all categories of Web 2.0 applications, not only as a consumer, but also as a content contributor.

These applications correspond with the applications mentioned by Sarashohn-Kahn (2008). According to Sarashohn-Kahn, these applications provide the foundation for social networking in health known as 'Health 2.0'. Furthermore, based on a survey of 1,084 adults comprising 513 men and 571 women 18 years of age and older, iCrossing (2008) stated that 34% of those searching for information on health issues use social media resources to delve into health-related topics. Online forums and message boards are the most important and popular applications.

2.2.3 Web 2.0 technologies

Following Constantinides et al. (2008) a distinction is made between Web 2.0 applications and technologies. Constantinidis et al. (2008) mentioned in their study the most important enabling technologies of Web 2.0, namely: (1) Wiki's, (2) RSS, (3) Open Source, (4) Widgets, (5) Mash, (6) AJAX and (7) RIA. So which technologies could be of any use for patients? Firstly, wikis are. The use of Wikis in health and wellness is underlined by the survey of Icrossing (2008). They found that Wikipedia is the most used individual tool. Wikis enable a group of people to record, edit and verify knowledge on a particular subject collectively (Sarasohn-Kahn 2008) or as Constantinides et al. (2008) summarize it: 'collaborative publishing'.

The second technology that can be used by patients is RSS. RSS is short for Rich Site Summary or Really Simple Syndication and is a way to syndicate and customize online content (Constantinidis et al. 2008). Sites who use RSS allow monitoring of consumers' favourite blogs, efficient customization of news (Dans 2007) or other online content of interest to the user (Constantinidis et al. 2008). RSS is a technical device you can subscribe to. The use and collection of RSS-feeds saves time and you will always be updated with the latest news and other interests. RSS is widely used in websites that are frequently updated like blogs, forums and news sites.

Finally, the third technology used by patients is a so-called podcast. According to Sarashohn-Kahn podcasts help people to create and share audio files for social networks in health. More specifically a podcast is a series of digital media files episodically released which can be downloaded from the Internet and listened to or watched by patients. Patients can also create their own podcasts.

2.2.4 Social participation level

In 2006 Forrester Research Inc., a technology and market research company that provides advice to global leaders in business and technology measured the use of social media among US adults. They recognized six different levels of participation (from high to low): (1) creators, (2) critics, (3) collectors, (4) joiners, (5) spectators and (6) inactives. Forrester Research argued that not everyone is cut out to be a creator; nor is everyone inclined to join social networking from the start. Companies seeking to engage customers with these new tools need to understand where their audiences are within this categorization (Forrester Research 2008). So the question should then be: to which category do patients belong?

2.2.5 Web 2.0 effects on healthcare

The online environment is rapidly changing from Web 1.0 into Web 2.0. This also has an effect on healthcare. Firstly, control over media and health information has been shifting towards the patient. Social interaction between patients is important. They can now share stories and experiences, and support each other. Secondly, from the perspective of healthcare practitioners, many activities can be delivered to patients online, namely: (1) the provision of information, (2) peer contact, (3) transactions (products, treatments, appointments etc.) and (4) consultation. Social media can be used by patients as a platform for health information and support. This movement is also referred as Health 2.0, and can be defined as the use of social software to promote collaboration between patients, their caregivers, medical professionals, and other stakeholders in health (Sarasohn-Kahn 2008).

The concept of Health 2.0 was also defined by Bos (2008) on the basis of his analysis of discussions on three weblogs. Bos defined Health 2.0 as the combination of health data and health information with (patient) experience through the use of ICT, enabling the citizen to become an active and responsible partner in his/her own health and care pathway. According to Eytan (2008), "Health 2.0 is the transition to personal, participatory healthcare. Everyone is invited to see what is happening in their own care and in the health care system in general, to add their ideas, and to make it better every day."

Within the environment of Health 2.0, people with chronic health conditions are sharing their stories with each other, not just for emotional support, but also for the clinical knowledge they gain from participating with "patients like me" in an online community (Sarasohn-Kahn 2008). This is also underlined by a study by Barker (2008), which showed that adolescents spend a large amount of time communicating with their existing peer groups via the internet as means of support, entertainment and passing time. The internet and in this instance social networking sites also provide companionship to adolescents who experience a sense of negative social identity and collective self-esteem thus allowing them to identify with people who are like them (or who they might perhaps wish to be like).

Another term often used is Medicine 2.0. It suffices to say that most authors do not necessarily see a significant difference between Health 2.0 and Medicine 2.0. If there is any difference, Medicine 2.0 is the broader concept and umbrella term which includes consumer-directed "medicine". (Hughes B et al. 2008; Eysenbach 2008). Medicine 2.0 is defined as: applications, services and tools for health care consumers, caregivers, patients, health professionals, and biomedical researchers, who use Web 2.0 technologies and/or semantic web and virtual-reality tools to enable and facilitate specifically social networking, participation, apomediation, collaboration and openness (Eysenbach 2008).

Following Eysenbach (2008) five major areas/themes are affected by the use of Web 2.0 applications and technologies in health, healthcare, medicine, and science, which will outlive the specific tools and services now on offer. These areas are: (1) social networking, (2) participation, (3) apomediation, (4) collaboration and (5) openness.

Social networks

Even before the internet became widely available, evidence was found that social networks had a positive influence on health (Berkman and Syme (1979). This large-scale Californian study showed that people with the lowest levels of social contact had mortality rates two to four-and-a-half times greater than those with strong social networks. These social networks can now be enhanced through websites and online communication. These new websites facilitate the exchange of health information, support and personal stories/experiences in ways that exceed both medical textbooks and chatting with a friend on the phone, because they unite some of the benefits of both. Consumers/patients are quickly adopting these online social networks.

Moreover, according to Capaldo (2007), and based on the studies of well known social network theorists who mapped the strength of strong ties (Levin, 2002), weak ties (Granovetter, 1973), the structural holes between them (Burt, 1992) and mechanisms to exploit and bridge these holes (Mc Evily and Zaheer, 1999), the 'dual network' is emerging. This is a network architecture wherein a small core of strong ties is integrated with a larger periphery of weak ties, which should increase knowledge and relational capability as a result.

This dual network theory corresponds with Wellman's networked individualism theory. Wellman says that when strong ties are unable to provide information, people are likely to seek it from weak ties. Because people with strong ties are more likely to be socially similar

and to know the same people, they are more likely to possess the same information. By contrast, Wellman argues, new information is more apt to come through weaker ties. Such 'network capital' includes information, knowledge, material aid, financial aid, alliances, emotional support and a sense of being connected.

Wellman also indicates that people usually obtain support, companionship, information and a sense of belonging from those who do not live within the same neighbourhood or even within the same metropolitan area. Wellman advocates the shift from globalised networks, which are communities of shared interest rather than communities of shared kinship or locality, to networked individualism, a personalized, wireless world with each person switching between ties and networks. People remain connected, but as individuals rather than as human beings rooted in their home bases of work units and households. Wellmann predicts that there will be specialized social networks which will consist of either like-minded people or people with complementary roles.

Social networking is the foundation of Web 2.0 technologies in health. Eysenbach (2008) says that Web 2.0 technologies in health lead to the explicit modelling of connections between people, which forms complex networks of relations, which in turn enables and facilitates collaboration and collaborative filtering processes. Moreover, it is a potentially powerful tool to engage users, because it provides "social" incentives to enter, update, and manage personal information (Eysenbach 2008).

Finally, the more participants there are in a social network, the more value they create. Surowiecky (2005) refers to this positive effect as collective intelligence. Surowiecky notes that "groups are remarkably intelligent and are often smarter than the smartest people in them." An example is the 'PatientsLikeMe' website, where people from all over the world share personal information on their medical conditions. According to Surowiecky (2005), "sites like this make it possible to solicit and aggregate information from people all over the world with just a few clicks of the mouse".

Communities

According to Sarasohn-Kahn (2008) social media are a set of internet tools that enable a group of people with a common interest to connect with one another to learn, play, work, organize and socialize. Thus users are linked into networks and form communities based on shared interests. Such a community network is called a Community of Practice (CoP); in a health context it is referred to as a Community of Circumstances (CoC).

Wenger (2007) summarizes Communities of Practice (CoPs) as "groups of people" who share a concern or a passion for something they do and who learn how to do it better as they interact regularly." Examples of these communities in health are online support groups.

A study by Grandinetti (2000) found that user rated online support groups are more convenient, supported, cost-efficient, in-depth informative, and thus more helpful than physicians. These online support groups, like face-to-face groups, are alternatives to professional care. Online support groups provide social support, information, shared-experiences, behavioural models and empowered participants fulfilling the function of a community (Sharf 1997; King and Moreggi 1998; Nochi 1998). Availability, anonymity, selectivity in responding, capacity for immediate and time-delayed reaction, an unlimited volume of participants (including professionals) and exposure to increased numbers of opinions, expertise and experiences are pivotal advantages (Sharf 1997; King and Moreggi 1998; Hagthornwaite et al. 1998).

Collaboration

According to Eysenbach (2008) collaboration specifically means to connect groups of people with each other who have either not or insufficiently interacted with each other. An example would be academic and diverse user groups. Furthermore, it is important to foster public participation and engagement in research issues and healthcare decisions. Eysenbach argues that collaboration between researchers on the one hand and the public and health professionals on the other hand, improves possibilities for knowledge translation and for turning important research findings into practice. Sharing ideas, discussing symptoms and debating treatment options together, and the collaboration between specialized and other stake-holders, can ultimately improve patients' care. By using social media patients should be capable of creating such interpersonal network structures.

Participation

The emergence of social networking platforms and applications creates new levels of patient participation as well as unique and unprecedented opportunities for engaging patients in their health, healthcare, and health research, and for connecting patients with informal and formal caregivers, health professionals and researchers (Eysenbach 2008). Patients should become active participants in their own care and receive services designed to focus on their individual needs and preferences. This is exemplified by the recent movement to open up the possibility for consumers to access their electronic health record. Sulik and Eich-Krohms (2008) go even further and argue that participation is the core factor determining an individual's ability to be a medical consumer. They characterize a successful medical consumer as optimistic, proactive, rational, responsible and informed.

Openness

Another key factor for social media in a healthcare context is openness. According to Eysenbach (2008) the technology of Web 2.0 stands for transparency, interoperability, open source and open interfaces. In the future, Health 2.0 and Web 3.0 developments will demand full control over a patient's data by healthcare professionals and institutions. However, according to Eysenbach (2008) many current Medicine 2.0 applications fall short in that regard. The problem is that people can feed information into the system but cannot get it out again.

Apomediation

Apomediation is the next effect of social media mentioned by Eysenbach. This concept refers to an information seeking strategy in which people rely less on traditional experts and authorities as gatekeepers (Eysenbach 2008). Eysenbach conceptualizes that "apomediarities" (which includes Web 2.0 approaches) can partly take over the role of the intermediary and "push" or "guide" users to relevant and accurate information. This effect of Web 2.0 may change the necessity of mediating agents in health networks and favour apomediarities to guide health consumers to high quality information and services without being a prerequisite to obtain that information or service in the first place.

Empowerment

The model by Constantinidis et al. (2008) acknowledges the effects of the use of Web 2.0 on the areas mentioned above but also adds empowerment as another possible effect of Web 2.0. Following Constantinidis, the use of Web 2.0 applications/technologies in healthcare should empower patients. They argue that users of Web 2.0 can easily create communities of special interests and further share their experiences and knowledge, but also have the possibility to engage in a transparent conversation. This will result in a unique form of customer empowerment (Constantinidis et al. 2008). Furthermore, according to Urban (2003, 2005), Web 2.0 applications are becoming increasingly popular due to the advantages they offer to users and their effect on customer empowerment. This is acknowledged by Bos (2008) who argues that it is only with recent developments in the application of the internet, or more specific Web 2.0, that patient empowerment becomes a feasible reality.

Wallerstein (1992) already found that stronger social networks support community empowerment. These networks can be enhanced through websites and online communication. New technologies such as Web 2.0 have this potential. This is also underlined by Seale et al. (2005), who explain that web forums are a rich source of data about illnesses and gender differences, and are platforms for an intensification of people's knowledge gathering activities. Seale et al. found that web forums, although they are actually publicly visible, appear to be subjectively experienced by both sexes as relatively private places for the exchange of intimate personal information. In addition to this, Van Uden-Kraan et al. (2009) found that participation in online support groups can make a valuable contribution to the empowerment of patients. Furthermore, a study by Demiris (2006) indicated that virtual communities may empower patients and enhance coordination of care services; however, there is not sufficient systematic evidence of the effectiveness of virtual communities on clinical outcomes or patient empowerment yet.

2.2.6 Definition of social media

Social media in health and care continue to develop into media with a Web 2.0 character. Web 2.0 applications and technologies are being used more and more by patients to seek information or support. As said before, Web 2.0 is carried out by groups of people, whereby each user/individual can create, share and value media content. Web 2.0 applications support the creation of informal user networks facilitating the flow of ideas, information, and knowledge, and promote innovation and creativity by allowing the efficient generation, dissemination, sharing and editing of content. The use of social media in this study is defined as follows: *“Consuming of, contributing to and creating own social content by patients with the help of online network applications en technologies characterized by a web 2.0 nature”*.

