# How SES and Self-Efficacy Relate to Usability Evaluations of a Public Health Information Website: A Cross-Sectional Study.

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## Abstract

Public health websites should be accessible to everyone to ensure all layers of society have access to evidence-based health information. Existing accessibility evaluations of public health websites' have neglected social disparities in the usability of such websites. The current study investigates how individuals' socioeconomic status (SES) relates to their usability evaluation of the public health website thuisarts.nl and how their eHealth literacy level mediates this relationship. This study also examines how users' usability evaluation is associated with their perception of their ability to manage their health based on the website's information (health management self-efficacy). Participants had to visit thuisarts.nl and evaluate the websites' usability, self-report their believed ability to manage their health after visiting the website and self-report their eHealth literacy level. Statistical analysis showed that participants with low SES evaluated the usability of thuisarts.nl significantly lower than participants with high SES. This relationship was not mediated via participants' eHealth literacy level. Participants' usability evaluation correlated strongly with their health management self-efficacy. This study provides evidence of social disparities in the accessibility of public health websites. Future research should explore the factors underlying these disparities.


*Keywords:* usability, public health websites, SES, health management, self-efficacy, evaluation

A shortage of healthcare workers is striking the Dutch healthcare system with high healthcare costs and excessive workloads (Ministerie van Volksgezondheid Welzijn en Sport,

2022; Varkevisser et al., 2023). In response, the Dutch government, alongside 40 relevant healthcare partners, has established an Integral Health Agreement (IZA), proposing a transformation of the supply of healthcare (Ministerie van Volksgezondheid Welzijn en Sport, 2022). This transformation aims to encourage all individuals to apply care *themselves*, if possible, *digitally* if possible and *from home* if possible. To achieve this, public health websites with evidence-based information are considered the most promising solution. However, social disparities in the use of online health information sources exist and evaluations of the accessibility of public health websites for all layers of society are lacking. Notably, digital self-care by all layers of society is imperative as healthcare workers and GPs are overrun with excessive work pressure and staff shortage, leading to burnout and turnover, which further decreases the provision of care (de Wilt et al., 2020; Kox et al., 2020; Van der Heijden, B. et al., 2019)

To achieve the intended aims of the health agreement, a promising solution to decrease the workload of healthcare workers and healthcare costs is proposed in the IZA: the use of digital care applications, also known as e-Health (de Wilt et al., 2020; Ministerie van Volksgezondheid Welzijn en Sport, 2022; Stoffers, 2018; van der Vaart, R. et al., 2022). eHealth can be defined as an umbrella term that encompasses technological healthcare services and tools that support, assist or complement human-delivered care (Oh et al., 2005). eHealth offers possibilities to lower the workload for healthcare workers and GPs while simultaneously benefitting and empowering patients by improving the accessibility and availability of care (de Wilt et al., 2020; Schreiweis et al., 2019). For example, using mobile or web-based applications allows GPs and healthcare workers to remotely communicate with their patients, saving both parties time and costs (van der Vaart, R. et al., 2022). This was demonstrated in a study by de Wilt et al. (2020) where participating GPs reported reduced workload because of their eHealth use. Also, eHealth applications can be used to guide

patients into monitoring their health status themselves such as administering insulin, thereby reducing the need for healthcare workers and allowing them to spend more time on patients that have a greater need for person-centred care.

Besides the above-mentioned examples, the most widely used application of eHealth is digital self-care via online health information. A recent survey illustrated that 55 per cent of Europeans aged 16 to 75 utilize the Internet to search for health information, with Finland and the Netherlands ranking highest with 77 and 76 per cent, respectively (Eurostat, 2021). Online health information seeking (OHIS) involves individuals consulting websites to find relevant information about their diseases, health concerns, symptoms, and treatments (Tonsaker et al., 2014). Using the knowledge gained from OHIS, individuals can make informed decisions about their health and manage their health problems (Jia et al., 2021; Lambert & Loiselle, 2007). OHIS has been shown to have positive outcomes on health, as research has shown that patients performing OHIS adhere better to treatment, have improved self-care and are more obedient in medication taking (Stetina et al., 2009; Thapa et al., 2021). Moreover, the availability of health information on the Internet empowers patients through improved access to information about their health, symptoms, and treatments (Nölke et al., 2015). Furthermore, if a sizable portion of the population consults websites to obtain information about their health and is motivated to act upon their newfound knowledge, the demand for GPs might be reduced, thereby lowering the pressure on the healthcare system (Martins et al., 2017).

However, a large body of research suggests that there are social disparities in the use and adoption of digital health applications (Al-Dhahir et al., 2022; Estevez et al., 2023; Hansen et al., 2019; Kontos et al., 2014; Nölke et al., 2015). For instance, a study conducted by de Wilt et al. (2020) among GPs in the Netherlands found that GPs concluded that their patients with a lower socioeconomic status (SES) were particularly underrepresented in the

utilization of eHealth applications in their practice. These social disparities also exist for OHIS in specific, as two meta-analyses show that low SES is associated with low OHIS (Jia et al., 2021; Wang et al., 2021). Similarly, the Dutch Institute for Healthcare Research, the Nivel, found a significant difference in the use of online sources to obtain health information between Dutch participants from low and high-SES groups: 53 per cent of low-SES individuals utilized online health information, compared to 78 per cent of high-SES individuals (Zagt et al., 2023a). Prior research offers multiple explanations that account for disparities in the use and adoption of online health information between SES groups.

Firstly, internet access. Multiple studies argue that limited access to the internet is a common barrier for low-SES individuals, refraining them from carrying out OHIS (Al-Dhahir et al., 2022; Jia et al., 2021; Kind et al., 2005; Yoon et al., 2020). Although this is true for some countries, in the Netherlands access to the internet among individuals of low SES is relatively high, as 95.2 per cent of this group has access to the internet from their home (Centraal Bureau voor Statistiek, 2023). Since the average Dutch internet accessibility percentage is 97.8, it is unlikely that access to the internet plays a significant role in the social disparities of OHIS in the Netherlands. Secondly, eHealth literacy plays a prominent role in OHIS (Sundell et al., 2022). According to Norman & Skinner (2006b), eHealth literacy refers to one's ability to obtain, use and understand health information from digital sources. Low SES is associated with lower levels of eHealth literacy, and those with lower eHealth literacy levels have more difficulties with searching, finding and understanding online health information and have more concern about the quality and trustworthiness of the information (Guo et al., 2021a; Jia et al., 2021; Quinn et al., 2017; Sundell et al., 2022). Thirdly, preference of information source and trust. In the Nivel report, it is hypothesized that lower educated individuals prefer information from their health professionals over obtaining their health information online. Other research supports this hypothesis and concludes that lower

SES individuals often have more trust in health professionals than in internet sources (Kim, Y., 2016). Additionally, some research suggests that the presentation of online health information misaligns with the needs of low-SES individuals (Faber et al., 2021). Furthermore, one qualitative study in the Netherlands argues that for some low-SES individuals, the internet is, and never will be a useful information source (Zagt et al., 2023b).

Although this is true for a proportion of low-SES individuals, most Dutch individuals of low SES use the Internet as a health information source (Zagt et al., 2023a). Moreover, many other low-SES individuals could potentially be convinced to carry out OHIS if it would fit their needs and preferences (Faber et al., 2021; Jia et al., 2021). For instance, when low-SES individuals, with their current literacy level, could use websites that contain health information that they deem trustworthy (Gagen & Kreps, 2019; Jia et al., 2021; Kim, Y., 2016). Therefore, the availability of websites that are usable for individuals with a lower SES could potentially decrease the social disparities in OHIS (Gilmour, 2007). Recognizing this, governments and nonprofit organisations have developed and invested in public websites that aim to be accessible to everyone. According to the 'guidance on software accessibility' of the ISO (2024), the *accessibility* of a website is defined as the *usability* of a website *for individuals with the widest range of capabilities*. Therefore, accessible public health websites refer to websites that have good *usability* for *anyone*, meaning easy to use; understandable; and trustworthy. (Estevez et al., 2023; Petrie & Bevan, 2009).