2.3 Empowerment

2.3.1 Introduction

Web 2.0 applications and technologies are empowering, engaging and educating patients and providers in healthcare. They are key issues for a better healthcare system, which emphasizes social networking together with collaboration, participation, apomediation, and openness as opposed to the traditional, hierarchical, closed structures within healthcare.

There is also a broader idea behind the use of social media in healthcare, namely the notion that healthcare systems need to move away from hospital-based medicine and focus on promoting health, providing healthcare in people's own homes, and empowering consumers/patients to take responsibility for their own health (Eysenbach 2008).

As said before, the Internet has been a tool for users and citizens to get more involved and empowered, and Web 2.0 technologies have taken this to a new level, as the philosophy of end-user participation and engagement (“trust your users”) is deeply ingrained in Web 2.0 thinking. Furthermore, the level of empowerment among patients is related to the way patients wish to be served by healthcare institutions. Nowadays patients’ growing need for autonomy, self-efficacy and knowledge, all important aspects of empowerment, are influencing and changing healthcare.

Recently, some concerns have been raised about the level of patient empowerment in healthcare applications. A few studies have examined empowerment interventions as they actually unfold in the context of health care applications. A study by Ouschan et.al. (2006), for example, found that patients are more trusting towards of and committed to physicians who adopt an empowering communication style.

2.3.2 Conceptualization

For years patient empowerment has been the subject of thinking and research. The first discussions started in the mid 1990s (Saltman RB, 1994). The most famous study in the field of empowerment is a study by Rogers et al. (1997) who developed and validated a scale measuring the construct of empowerment, as defined by consumers and former patients themselves. With these findings they set a framework for understanding the imprecise concept of empowerment. Rogers et al. used five factors to determine the level of empowerment; (1) self-efficacy/self esteem, (2) power/powerlessness, (3) community activism, (4) righteous anger and (5) optimism/control over the future.

Real definitions of patient empowerment, however, are hard to find. Empowerment is more or less a patient-centred, collaborative approach tailored to match the fundamental realities of healthcare. Patient empowerment refers most often to the actions and responsibilities of patients concerning their own health. Empowerment concerns the autonomy and the right and responsibility of patients to access health information and to make their own health-related decisions (Feste and Anderson 1995; Anderson et al 2005; Funnel and Anderson 2003).

Funnel et al. (1991) defined the concept of patient empowerment as ‘helping patients to discover and develop their inherent capacity to be responsible for their own life’. The term “patient empowerment” describes a situation where citizens are encouraged to take an active part in their own health management. This is in line with Bruns et al. (2002) who stated that empowerment refers to the extent to which individuals and whole communities are active and informed participants in discussions about their own health. Moreover, patient empowerment is considered a philosophy of healthcare that begins with the idea that optimal outcomes of healthcare interventions are achieved when patients become active participants in the

healthcare process. It emphasizes the importance of individual involvement in healthcare decision making.” (Monteagudo and Moreno 2007).

Furthermore, the concept of empowerment is strongly related with patients’ self-care and self-management skills. In health promotion health is viewed as a resource for daily living, and self-help/self-care is seen as empowering. When they acquire self-care skills, people are able to participate more actively in decisions influencing their own health, and in influencing the conditions that influence their health (Kickbush 1989). In a review of seventy studies conducted by Clark et al. (1991), a number of skills were found to be common to most successful self-management initiatives. These skills included the ability to: (1) recognize and act on symptoms, (2) use medication correctly, (3) manage emergencies, (4) manage diet and exercise, (5) interact effectively with health care providers, (6) use community resources, (7) adapt to work, (8) manage relations with significant others and (9) manage psychological responses to illness.

Kliche (2008) also acknowledged the importance of the concept of empowerment and its prevalence, but thought of it more as a buzz word. Therefore he conducted a conceptual review of empowerment in prevention and health promotion. His concept covered the fields of prevention, care and therapy, rehabilitation, health-care research, nursing and work-related stress. The analysis revealed eight dimensions of empowerment: (1) shared decision-making, (2) self efficacy, (3) social support and social capital, (4) skills and competences, (5) healthcare utilization, (6) goal setting and attainment, (7) reflexive thought and (8) innovation.

These eight dimensions correspond to a large extent with a study by Uden-Kraat et al. (2009) who conducted a qualitative study amongst participants in online support groups and who were the first to obtain a complete overview of the empowerment concept in relation to social media in health. They mentioned the following empowering outcomes: (1) being better informed, (2) feeling confident with their physician, (3) feeling confident with their treatment, (4) feeling confident with their social environment, (5) improved acceptance of the illness, (6) increased optimism and control, (7) enhanced self-esteem and (8) improved social well-being and collective action.

Vos and Van Doorn (2004), however, see empowerment as a guiding strategy based on power and knowledge in society and always in relation with disadvantaged groups. They advocate that empowerment will lead to full participation in society. To realize patient empowerment, healthcare providers therefore need to guide and prescribe patients less. They have to ensure that patients can think along with the practitioners and participate in finding solutions. By giving them space and creating the right conditions, patients will be able to help themselves and develop and demonstrate specific competences. According to Spencer and Spencer (1993) a competency is an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation. Moreover, they mention five aspects of a competency which must be demonstrated, namely: (1) motives, (2) personal characteristics, (3) self-concept, (4) knowledge and (5) skills.

2.4 Quality of Health & Care

When analyzing the literature one finds an almost limitless number of end-point outcomes for the quality of healthcare. In this study, however, all quality outcomes that are being influenced by empowerment are divided into four categories: (1) clinical outcomes, (2) health-related quality of life, (3) satisfaction with care and (4) costs.

Clinical Outcomes

Clinical outcomes may improve when patients are empowered. By increasing the role of patients, health care providers should become more responsive to patients' needs and preferences and deliver better quality of care (Wensing 2000). Multiple studies have shown that patients, who are involved in the decision-making process about their care and the management of their conditions, have better results than those who are not involved (Wagner et al. 2001; Wagner et al. 2001; Greenfield et al. 1985; Greenfield et al. 1988). Empowerment may improve patients' compliance with their medication regimen and medical follow-up care. The more patients are empowered, the more able they are to have meaningful discussions with their specialists. The concept of 'patient as partner' is essential. A mutual understanding between patient and specialist leads to rapid diagnosis and negotiated treatment options that are more likely to be adhered to (Taylor 2000).

Health-related quality of life

Empowered patients tend to feel more capable to influence their health-related quality of life in a positive way. According to Pibernik et al. (2004) empowerment-based intervention was shown to affect patients' quality of life favourably. This quality of life is most often referred to as the health-related quality of life (HRQL). This refers to perceived mental and physical health over time. This HRQL is widely used to better understand how an illness or other physical and mental limitations interfere with a patient's day-to-day life. Health professionals use it to measure the effects of diseases, numerous disorders and short- and long-term disabilities. Tokuda et al. (2009) distinguish eight factors in order to measure the HRQOL, namely: (1) general health, (2) physical function, (3) physical role (role limitations because of physical health), (4) bodily pain, (5) vitality, (6) social functioning, (7) mental health, and (8) emotional role (role limitations because of emotional problems)

Satisfaction with care

A patient's satisfaction with his or her healthcare depends to a great extent on his or her relationship with the healthcare provider or professional. As said before, this relationship is positively influenced by empowerment. Studies have shown that patients who perceive themselves as being empowered and well educated by their physician or another healthcare professional are more likely to be satisfied with their healthcare experience. This experience is best measured by Jenkinson et al. (2002), who measured the adult experience of patient health care. They distinguish the following domains: (1) information and communication, (2) patient involvement/respect for patient preferences, (3) hospital environment, (4) coordination of care, (5) discharge and transition, (6) pain/physical comfort, and (7) access.

Costs

The costs of healthcare have been shown to be reduced by empowerment because empowerment programs promote more efficient use of healthcare (Gustafson et al. 1999). The patient's demand on the healthcare system decreases. According to some studies approximately eighty per cent of all health problems could be treated at home. Two of the most frequently cited benefits are reduced absenteeism and lost workdays. Effective education programs can prevent minor illness or injury from progressing to the point of needing professional intervention. Increased patient awareness through education can also result in an earlier detection of problems and timelier outpatient intervention, thus decreasing the number of hospitalizations. Lastly, patients with chronic diseases who have been empowered through patient education programs generally have better coping skills and are usually less reliant on healthcare givers.

2.5 Research questions

The use of social media was defined as follows: *“Consuming of, contributing to and creating own social content by patients with the help of online network applications en technologies characterized by a web 2.0 nature”*. Following Constantinides et al. (2008) and Urban (2003, 2005) Web 2.0 has a positive effect on customer empowerment. Constantinides (2008) and Sarasohn-Kahn (2008) distinguish five categories of web 2.0 applications; (1) blogs, (2) social networks, (3) communities, (4) forums and (5) content aggregators. Furthermore, social media technologies that can be used by patients are (1) Wikis, (2) RSS feeds and (3) Podcasts.

If reality follows theory and these Web 2.0 applications and technologies have a positive effect on empowerment, the results should show that the more patients are using social media with a web 2.0 character, the higher their sense of empowerment will be. Next, the conceptual framework of this study defines patient empowerment in this study as: *“The extent to which patients are equipped to help themselves with respect to their own health management”*. To measure patient empowerment in this study, five aspects are taken into account: (1) health knowledge, (2) self-confidence and acceptance, (3) self-care and self-management skills, (4) self-efficacy and (5) motivation.

Furthermore, following Forrester (2006), there are different levels of participation in social media activities. These participation levels could have different effects on patient empowerment. Forrester (2006) differentiated between six levels (from high to low) of user participation in social media, namely; (1) creators, (2) critics, (3) collectors, (4) joiners, (5) spectators and (6) inactives. In this study these six levels are compressed into three levels of activity/participation; (1) Low; meaning visiting/consuming social content, (2) Medium; meaning contributing to social content and (3) High; meaning publishing own opinions /content on the internet.

Finally, all quality outcomes which are influenced by empowerment can be placed in four categories: (1) clinical outcomes, (2) health-related quality of life, (3) satisfaction with care and (4) costs. Empowerment should have a positive effect on these quality outcomes. However, clinical outcomes and costs were very hard to measure and can therefore not be included in this study. Thus, to measure the perceived quality outcomes only patients' 'health-related quality of life (HRQL)' and 'satisfaction with care' are included.

Based on the theoretical framework and the central question of this study (What are the effects of the use of social media on patients' health and care?) the six research questions of this study are:

- **RQ1:** What is the empowerment level of chronic patients in the Netherlands?
- **RQ2:** Does the use of social media have a positive effect on patient empowerment?
- **RQ3:** Which empowerment aspects are positively affected by patients who use social media?
- **RQ4:** How does patient empowerment affect the perceived quality of patients' health and care?
- **RQ5:** Does the use of social media have a positive effect on the perceived quality of patients' health and care?
- **RQ6:** Are there any demographic characteristics that moderate the relation between the use of social media and the perceived quality of patients' health and care?

3 Methodology

For this study an online questionnaire was used as a tool for data collection. This online questionnaire was promoted with help from Zorgbelang Overijssel. They placed a link to the questionnaire in their digital newsletter which was sent to 3000 people. Zorgbelang Overijssel is a foundation with over 120 participants. Zorgbelang represents the interests of those who require care in the region Overijssel. The majority of these people have a chronic illness.

3.1 Online questionnaire

An online questionnaire has clear advantages and disadvantages. The main advantages of this method for this study are:

- Quickness in reaching your target group
- Data of respondents can be put in a database file directly
- Extremely low costs
- The software ensures respondents answer all questions
- A respondent can take all the time he or she needs
- The questionnaire is anonymous

A so called 'walkthrough' was conducted among five fellow students. They filled in the survey and were then interviewed on the following topics: (1) clarity, (2) difficulty, (3) length and (4) understanding ability of the questionnaire. Afterwards a SWOT analysis was made which was followed with improvements to the survey where possible.

The interviewees all rated the survey as very clear and understandable. The average length to fill in the survey was between ten and fifteen minutes. Strong points mentioned were the extra explanation given when difficult concepts were used, the possibility to click on the answer itself and the warning message if one forgot to fill in a question. One weak point was mentioned: the survey lacked a help icon to explain difficult concepts. The software, however, did not allow placing an icon with an explanation at some questions or difficult concepts.

Using this 'walk through' technique most disadvantages could be solved or taken into account. However, some disadvantages still continued to exist. For example, the respondents who took part in the survey do not represent the population. There exists a clear selection bias of people who will fill out an online questionnaire and people who will not. Moreover, mainly young, intelligent people, with plenty of free time, are surfing the internet so the age of the respondents is biased.

Another disadvantage of using an online questionnaire is that you have no control over the accuracy of the data. It is easy for respondents to lie, although the serious nature of the questions asked eliminates this for the greater part. Furthermore, because of the time span of this research, a longitudinal study was not possible and causality cannot be investigated over time.

3.2 Sampling

The sample population consisted of all 'chronic patients' who have subscribed to the digital newsletter of Zorgbelang Overijssel. The newsletter was sent to 3000 people, of whom 228 viewed the online questionnaire and 65 people actually completed it. This is a response rate of 2,2% as shown in the table below. The response rate is the result of dividing the number of patients who completed the survey by the total number of patients who were eligible to participate and could have filled in the online questionnaire.

Table 1
Response rate figures of the online questionnaire

Response questionnaire	
Viewed	228
Completed	65
Response Rate	2,20%

However, it is impossible to check whether the sample reflects the entire population. The population is in fact unknown. The Dutch Ministry of Health, Welfare and Sport (VWS) defines chronic illness as: "irreversible illness, with no prospect of full recovery and a long average duration of illness" (De Klerk, 2002). This definition is widely used in reports about chronically ill people (Smulders & Kerkhof, 2005). There is, however, still scope for multiple interpretations; sometimes the mentally handicapped and people with impaired hearing are included and sometimes they are not. This influences the estimates of the number of people with a chronic disease in the Netherlands. The latest estimates were made in the late 1990s, when the number of chronically ill people ranged from about 1.5 to 4.5 million people (De Klerk, 2002).

To clarify the target group some general questions on the nature of the respondent's illness were included in the online survey. The results are that 95% of respondents in the questionnaire visit a doctor, specialist or a paramedic, of whom 61% visit more than once a month and 34% more than 4 times a month. A specialist is visited most often (44%). Furthermore, 91.5% of respondents would describe him or herself as a chronic patient. The mean age of the respondents is 42.

3.3 Operationalization

In this paragraph the main variables of the study are translated into observable items. This chapter provides guidelines for observing a particular variable. How the different variables are operationalized into measurable items is shown in the added tables.

Demographic and health characteristics

The respondents were asked to provide information about demographic characteristics such as age, sex, education, marital status and, subsequently, health characteristics such as diagnosis, healthcare provider and care visits.

Independent variables

Respondents were asked to indicate how frequently they carry out social media activities on three different levels of social participation. The three different levels were: (1) visiting /consuming social content, (2) contributing to social content and (3) creating own social content. Respondents could answer on a four-point scale, ranging from (1) 'daily' to (4) 'never'.

Table 2
Operationalization of the independent variables

Variables	Indicators	Questions	Source
The use of social media	Consuming social content	Listening podcasts	Forrester 2007
		Ratings and reviews	Forrester 2007
		Listen to and download audio files (music)	Forrester 2007
		Watch videos	Forrester 2007
		Visiting social network sites	Forrester 2007
		Visiting weblog	Forrester 2007
		Visiting online forums	Forrester 2007
	Contributing to social content	Vote/opinion on websites	Forrester 2007
		Vote/opinion online forums	Forrester 2007
		Comment on profile (hyves)	Forrester 2007
		Comment on weblog	Forrester 2007
		Post on rating and reviews	Forrester 2007
		Make use of tags	Forrester 2007
		Contribute to wiki	Forrester 2007
	Creating own social content	Make use of RSS feeds	Forrester 2007
		Own stories/experiences online	Forrester 2007
		Put a picture on public website	Forrester 2007
		Put audio files(music) on public website	Forrester 2007
		Put video files on public website	Forrester 2007
		Publish, maintain or update weblog	Forrester 2007
		Publisch, update webpage	Forrester 2007

Intermediary variables

Respondents were asked to indicate how empowered they felt. 41 items were formulated that described the empowerment level among patients. Respondents could answer on a five-point Likert scale, ranging from (1) ‘completely disagree’ to (5) ‘completely agree’. The concept of empowerment was measured by five variables. ‘Self-efficacy’ was measured with five items ‘Health knowledge’ with fifteen, ‘Motivation’ with four, ‘Self-confidence and acceptance’ with eleven and finally ‘Self-care and Self-management skills’ with six.

Table 3
Operationalization of the mediating variables

Variables	Indicators	Questions	Source
Patient Empowerment	Health knowledge	Well informed as a patient	Uden-Kraan et al. (2009)
		Clear picture about my illness	Uden-Kraan et al. (2009)
		Right knowledge to handle my illness	Uden-Kraan et al. (2009)
		Understand my illness	Uden-Kraan et al. (2009)
		Awareness other treatments	Uden-Kraan et al. (2009)
		Awareness new developments	Uden-Kraan et al. (2009)
		Awareness other healthcare providers	Uden-Kraan et al. (2009)
		Awareness alternative medication	Uden-Kraan et al. (2009)
		Awareness health products	Uden-Kraan et al. (2009)
		Understanding medical guidelines	Uden-Kraan et al. (2009)
		Prepared for an appointment	Uden-Kraan et al. (2009)
		Understanding medical advices	Uden-Kraan et al. (2009)
		Explanation of needs	Uden-Kraan et al. (2009)
		Contradict healthcare provider	Uden-Kraan et al. (2009)
		Know what my provider expects	Uden-Kraan et al. (2009)
	Motivation	Control health	Uden-Kraan et al. (2009)
		Improve health	Uden-Kraan et al. (2009)
		Handle own care	Uden-Kraan et al. (2009)
		Search for alternative treatments to improve health	Uden-Kraan et al. (2009)
	Self-efficacy	Faith in the future	Uden-Kraan et al. (2009)
		Capable to improve health	Uden-Kraan et al. (2009)
		Control over my illness	Uden-Kraan et al. (2009)
		Control over course illness	Uden-Kraan et al. (2009)
		Feeling of influencing illness	Uden-Kraan et al. (2009)
	Self-confidence and acceptance	Content with myself	Uden-Kraan et al. (2009)
		Support others	Uden-Kraan et al. (2009)
		Open about illness	Uden-Kraan et al. (2009)
		Dare to comment on others	Uden-Kraan et al. (2009)
		Dare to speak about illness	Uden-Kraan et al. (2009)
		Dare to share experiences	Uden-Kraan et al. (2009)
		Positive attitude	Uden-Kraan et al. (2009)
		Acceptation illness	Uden-Kraan et al. (2009)
		New social contacts	Uden-Kraan et al. (2009)
		Feel less lonely	Uden-Kraan et al. (2009)
		Feel positive about myself despite illness	Uden-Kraan et al. (2009)
	Self-manage and self-care skills	Capable to take care of myself	Clark et al. (1991)
		Capable to manage emergencies	Clark et al. (1991)
		Use medication concequent	Clark et al. (1991)
		Use medication correct	Clark et al. (1991)
		Capable of managing own health	Clark et al. (1991)
		Correct guidelines and excersises	Clark et al. (1991)

Dependent variables

To determine the dependent variable 'Quality of health and care' respondents were asked to indicate how much they were 'Satisfied with their current care' and how high they would rate their 'Health-related quality of life (HRQL).' 'Health-related quality of life' was assessed with the SF 8 method. Respondents could answer on a five-point Likert scale, ranging from (1) 'completely disagree' to (5) 'completely agree'. 'Satisfaction with care' was measured with ten items and 'HRQL' with seven.

Table 4
Operationalization of the dependent variables

Variables	Indicators	Question	Source
Quality of Health and Care	Health-related quality of life (HRQL)	Physical ability	Tokuda et al. (2009)
		Good social life	Tokuda et al. (2009)
		Good social life	Tokuda et al. (2009)
		Mobility	Tokuda et al. (2009)
		Fear and depressions	Tokuda et al. (2009)
		Pain and discomfort	Tokuda et al. (2009)
		Daily activities	Tokuda et al. (2009)
	Satisfaction with care	Satisfaction with service	Jenkinson et al.,2002c
		Satisfaction own input	Jenkinson et al.,2002c
		Satisfaction with costs	Jenkinson et al.,2002c
		Satisfaction with received support	Jenkinson et al.,2002c
		Satisfaction with healthcare provider	Jenkinson et al.,2002c
		Stay the forthcoming year with healthcare provider	Jenkinson et al.,2002c
		Recommend my healthcare provider	Jenkinson et al.,2002c
		Communication with healthcare provider	Jenkinson et al.,2002c
		Updated by healthcare provider	Jenkinson et al.,2002c
		Respect wishes by healthcare provider	Jenkinson et al.,2002c

4 Results

To answer the main question of this study the six research questions, which were formulated in chapter two, are answered. Before these questions are answered the reliability of the variables is tested. Next, correlation analysis and multicollinearity and normality tests were executed. All variables were tested on significance and all irrelevant variables were excluded from the research. Subsequently, the research questions of this study are answered with the help of linear regression and mediating and moderation analysis, all executed in SPSS.

4.1 Reliability

Firstly, the reliability of the variables were tested. A score of 0,80 or more than the item is well constructed. A minimum reliability of 0,60 is required. The independent variable is the use of social media and consists three different levels of social participation. With help of SPSS the internal consistency (Cronbach's alpha) was determined. Table 2 showed that 'the use of social media' was measured with 21 items ($\alpha = 0,93$). 'Low' with seven items ($\alpha = 0,83$), 'Medium' with eight ($\alpha = 0,86$) and finally 'High' with six items ($\alpha = 0,85$). The intermediary empowerment was measured by five variables. 'Efficacy' was measured with five items ($\alpha = 0,78$), 'Health knowledge' with fifteen ($\alpha = 0,92$), 'Motivation' with four ($\alpha = 0,71$), 'Self-confidence and acceptance' with eleven ($\alpha = 0,77$) and finally 'Self-care and Self-management skills' with six ($\alpha = 0,67$). Finally, the dependent variables of this study, 'Satisfaction with care' was measured with ten items ($\alpha = 0,89$) and 'HRQL' with seven ($\alpha = 0,83$). Thus all variables can be included in this research.

4.2 Correlation

Patients' perception of satisfaction with care was very strongly related with the use of social media ($t=.137$, $df = 59$; $p = .069$). The correlation analysis, however, found almost no correlation between the use of social media and patients' perceived Health-related Quality of Life ($t=.043$, $df = 59$; $p = .320$) and therefore HRQL was excluded from the research model. Correlation analysis, furthermore, showed that the use of social media was significantly correlated with patients' health-related knowledge ($t=.181$, $df = 59$; $p = .024$) and their self-confidence and acceptance levels ($t=.232$, $df = 59$; $p = .006$). The other empowerment aspects self-efficacy, motivation and self-management/self-care skills were found not to be significantly correlated with the use of social media and therefore were excluded from the research model. The table below shows the results of the correlation analysis between the mediating empowerment aspects of this study and the quality outcomes. Only the empowerment aspects health knowledge and self-confidence and acceptance are relevant in relation with patients' satisfaction with care. Health knowledge was significantly related ($t=.381$, $df=59$; $p = .000$) and self-confidence and acceptance was strongly related ($t=.124$, $df=59$; $p = .092$) with patients' perceived satisfaction with care.

Table 5
Kendall's tau_b correlation test (t) between patient empowerment & quality outcomes

Empowerment	Satisfaction with care	HRQOL
Health knowledge	t=.381, df=59; p = .000	t=-.004, df=59; p = .482
Self-efficacy	t=.003, df=59; p = .487	t=.477, df=59; p = .000
Motivation	t=.126, df=59; p = .096	t=-.094, df=59; p = .166
Self-confidence and acceptance	t=.124, df=59; p = .092	t=.201, df=59; p = .016
Self-management/Self-care skills	t=.238, df=59; p = .006	t=.194, df=59; p = .021

4.3 Multicollinearity

The next step was to exclude the predictors that are highly collinear. High multicollinearity can cause problems with the estimation of the regression coefficients. Multicollinearity does not reduce the predictive power or reliability of the model. A multiple regression model with correlated predictors can indicate how well the group of predictors predicts the outcome variable, but it may not give valid results about any individual predictor, or about which predictors are redundant with others. Within SPSS, the option 'collinearity diagnostics' examines multicollinearity among the predicting variables. A tolerance of less than 0.10 and a VIF of 5 and above indicates a multicollinearity problem. In this study, as shown in the table below, the independent variables, the use of social media, health knowledge and self-confidence and acceptance do not have a tolerance less than 0.10 or a VIF score more than 5. Thus, multicollinearity is not a problem in the research model.

Table 6
Multicollinearity of the predicting variables

Predictors	Tolerance	VIF
The use of social media	0,866	1,154
Health-related knowledge	0,661	1,512
Motivation	0,601	1,665
Self-confidence and acceptance	0,648	1,544

4.4 Normality

Another condition for a linear regression model is a normal distribution of the variables. Confidence intervals and various significance tests for coefficients are based on the assumptions of normally distributed errors. If the error distribution is significantly non-normal, confidence intervals may be too wide or too narrow. This goodness of fit test was in this study conducted with the Kolmogorov-Smirnov test (Z) for normality. One-Sample Kolmogorov-Smirnov Goodness-of-Fit tests whether or not a given distribution is not significantly different from one hypothesized (on the basis of the assumption of normal distribution). As shown in the table below, for the use of social media, health knowledge, self-confidence and acceptance and satisfaction of care no significant evidence was found that these variables were not normally distributed.

Table 7
Goodness of fit test for normality of the variables

Predictors	Kolmogorof-Smirnov Z	Sig. (2-tailed)
The use of social media	0,636	0,813
Health-related knowledge	0,71	0,694
Selfconfidence and acceptance	0,796	0,551
Motivation	0,909	0,38
Satisfaction with care	0,869	0,437

4.5 Research questions

1) What is the empowerment level of chronic patients in the Netherlands?