To assess if public health websites are usable for everyone, several studies have evaluated public health websites on their accessibility (Conesa-Fuentes et al., 2013; Gagen & Kreps, 2019; Risoldi Cochrane et al., 2012). However, existing studies, in their accessibility evaluations, focus mainly on individuals with disabilities (Estevez et al., 2023). As a result, current evaluations of public health websites neglect socioeconomic position when specifying the spectrum of *users with the widest range of capabilities*. It is important to take SES into

account when evaluating the accessibility of a website since usability has been shown to pose a barrier to the use of eHealth applications for low SES groups (Al-Dhahir et al., 2022; Hansen et al., 2019; Kontos et al., 2014; Schreiweis et al., 2019). For example, individuals with lower SES tend to have less trust in online health information websites. Trustworthiness, a key aspect of usability, significantly influences people's decisions to choose and use health information websites (Kim, Y., 2016). Furthermore, existing evaluation studies in the literature use experts or automated tools to evaluate public health websites, thereby ruling out the perspective of the users. It is important to consider the perspective of the users because according to the Technology Acceptance Model by Davis (1989), users' perceptions of the ease of use of a website, a key aspect of usability, positively influence users' attitude towards use. In turn, attitude towards use positively influences actual usage (van der Heijden, H., 2003). To ensure public health websites are usable for everyone, it is important to consider the SES position and the perspective of the users when evaluating the accessibility of public health websites. Such evaluations can help improve the usability of public health websites for everyone and therefore decrease social disparities in the accessibility of evidence-based health information.

Moreover, usability potentially plays an important part in the impact public health websites make. Studies have shown that perceptions of usability correlate with self-efficacy (Buker et al., 2024; Holden & Rada, 2011). According to Bandura (1984), self-efficacy refers to one's perception of one's ability to perform a certain behaviour and according to Sheeran et al. (2016), this perception is a primary predictor of one's motivation and intention to act upon health information. This is in line with the Technology Acceptance Model, which explains that users' ease of use perceptions of a website predict their intention to use technology. Potentially, users' perceptions of the usability of public health websites relate to the extent to which users believe they can use the technology, i.e. public health websites, to

manage their health. This belief is a proxy of users' motivation to actively manage their health (Sheeran et al., 2016). However, it is unknown if a relationship exists between usability perceptions of public health websites and users' health management self-efficacy. This is because existing studies that found this relationship conducted their study in a different context or used eHealth applications that differed from public health websites (Buker et al., 2024; Holden & Rada, 2011; Talboom-Kamp et al., 2020). Since motivating users to manage their health is the primary goal of public health websites, it is important to investigate the relationship between usability and self-efficacy in the context of public health websites (Ministerie van Volksgezondheid Welzijn en Sport, 2022). Knowledge about the relationship between usability and self-efficacy can be used to improve public health websites' ability to motivate users to manage their health and thereby increase the impact public health websites can make. Moreover, if a relationship is found between usability and self-efficacy in the public health website context, it emphasises the importance of equity in the usability of such websites.

Therefore, the aim of this study is to investigate the equity of the usability of public health websites and investigate how perceptions of the usability of public health websites relate to health management self-efficacy. To investigate this, www.thuisarts.nl is a suitable platform. Thuisarts.nl is a collaborative effort involving 40 associations, including the Dutch GP Association and the Federation of Medical Specialists, and is the most well-known public health website in the Netherlands (thuisarts.nl, 2023). The website is jointly funded by these associations and the Dutch government. The website provides evidence-based health information supported with visual aids such as pictures and videos (Wouter et al., 2016). Thuisarts.nl is the most utilized platform for health information in the Netherlands, including among GPs themselves (Ministerie van Volksgezondheid Welzijn en Sport, 2022). Research by Spoelman (2016) analyzing search trends on thuisarts.nl and consultation patterns,

demonstrated that patients act upon the website's information, evidenced by a 12 per cent reduction in Dutch GP consultations two years following the website's launch. Furthermore, the report by Nivel illustrated that only 9 per cent of low-SES participants in their study utilized thuisarts.nl, compared to 53 per cent of the high-SES group. This suggests that there might be differences in the accessibility of thuisarts.nl for SES groups.