In this study patient empowerment is defined as follows: "The extent to which patients are equipped to help themselves with respect to their own health management". To measure patient empowerment in this study, five aspects are taken into account: (1) health knowledge, (2) self-confidence and acceptance, (3) self-care and self-management skills, (4) self-efficacy and (5) motivation". The average score of patient empowerment is 6,5. This score is measured by dividing the average score by the total score * 10. This score means that chronic patients in the Netherlands are competent enough to take health-related matters into own hand but there is still room for improvement. The average scores of the five empowerment aspects are, respectively from high to low: (1) motivation 7,5; (2) self-care and self-manage skills 7,1; (3) health knowledge 6,5; (4) self-confidence and acceptance 6,4 and (5) self-efficacy 5,5.

2) Does the use of social media have a positive effect on patient empowerment?

To answer this question an ordinal linear regression analysis was executed in SPSS with help of the Chi-square test (χ^2). The independent variable is categorical and shows whether or not patients use social media or not. The dependent variable is ordinal and shows if patients feel empowered or not. Results showed only significant evidence ($\chi^2=.14,955$; $df=7$; $p=.037$) that the level of empowerment differs for patients who use social media to visit or consume social content and patients who do not. Empowerment is hereby measured as an ordinal scale. The five-point Likert scale that is used to measure patient empowerment, with values "strongly agree", "agree", "neutral", "disagree" and "strongly disagree", can also be seen as "in between" and if assumed that the intervals of the five values are the same, a normal linear regression can be used. Results of a normal simple linear regression in SPSS showed a positive linear relation ($B=.234$; $n=59$; $p=.074$) between the use of social media, visiting and consuming social content and the level of empowerment. The beta (B) shows to what extent the predictor affects the outcome if all the other predictors are held equally.

3) Which empowerment aspects are positively affected by patients who use social media?

To measure patient empowerment in this study, five aspects are taken into account: (1) health knowledge, (2) self-confidence and acceptance, (3) self-care and self-management skills, (4) self-efficacy and (5) motivation. Again an ordinal regression was executed in SPSS and the Chi-square test was used to find out whether or not the level of any of the empowerment aspects is different for patients who use social media and patients who do not. Results showed significant evidence that the level of health knowledge ($\chi^2=.18,836$; $df=7$; $p=.009$), motivation ($\chi^2=.14,058$; $df=7$; $p=.050$) and self-confidence and acceptance ($\chi^2=.18,490$; $df=7$; $p=.010$) for patients who use social media to consume or visit online content and patients who do not. In addition to this, results of normal simple regression in SPSS showed a significant linear ($B=.262$; $n=59$; $p=.045$) relation between the use of social media on all participation levels and the health knowledge of patients. Furthermore, normal simple regression showed strong linear relations with the use of social media, visiting and consuming social content, and the level of self-confidence and acceptance ($B=.210$; $n=59$; $p=.111$) and the motivational level ($B=.220$; $n=59$; $p=.095$).

4) How does patient empowerment affect the perceived quality of patients' health and care?

Ordinal regression in SPSS found significant evidence that both satisfaction with care ($\chi^2=.59,191$; $df=27$; $p=.000$) and the HRQL ($\chi^2=.56,806$; $df=27$; $p=.001$) are different for patients who are empowered and those who are not. In the research model, however, only the empowerment aspects health knowledge, self-confidence and acceptance and motivation are relevant in relation with patients' satisfaction with care. The other variables were already excluded from the research model. Again an ordinal linear regression analysis was executed in SPSS with the help of the Chi-square test (χ^2) to test whether patients' perceived quality of care is different for patients who are aware of health issues (health knowledge), self-confident and motivated and patients who are not. Results showed significant evidence that satisfaction of care is different for patients who are aware of health issues (health knowledge) ($\chi^2=.45,311$; $df=12$; $p=.000$), self-confident ($\chi^2=.29,452$; $df=11$; $p=.002$) and motivated ($\chi^2=.16,792$; $df=4$; $p=.002$). If assumed that the intervals of the five-point Likert scale which measure patients' perceived satisfaction with care are equal, a normal simple linear regression can be used. Results showed a significant linear relation ($B=.410$; $n=59$; $p=.001$) between health knowledge and satisfaction with care and weak positive relations between self-confidence ($B=.113$; $n=59$; $p=.395$) and motivation levels ($B=.119$; $n=59$; $p=.368$).

5) Does the use of social media have a positive effect on the perceived quality of patients' care?

An ordinal regression analysis was executed to measure a direct positive effect of the use of social media by patients' on their perceived quality of care. Quality of health was already excluded from the research model. Results showed strong evidence ($\chi^2=.17,739$; $df=11$; $p=.088$) that satisfaction is different for patients who use social media and patients who do not. A normal simple regression however shows a weak linear relation ($B=.164$; $n=59$; $p=.215$) between the use of social media, visiting and consuming content, and patients' perceived satisfaction with care. Furthermore, with help of crosstabs in SPSS the Chi-square Likelihood Ratio (LR) found significant evidence ($LR=.20,659$; $df=10$; $p=.024$) between use of discussion forums and patients' perceived satisfaction with care.

6) Are there any demographic characteristics that moderate the relation between the use of social media and the perceived quality of patients' health and care?

A moderator is a variable which has a strong effect on the relation between the independent and dependent variables. The variables tested for moderation were: (1) age, (2) gender and (3) educational level. The effect of a moderating variable is characterized as an interaction. If significant evidence was found between the interaction term (predictor * moderator) and the explanatory variable moderation has been demonstrated. In order to measure the interaction between the predictors and the moderators so-called 'dummy variables' were created using SPSS. Dummy variables in regression analysis represent: Categorical or ordinal variables converted to 0 / 1 values (true/false values) which indicate whether a record belongs to a category or not. However, outcomes showed no significant evidence of the dummy variables age, gender and education.

4.6 Social Health Computing (SHC) model

After the research model is tested for reliability, correlations, multicollinearity, normality, linearity and moderation the following model of the relation between the use of social media and the quality of healthcare can be formulated:

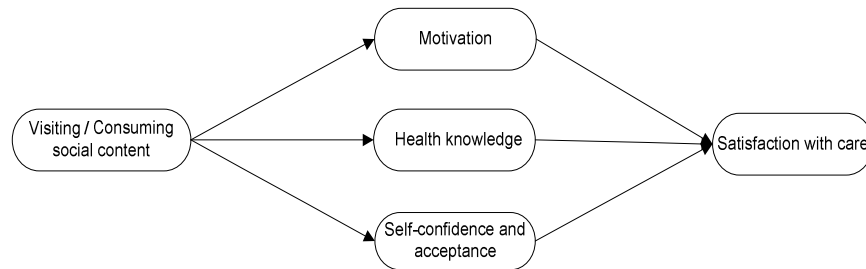


Figure 1. Social Health Computing (SHC) model

Subsequently, it is considered whether the estimated model fits the data well. Therefore the Chi-square test is used. The Chi-square test compares the likelihood ratio of the estimated model (-2 log Likelihood, in this case equal to 242,913) with the likelihood ratio of the model with intercept only (in this case equal to 163,415). The difference between these two likelihood ratios is the Chi-square (79,499). The degrees of freedom are 38. P value is < 001. This means that the SHC model above, with the use of social media, visiting and consuming social content, health knowledge, self-confidence and acceptance, fits the data better than a model without these variables ($\chi^2 = 79,499$; $df = 38$; $p = .000$).

5 Conclusions / Recommendations

In this chapter the results will be discussed and analyzed. Firstly, the research problem will be discussed. Secondly, theoretical implications, limitations and future research will be described. Next, conclusions will be drawn and finally, concrete recommendations will be given about the use of social media by patients in health care.

5.1 Discussion of the research problem

The research problem concerns which effects does the use of social media has on the quality of health and care of patients with a chronic illness. The use of social media increases the level of health-related knowledge, self-confidence and acceptance and motivation of patients. This leads to an improvement of patients' better position towards their healthcare provider and a higher quality of their conversations. Patients are better equipped concerning their health management. The improvement of the quality of discussions leads to an improvement of the relationship between patient and healthcare provider. This in turn improves patients' satisfaction with care. This has a positive effect on their health, because patients who are more satisfied with their care will be more loyal to their therapy. Use of social media is helping to transform patients into healthcare partners. The patient is more motivated to stay as healthy as possible despite his or her chronic illness.

5.2 Theoretical Implications

First, this study has given a clear conceptualization and operationalisation of the concepts 'use of social media' and 'patient empowerment'. There was no theoretical evidence for a relation between the use of social media and the quality of health care yet and little evidence for a relation between social media and empowerment. This exploratory study has for the first time demonstrated a linear relationship between the use of social media, in particular consuming and contributing to online content, and the perceived satisfaction of care of patients with a chronic disease. A significant linear relationship was found between the use of social media and health-related knowledge, confidence, acceptance and motivational levels of chronic patients. Furthermore, a significant linear relationship was found between the use of forums and patients' satisfaction with care.

5.3 Limitations & future research

Due to lack of time and money this study has not been able to explore the effect of the use of social media on clinical outcomes and costs. This could be an interesting research topic for the future. Do more knowledge, confidence, acceptance, motivation, education and loyalty to therapy lead to cheaper and/or better health care? As only chronic patients were tested it was impossible to measure a (direct) improvement in health. It is therefore important for future research to test the effects of social media on prevention and patients with more acute health problems. In addition, this particular study was based on data from one time period, whereas in the future longitudinal research is needed to further investigate linear relations and causation.

5.4 Conclusions

This exploratory study shows a linear relationship between the use of social media: “consuming of, contributing to and creating own social content by patients with the help of online network applications and technologies characterized by a web 2.0 nature” and the satisfaction of a chronic patient with his or her care. However, it should be said that only in the case of consuming and visiting social content a noteworthy effect on patients’ perceived satisfaction with care was discovered. Therefore, the use of social media by patients should primarily be seen as consuming and visiting online social content. Information should come primarily from other users.

The role of social media or web 2.0 in the health and care of patients should not be overestimated. Only social media / Web 2.0 applications aimed at increasing the level of health knowledge have a positive effect on patients’ satisfaction with their care. Especially web forums have this potential and results of this study showed that patients’ satisfaction with care significantly depends on whether or not these forums are used.

Use of such a social media/ Web 2.0 application leads to an increase in a patient’s health-related knowledge, self-confidence and motivation. This makes the patient a better conversation partner, which can lead to a better relationship between patient and healthcare provider and, in turn, to more loyalty of the patient towards his or her therapy. This will almost guarantee a better health.

As said before, the use of social media enhances confidence, acceptance and motivation levels of the chronically ill, which means they are less likely to become socially isolated. Without the use of social media they might lose contact with other people, because their chronic illness prevents them from meeting friends. A chronic illness also means that often patients are unable to hold on to a job, which further increases their isolation. Patients with an active social network will positively influence their health (Berkman and Syme (1979).

The use of social media by patients will also, in the long run, increase efficiency and reduce costs. Higher satisfaction levels will lead to higher rates of loyalty to therapy, which will stimulate reduced absenteeism and lost working days. Furthermore, patients’ demand on the healthcare system will decrease, because a higher level of health knowledge makes it less likely that people will unnecessarily call in professional help. Better informed patients will generally have better coping skills and will be less reliant on healthcare givers. Increased patient awareness can also result in an earlier detection of problems and timelier patient intervention, thus decreasing the number of hospitalizations.

Against a political background in which the government wants to increase the retirement age to 67 years it is in the public interest that chronic patients remain as healthy as possible. The use of social media can play an important role by ensuring that patients will follow treatment faithfully and become a partner in healthcare. With more loyalty towards treatment, chronic patients will become co-producers of their own health.

5.5 Recommendations

Patients should be seen as experts of their illness and health care professionals as experts of medical conditions and management resources. With the use of social media patients are better informed and more able to manage their own health care through prevention and lifestyle changes leading to improved satisfaction both in the short and long term. The capabilities patients have for identifying risks and managing events to slow the progress of their condition help to prevent medical crises before they happen. To ensure success enhancement of the partnership between patients and health care professionals is important.

This will result in patients playing a more active role in the care process. A better informed patient is an equal partner in decisions about treatment but also in the self-management of chronic diseases. More information about healthy lifestyles can also lead to the prevention of disease or a reduction of adverse effects. This may contribute to reducing healthcare costs and labor shortages in health care.

The advantages of the use of social media by patients should be used by healthcare providers to improve health care together with the patient. Health providers may buy better care products using the experiences of patients. Besides improving mutual contact care providers and patients need to cooperate more on shared care: providers should encourage care standards and self-management.

In the near future healthcare institutions should partly take over the role of the intermediary and 'push' or 'guide' patients to a higher quality thus more relevant and accurate information and services. Healthcare institutions can help patients to navigate through the onslaught of health information provided.

This can be supported by Web 3.0 technologies. Web 3.0 will play an important role in healthcare in the near future. Web 3.0 will use rich domain knowledge and document-level metadata to organize and analyse health content. This includes not only data or Web pages and the links between them, but also patients, the connections amongst them, and the connections patients make with data. The Web is thus capable of 'thinking for the patient'. Different types of data are combined, which makes it possible for the Web to provide the patients with 'relevant' suggestions and advice.

With the help of Web 3.0, healthcare institutions can produce recommendations that are better targeted at the patients, because they are based on a better understanding of how the patient interacts with certain health content. A patient can take positive actions, like giving positive ratings or creating or distributing content, or negative actions, like providing negative comments. With an analysis of these interactions, it will become possible to provide recommendations to patients that are both related to the topic at hand and of particular interest to them.

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Methodology

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6 Appendixes:

6.1 Online questionnaire

The screenshot shows a web browser window with the title 'Sociale media in de gezondheidszorg - Windows Internet Explorer wordt aangeboden door Hypes'. The address bar contains a URL from 'www.somere.nl'. The page content includes a title 'Sociale media in de gezondheidszorg' with a close button 'x Sluiten'. Below the title is a 'Voorwoord' section with a 'Volgende' button. The text reads: 'Geachte heer / mevrouw', 'De volgende enquête is anoniem. Het beantwoorden van de vragen zal ongeveer 10 minuten bedragen. Vult u a.u.b. de enquête volledig in. Tips: U hoeft bij het beantwoorden van de vragen niet precies op het hokje te klikken maar kunt ook op het antwoord zelf klikken!', and 'Bijvoorbeeld dank voor uw medewerking!'. An illustration shows a red pencil pointing to a list of five checkboxes, with the first four checked. A 'Volgende' button is located below the illustration. The browser's status bar shows 'Gereed' and 'Internet | Beveiligde modus: ingeschakeld'. The Windows taskbar at the bottom displays several open applications: 'Somere - Windows L...', 'Sociale media in de ...', '4660929e0b3bf915...', 'Scriptie Bert Tague g...', 'Naamloos - Paint', and 'Boonaak'. The system tray shows the date 'EN', a volume icon, and the time '0:03'.

Sociale media in de gezondheidszorg - Windows Internet Explorer wordt aangeboden door Hypes

http://www.somere.nl/KASS/viewobject.php?object=1059155&take=true&opennew=true&popup=true&PHPSESSID=04m5u98524fsmh7f89t60k44&itemnr=3&revote=0&

Sociale media in de gezondheidszorg

Vraag 1 / 15

Vorige Volgende

Wat is uw geslacht? *

man vrouw

Wat is uw leeftijd? *

Wat is uw burgerlijke staat? *

Gehuwd Samenwonend Alleenstaand

Wat is uw hoogst genoten opleiding? *

Lager onderwijs VBO MAVO LTS HAVO VWO MBO MTS HBO HTS WO

Vorige Volgende

Internet | Beveiligde modus: ingeschakeld

Sociale media in de gezondheidszorg - Windows Internet Explorer wordt aangeboden door Hypes

http://www.somere.nl/KASS/viewobject.php?object=1059155&take=true&opennew=true&popup=true&PHPSESSID=04m5u98524fsmh7f89t60k44&itemnr=3&revote=0&

Sociale media in de gezondheidszorg

Vraag 2 / 15

Vorige Volgende

Van welke zorgaanbieder maakt u gebruik? *

Geen Huisarts Specialist Paramedici (fysio, ergo, logo etc.)

Hoeveel keer per maand bezoekt u uw zorgaanbieder? *

< 1 keer 1 - 2 keer 2 - 4 keer > 4 keer

Hoeveel jaren zijn er verstreken naar de diagnose van uw huidige ziekte/aandoening waarvoor u onder behandeling staat bij uw zorgaanbieder? *

Maakt u op dit moment gebruik van de awbz (algemene wet bijzondere ziektekosten)? *

Ja Nee

Zou u uzelf omschrijven als een chronisch patient? *

ja nee

Vorige Volgende

Gereed

Internet | Beveiligde modus: ingeschakeld

Sociale media in de gezondheidszorg - Windows Internet Explorer wordt aangeboden door Hypes

http://www.somere.nl/KASS/viewobject.php?object=1059155&take=true&opennew=true&popup=true&PHPSESSID=04r5u98524fsmh7f89f60k44&itemnr=5&revote=0&

Sociale media in de gezondheidszorg

Vraag 3 / 15

Vorige Volgende

Ik voel me goed geïnformeerd als patient *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik heb een duidelijk beeld van mijn ziekte/beperking *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik beschik over de juiste kennis om met mijn ziekte/beperking om te gaan *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik begrijp wat mijn ziekte/beperking allemaal inhoud *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik heb kennis van andere behandelingsmethodes *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik heb kennis van nieuwe ontwikkelingen aangaande mijn gezondheid *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik heb kennis van andere zorgaanbieders *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik heb kennis van andere medicijnen *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik heb kennis van andere gezondheidsproducten *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik begrijp de medische richtlijnen die mijn zorgaanbieder mij geeft *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Als ik een afspraak heb met mijn zorgaanbieder voel ik me goed voorbereid *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik begrijp de medische adviezen die mijn zorgaanbieder mij geeft *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik kan mijn behoefte goed duidelijk maken aan mijn zorgaanbieder *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik beschik over de kennis om mijn zorgaanbieder tegen te spreken als ik het er niet mee eens ben *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik weet wat mijn zorgaanbieder met of van mij wil *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Vorige Volgende

Gereed

Internet | Beveiligde modus: ingeschakeld

Somere - Windows... Sociale media in de ... 4e66929edb3bf915... Scriptie Bert Tague... Naamloos - Paint Boonaak

Sociale media in de gezondheidszorg - Windows Internet Explorer wordt aangeboden door Hypes

http://www.somere.nl/KASS/viewobject.php?object=1059155&take=true&opennew=true&popup=true&PHPSESSID=04r5u98524fsmh7f89f60k44&itemnr=6&revote=0&

Sociale media in de gezondheidszorg

Vraag 4 / 15

Vorige Volgende

Ik ben gemotiveerd om mijn eigen gezondheid in de hand te houden *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik ben gemotiveerd om mijn eigen gezondheid te verbeteren *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

Ik ben gemotiveerd om mijn eigen zorg te regelen *

helemaal mee oneens oneens neutraal mee eens helemaal mee eens

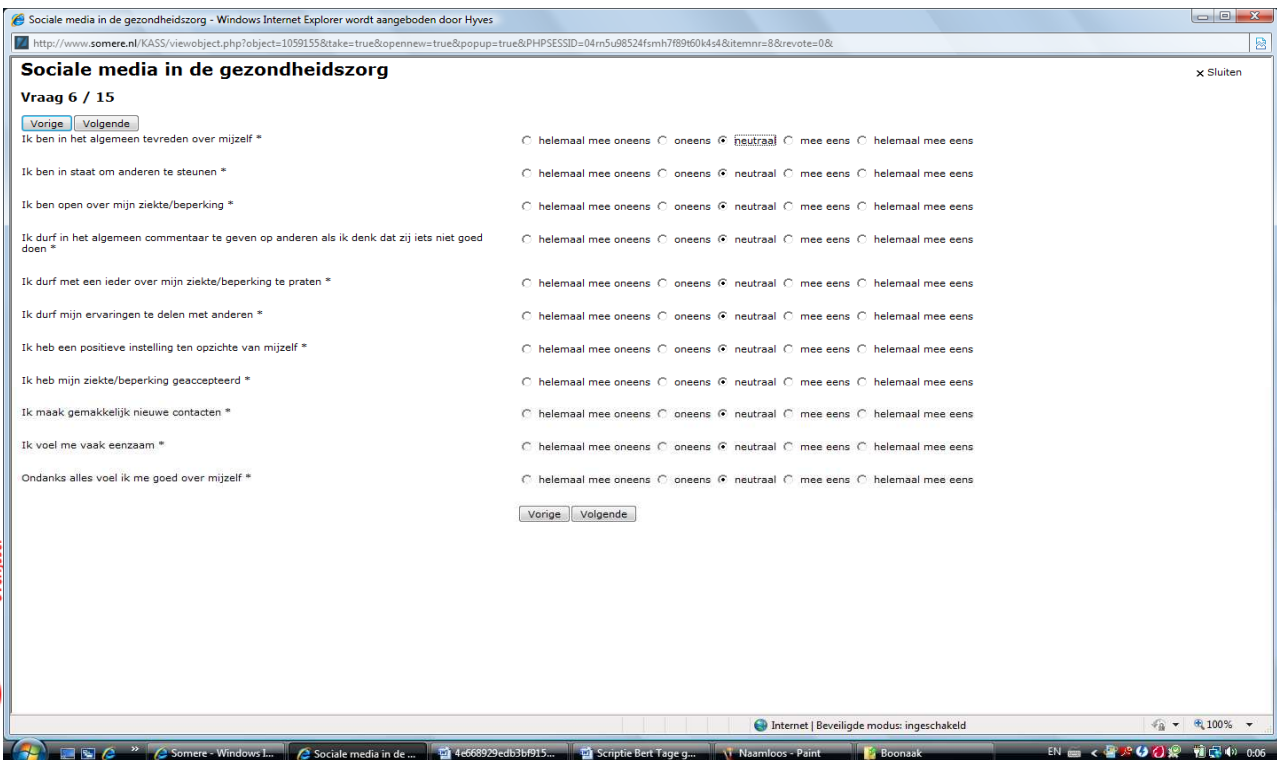
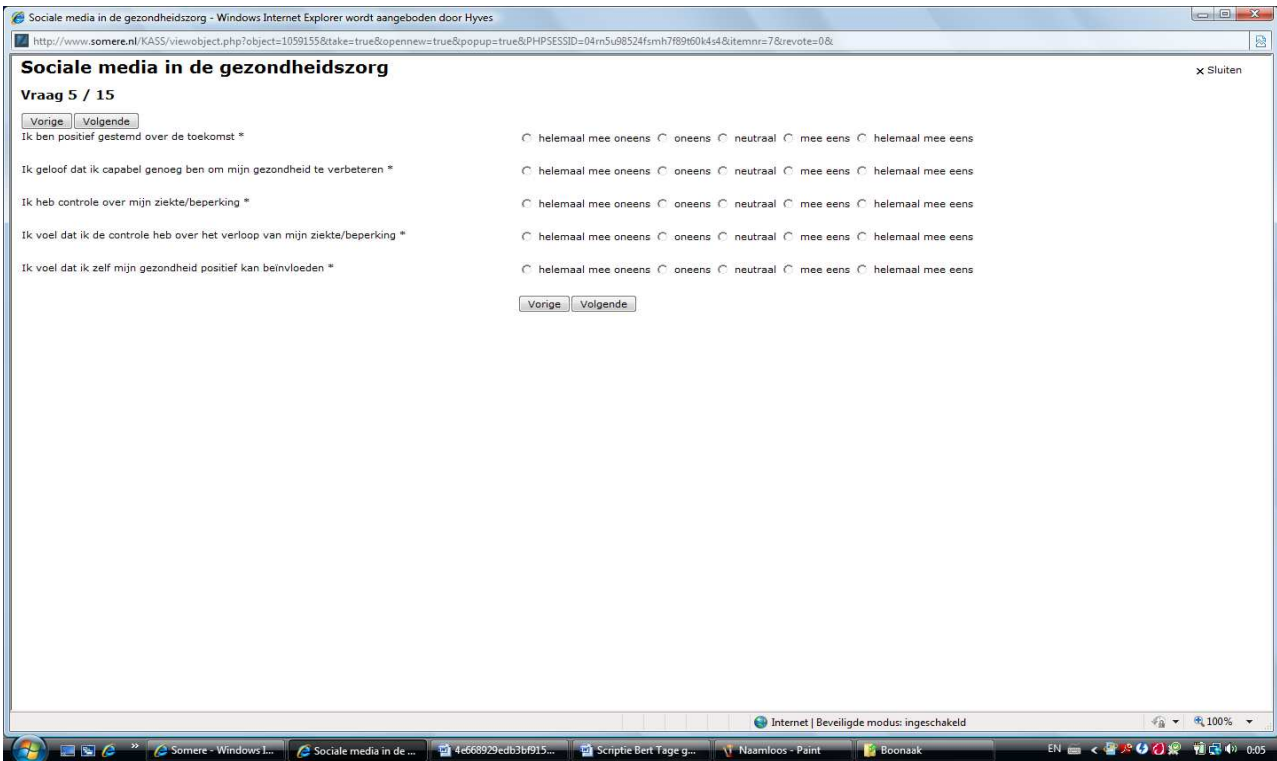
Ik ben gemotiveerd om op zoek te gaan naar alternatieven als het gaat om het verbeteren van mijn gezondheid *

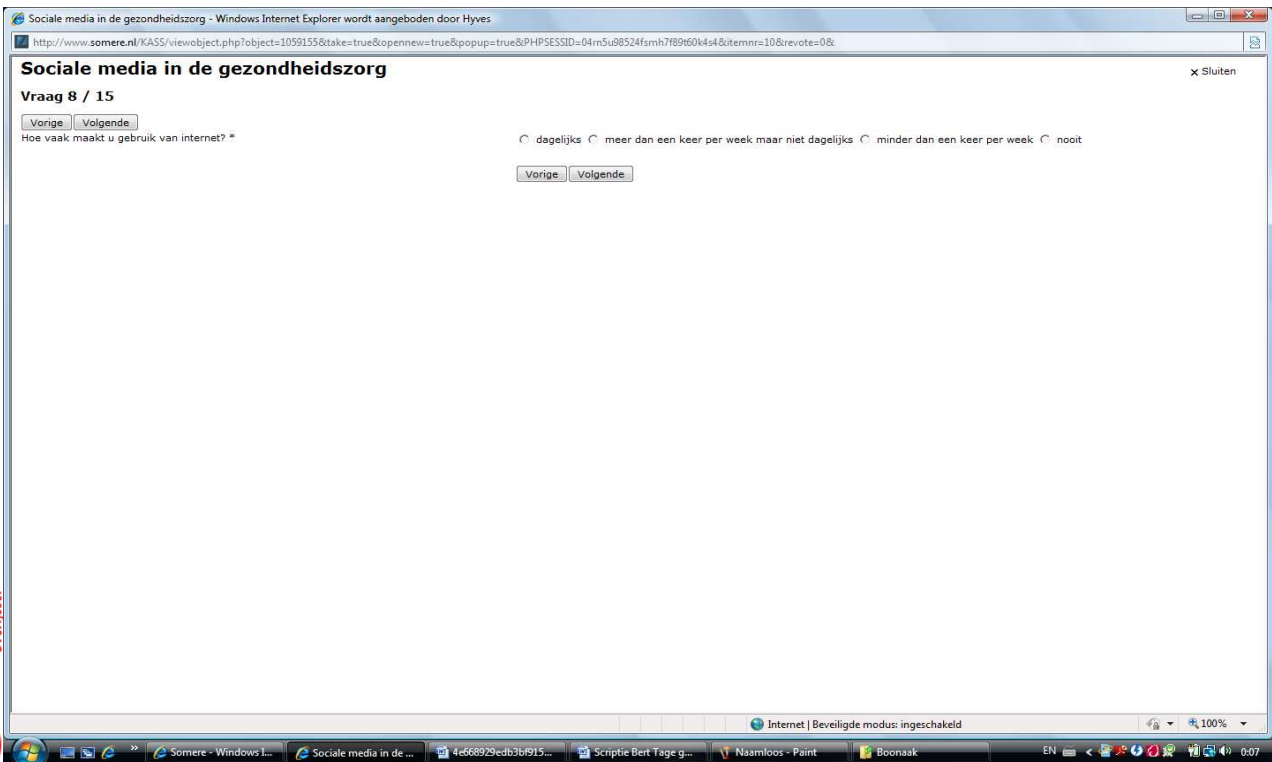
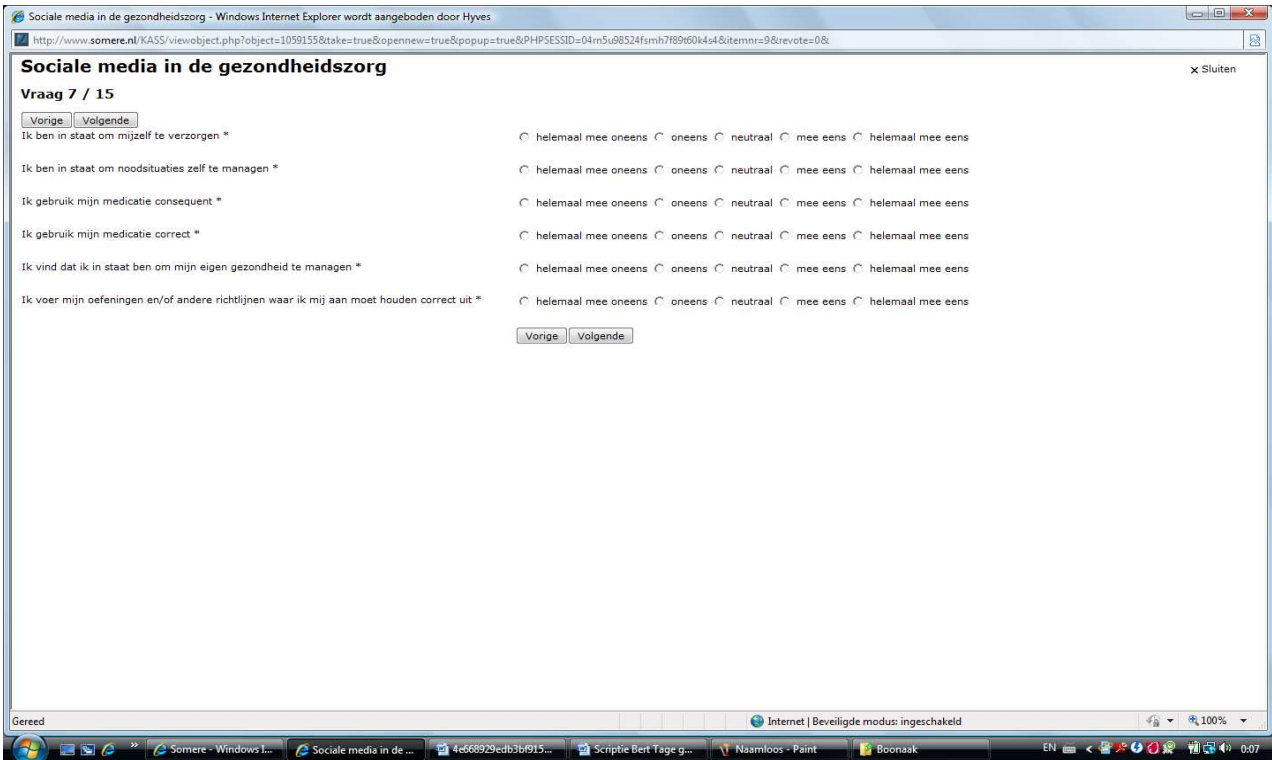
helemaal mee oneens oneens neutraal mee eens helemaal mee eens

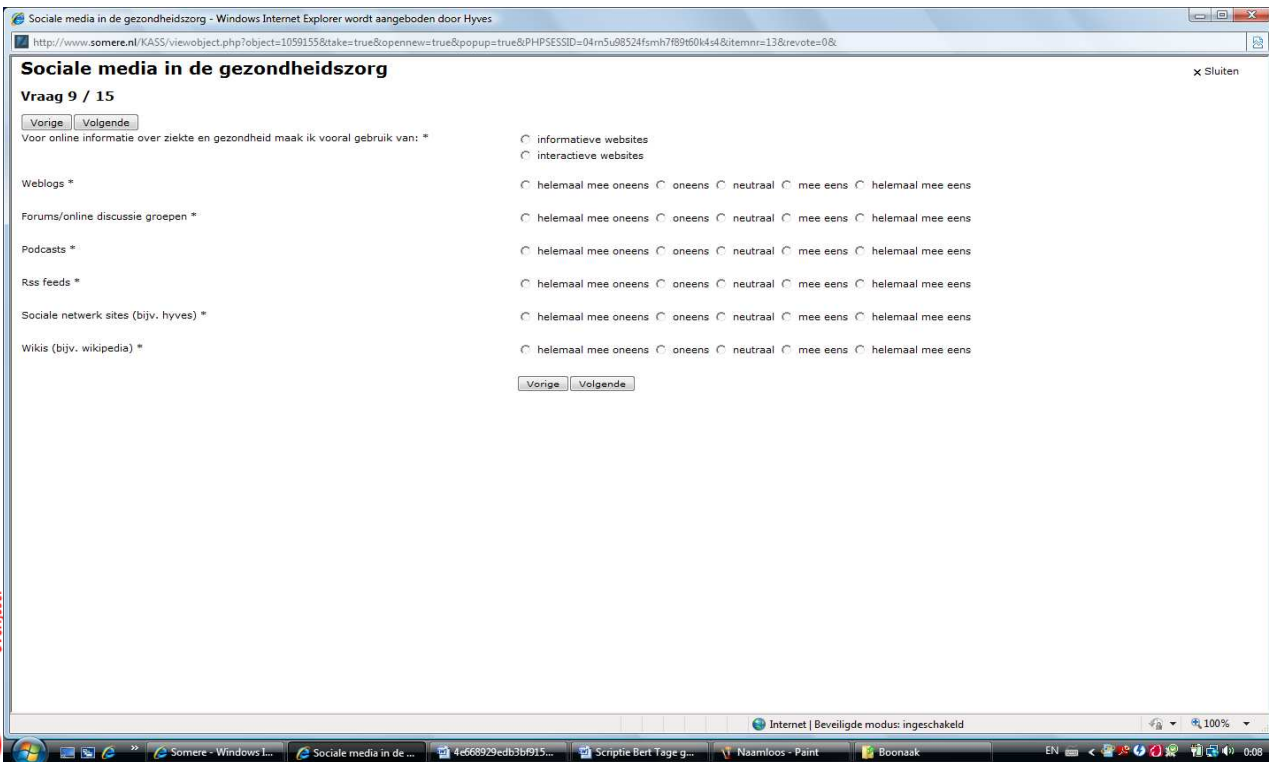
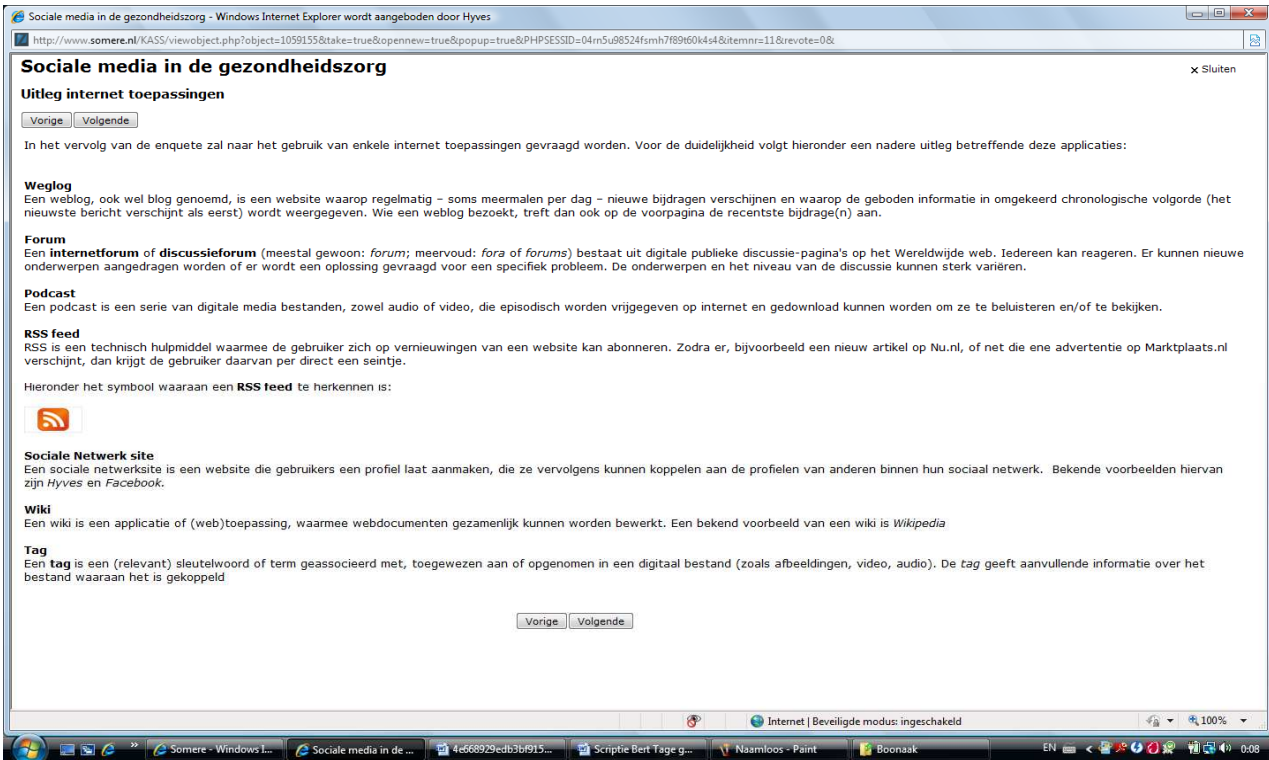
Vorige Volgende

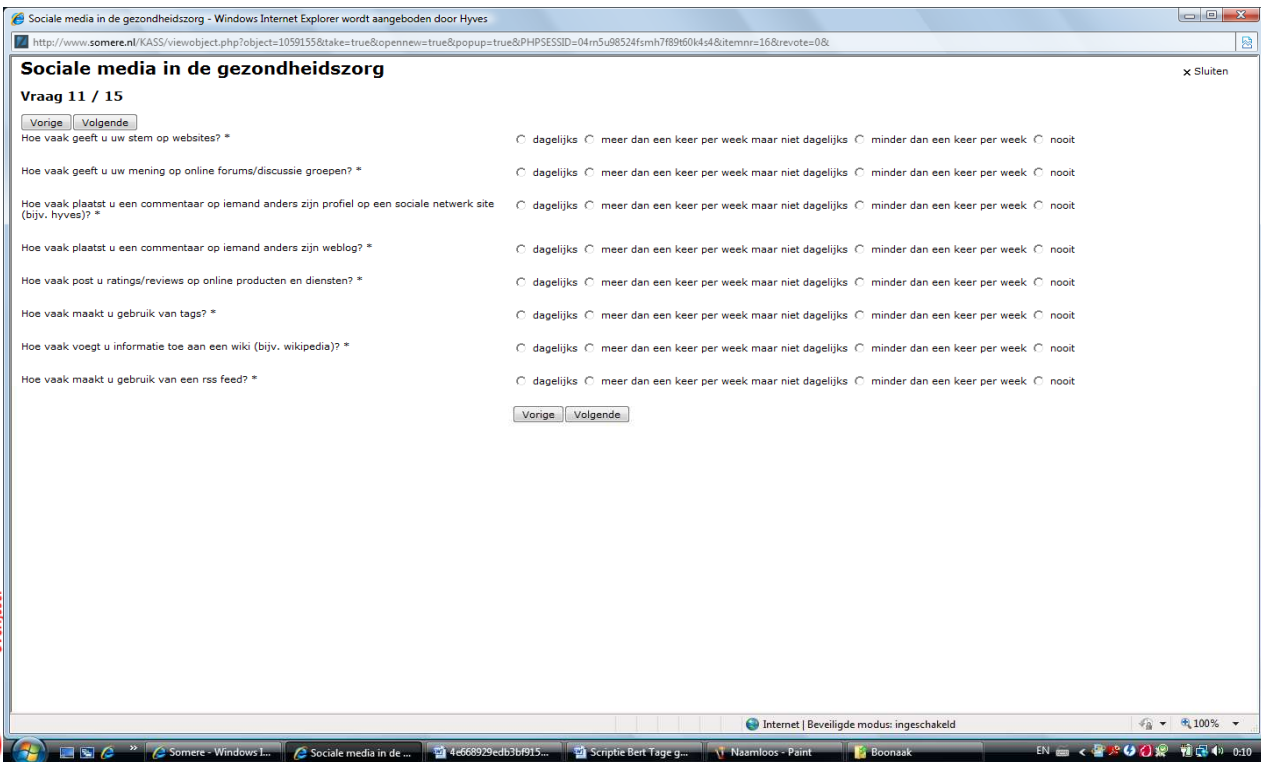
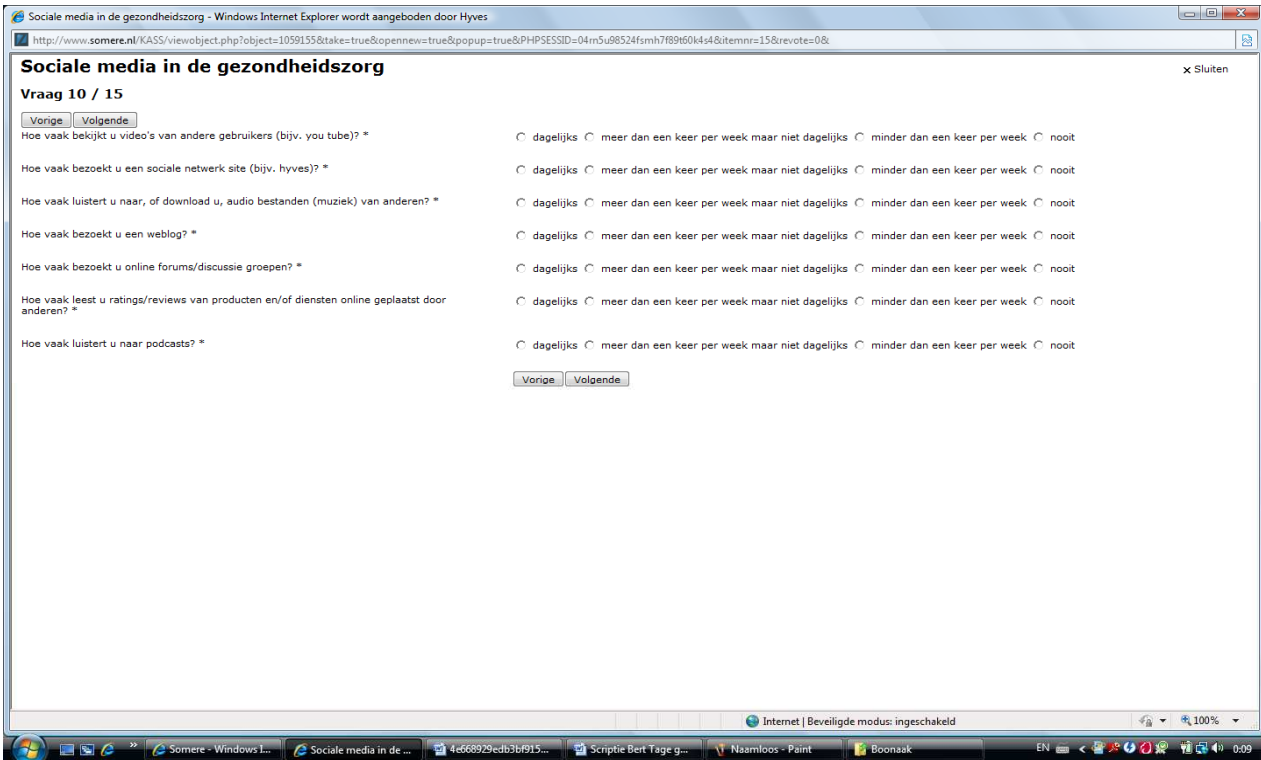
Internet | Beveiligde modus: ingeschakeld

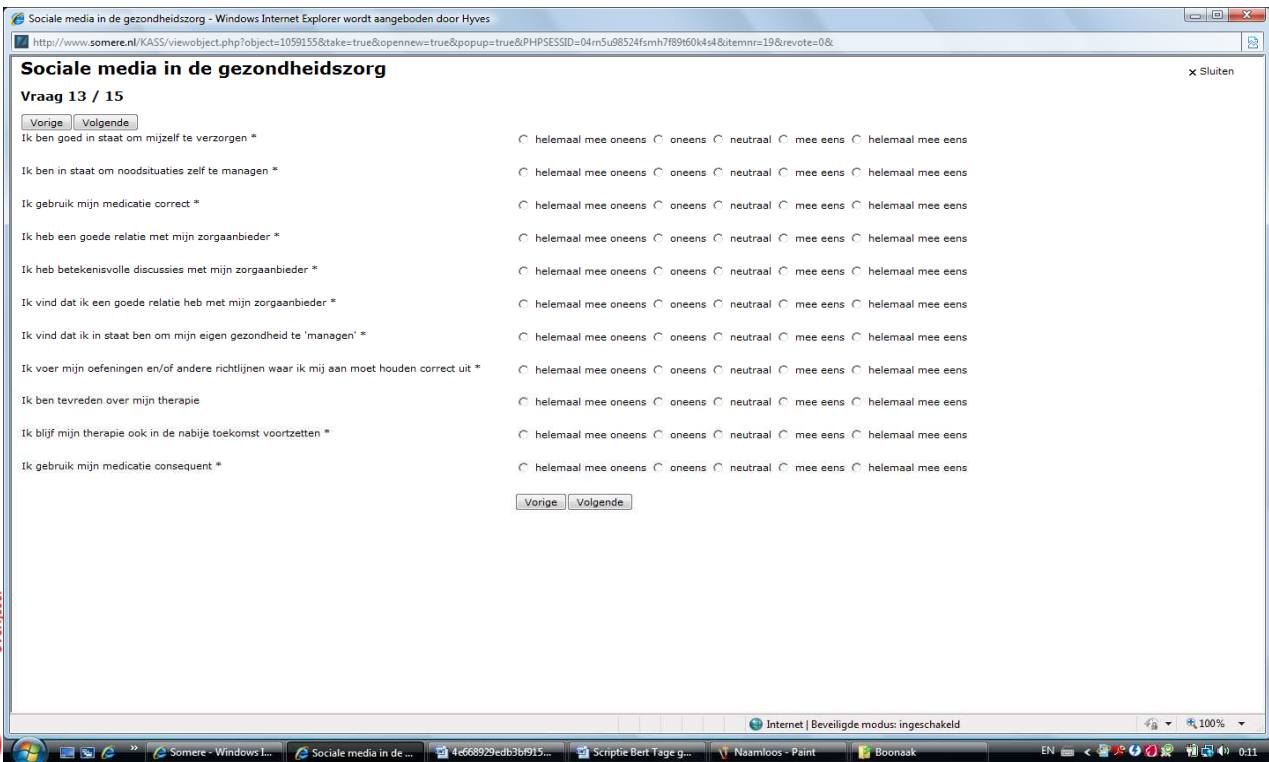
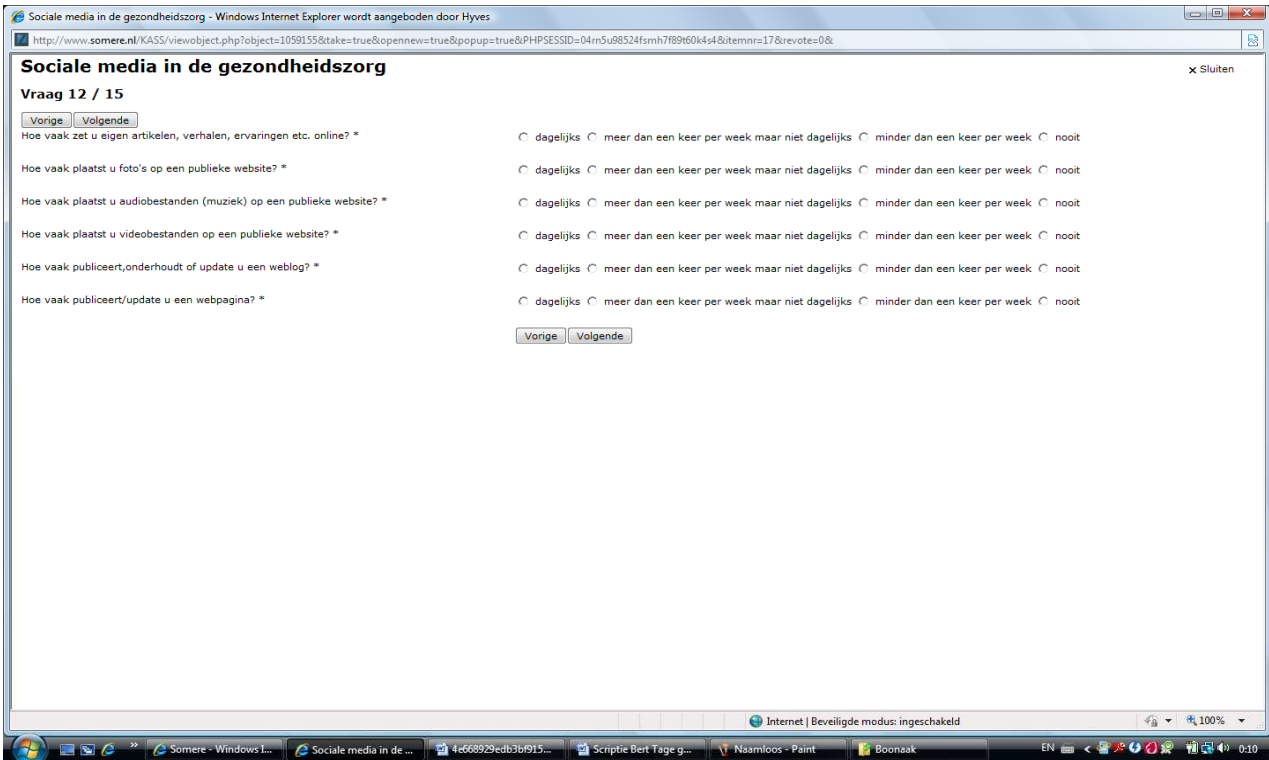
Somere - Windows... Sociale media in de ... 4e66929edb3bf915... Scriptie Bert Tague... Naamloos - Paint Boonaak

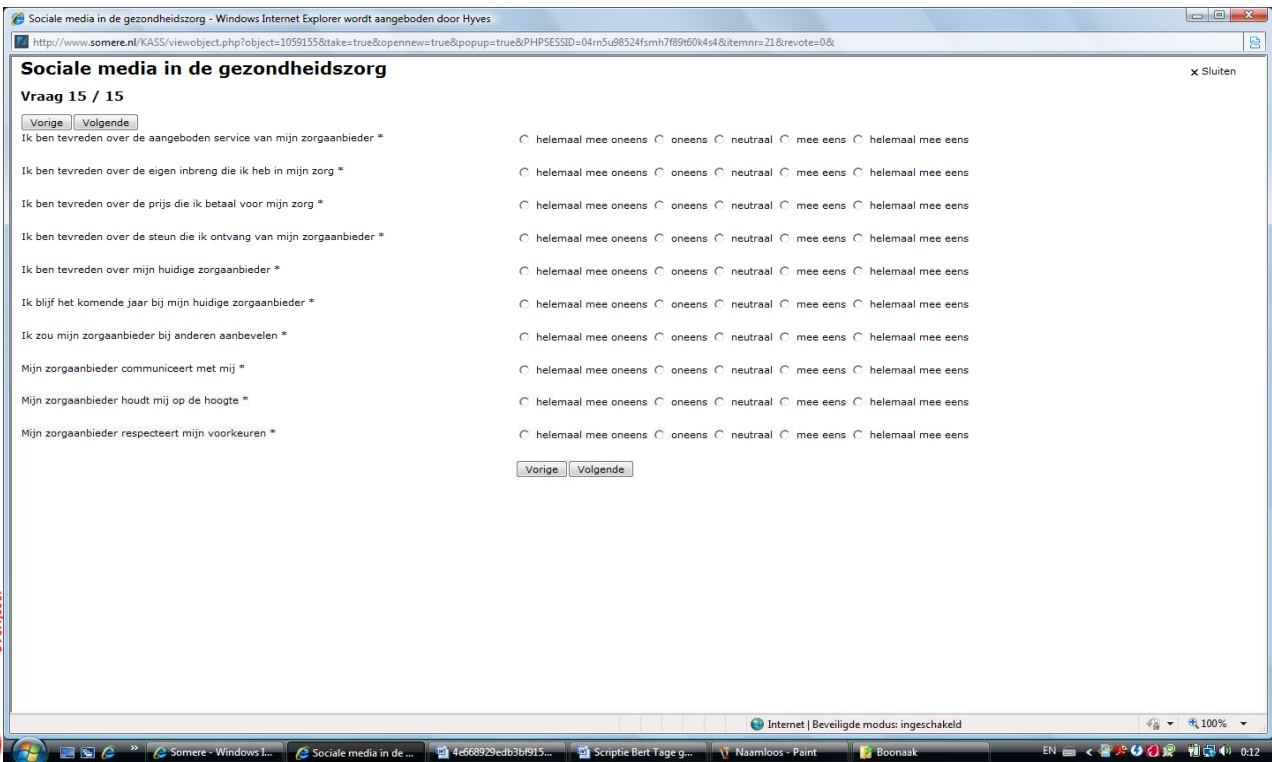
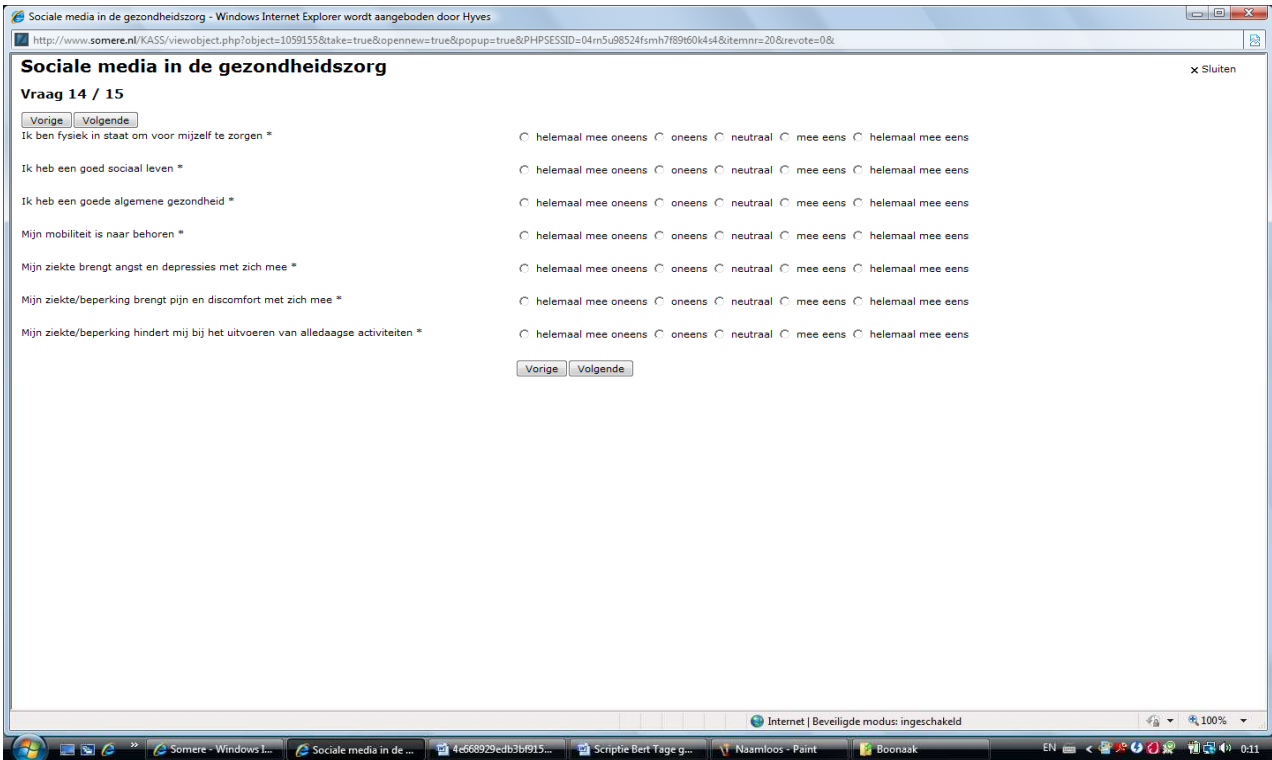












6.2 Statistical outcomes

6.2.1 Correlations

Correlations

			Efficacy	Knowledge	Selfconcept	Skills	Motivation	socialmedia	empowermen t	Low	Medium	High	Satisfaction	HRQL
Kendall's tau_b	Efficacy	Correlation Coefficient	1,000	,116	,393**	,278**	,189*	,031	,418**	,025	,037	,020	,003	,477**
		Sig. (1-tailed)		,108	,000	,002	,026	,371	,000	,396	,351	,420	,487	,000
		N	59	59	59	59	59	59	59	59	59	59	59	59
Knowledge	Knowledge	Correlation Coefficient	,116	1,000	,306**	,185*	,284**	-,181*	,638**	-,195*	-,157*	-,198*	,381**	-,004
		Sig. (1-tailed)	,108		,000	,025	,001	,024	,000	,018	,046	,019	,000	,482
		N	59	59	59	59	59	59	59	59	59	59	59	59
Selfconcept	Selfconcept	Correlation Coefficient	,393**	,306**	1,000	,219*	,325**	-,232**	,588**	-,226**	-,209*	-,240**	,124	,201*
		Sig. (1-tailed)	,000	,000		,011	,000	,006	,000	,008	,013	,007	,092	,016
		N	59	59	59	59	59	59	59	59	59	59	59	59
Skills	Skills	Correlation Coefficient	,278**	,185*	,219*	1,000	,288**	-,021	,394**	-,080	-,029	-,006	,238**	,194*
		Sig. (1-tailed)	,002	,025	,011		,002	,414	,000	,202	,380	,476	,006	,021
		N	59	59	59	59	59	59	59	59	59	59	59	59
Motivation	Motivation	Correlation Coefficient	,189*	,284**	,325**	,288**	1,000	-,007	,416**	-,079	,028	-,030	,126	-,094
		Sig. (1-tailed)	,026	,001	,000	,002		,471	,000	,205	,385	,384	,096	,166
		N	59	59	59	59	59	59	59	59	59	59	59	59
socialmedia	socialmedia	Correlation Coefficient	,031	-,181*	-,232**	-,021	-,007	1,000	-,136	,796**	,844**	,768**	-,137	-,043
		Sig. (1-tailed)	,371	,024	,006	,414	,471		,068	,000	,000	,000	,068	,320
		N	59	59	59	59	59	59	59	59	59	59	59	59
empowerment	empowerment	Correlation Coefficient	,418**	,638**	,588**	,394**	,416**	-,136	1,000	-,175*	-,120	-,156	,266**	,181*
		Sig. (1-tailed)	,000	,000	,000	,000	,000	,068		,029	,099	,051	,002	,025
		N	59	59	59	59	59	59	59	59	59	59	59	59
Low	Low	Correlation Coefficient	,025	-,195*	-,226**	-,080	-,079	,796**	-,175*	1,000	,651**	,567**	-,160*	-,010
		Sig. (1-tailed)	,396	,018	,008	,202	,205	,000	,029		,000	,000	,044	,458
		N	59	59	59	59	59	59	59	59	59	59	59	59
Medium	Medium	Correlation Coefficient	,037	-,157*	-,209*	-,029	,028	,844**	-,120	,651**	1,000	,729**	-,152	-,021
		Sig. (1-tailed)	,351	,046	,013	,380	,385	,000	,099	,000		,000	,053	,411
		N	59	59	59	59	59	59	59	59	59	59	59	59
High	High	Correlation Coefficient	,020	-,198*	-,240**	-,006	-,030	,768**	-,156	,567**	,729**	1,000	-,093	-,114
		Sig. (1-tailed)	,420	,019	,007	,476	,384	,000	,051	,000		,000	,168	,120
		N	59	59	59	59	59	59	59	59	59	59	59	59
Satisfaction	Satisfaction	Correlation Coefficient	,003	,381**	,124	,238**	,126	-,137	,266**	-,160*	-,152	-,093	1,000	,074
		Sig. (1-tailed)	,487	,000	,092	,006	,096	,069	,002	,044	,053	,168		,217
		N	59	59	59	59	59	59	59	59	59	59	59	59
HRQL	HRQL	Correlation Coefficient	,477**	-,004	,201*	,194*	-,094	-,043	,181*	-,010	-,021	-,114	,074	1,000
		Sig. (1-tailed)	,000	,482	,016	,021	,166	,320	,025	,458	,411	,120	,217	
		N	59	59	59	59	59	59	59	59	59	59	59	59

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

6.2.2 Linear regression

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	26,343	2,090		12,604	,000
	Low	-,199	,159	-,164	-1,254	,215

a. Dependent Variable: Satisfaction

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	45,409	3,204		14,174	,000
	Low	-,512	,244	-,268	-2,103	,040

a. Dependent Variable: Knowledge

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12,692	,802		15,822	,000
	Low	-,061	,061	-,131	-1,000	,322

a. Dependent Variable: Motivation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	31,251	1,885		16,576	,000
	Low	-,232	,143	-,210	-1,619	,111

a. Dependent Variable: Selfconcept

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13,687	3,101		4,413	,000
	Knowledge	,261	,077	,410	3,393	,001

a. Dependent Variable: Satisfaction

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20,393	4,186		4,872	,000
	Selfconcept	,124	,145	,113	,857	,395

a. Dependent Variable: Satisfaction

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20,182	4,190		4,817	,000
	Motivation	,312	,344	,119	,907	,368

a. Dependent Variable: Satisfaction

6.2.3 Ordinal regression

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	233,956			
Final	218,320	15,635	7	,029

Link function: Logit.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	183,726			
Final	171,773	11,954	7	,102

Link function: Logit.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	117,693			
Final	96,214	21,479	7	,003

Link function: Logit.

6.2.4 Multicollinearity

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	SHCategorical	,866	1,154
	motivationcategoriaal	,601	1,665
	knowledgecategoriaal	,661	1,512
	confidencecategoriaal	,648	1,544

a. Dependent Variable: Satisfaction

6.2.5 Normality

One-Sample Kolmogorov-Smirnov Test

		Knowledge	Selfconcept	Satisfaction	Motivation	Socialme ghtdire
N		59	59	59	59	
Normal Parameters ^a	Mean	39,1695	28,4237	23,9153	11,9492	
	Std. Deviation	9,54509	5,53423	6,08074	2,32248	
Most Extreme Differences	Absolute	,092	,104	,113	,118	,083
	Positive	,092	,090	,074	,118	,083
	Negative	-,059	-,104	-,113	-,085	
Kolmogorov-Smirnov Z		,710	,796	,869	,909	,636
Asymp. Sig. (2-tailed)		,694	,551	,437	,380	,813
a. Test distribution is Normal.						

6.2.6 Mediation analysis

Baron and Kenny (1986) and Judd and Kenny (1981) have discussed four steps in establishing mediation:

Step 1: Show that the initial variable is correlated with the outcome. Use Y as the criterion variable in a regression equation and X as a predictor (estimate and test path c). This step establishes that there is an effect that may be mediated.

Note: B should be seen as positive because the use of social media is measured in another direction, descending, and the other variables ascending.

Step 2: Show that the initial variable is correlated with the mediator. Use M as the criterion variable in the regression equation and X as a predictor (estimate and test path a). This step essentially involves treating the mediator as if it were an outcome variable.

Step 3: Show that the mediator affects the outcome variable. Use Y as the criterion variable in a regression equation and X and M as predictors (estimate and test path b). It is not sufficient just to correlate the mediator with the outcome; the mediator and the outcome may be correlated because they are both caused by the initial variable X. Thus, the initial variable must be controlled in establishing the effect of the mediator on the outcome.

Step 4: To establish that M completely mediates the X-Y relationship, the effect of X on Y controlling for M (path c') should be zero (see discussion below on [significance testing](#)). The effects in both Steps 3 and 4 are estimated in the same equation.

If all four of these steps are met, then the data are consistent with the hypothesis that variable M *completely* mediates the X-Y relationship, and if the first three steps are met but the Step 4 is not, then *partial* mediation is indicated. The relation of the dependent variable with the independent variable should not be significant.