To ensure reliable health information via thuisarts.nl is accessible to individuals from all layers of society, the website should be evaluated on its usability from the perspective of users with different SES backgrounds. Hence, evaluating the usability of thuisarts.nl can help to create more equity in the accessibility of free reliable evidence-based health information in the Netherlands. Besides, to gain better insight into the relationship between the usability of thuisarts.nl and health management self-efficacy, it should be investigated how users' evaluation of the usability of thuisarts.nl relates to their beliefs about their ability to manage their health after visiting the website. Therefore, the objectives of this study are to 1) evaluate the usability of thuisarts.nl by users with different SES backgrounds (and investigate the role of eHealth literacy in this relationship) 2) investigate the relationship between users' perceptions of usability and their health management self-efficacy. To achieve these objectives, the following research question will be answered in this study:

*What is the relationship between the usability evaluation of thuisarts.nl and SES, and the evaluation of the usability of thuisarts.nl and users' health management self-efficacy?*

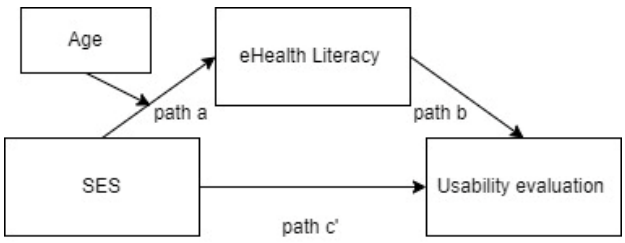
1) Three hypotheses are related to the first part of the research question. Firstly, it is hypothesized that there is a positive direct relationship between SES and the evaluation of the usability of thuisarts.nl (1), meaning that the high-SES group is expected to evaluate the usability of thuisarts.nl higher than the low-SES group. Path *c'* in Figure 1 depicts the hypothesized relationship. This relationship is expected based on research by Kim (2016) that showed that low-SES individuals have lower trust in online health information and research

by multiple authors who found that these individuals have lower eHealth literacy levels than high-SES individuals (Cheng et al., 2020; Guo et al., 2021b; Kontos et al., 2014; Neter & Brainin, 2012). Both trust and eHealth literacy levels play a key role in usability evaluations (Fisher et al., 2008; Kim, H. & Xie, 2017; Kim, Y., 2016). Secondly, it is therefore hypothesized that SES is related indirectly via eHealth literacy level to the evaluation of the usability of thuisarts.nl (2), as illustrated by path *ab* in Figure 1. Thus, eHealth literacy is expected to partly mediate the relationship between SES and usability evaluation of thuisarts.nl (Kontos et al., 2014; Neter & Brainin, 2012; Quinn et al., 2017). Since lower eHealth literacy levels refer to lower levels of ability to use, understand and obtain digital health information, it is expected that eHealth literacy level directly predicts usability evaluation of thuisarts.nl (3) (Norman & Skinner, 2006b). This expectation is shown by path *b* in Figure 1.

Next, conflicting evidence exists about the influence of age and sex on eHealth literacy levels. Research by Norman and Skinner (2006a) concluded that age does not predict eHealth literacy levels at any point in time whereas research by Hsu (2019) concluded that eHealth literacy levels differ between young adults and older adults.

**Figure 1**

*Conceptual Model depicting the moderated mediation model.*



Furthermore, multiple other studies have found that those with higher eHealth literacy levels are younger (Mackert et al., 2016; Richtering, Sarah et al., 2017; Richtering, Sarah S. et al., 2017). Therefore, it is expected that age interacts with the relationship between SES and eHealth literacy. Figure 1 illustrates the moderated mediation model that derives from the above-mentioned hypotheses. Finally, although Norman and Skinner (2006a) found males to have higher eHealth literacy levels, recent studies conclude that gender does not relate to eHealth literacy (Huang et al., 2020; Richtering, Sarah et al., 2017; Xesfingi & Vozikis, 2016). Therefore, gender is not expected to interact between SES and eHealth literacy levels and is excluded from the conceptual model.

2) It is hypothesized that users' evaluations of the usability of thuisart.nl relate to their health management self-efficacy. This expectation is based on research by Holden & Rada (2011) and Talboom-Kamp et al. (2020) who both concluded that self-efficacy correlates with usability perceptions. Additionally, studies investigating the Technology Acceptance Model found that ease of use relates to self-efficacy. For instance, Rahmawati (2019) found that perceptions of ease of use predicted self-efficacy in e-learning whereas Hasan (2007) found that computer self-efficacy predicted perceived ease of use. This double-sided relationship is expected to be found in the public health website context and to be positive due to multiple reasons: Firstly, users who evaluate a website as easy to use are better able to find health information that is relevant for them than users who deem the website hard to use. As a result, those finding information that is relevant to them might have more positive perceptions of their ability to manage their health after visiting the website, than those who did not find the right information (Buker et al., 2024). Next to ease of use, this relationship also applies to the usability aspect of trustworthiness (Fisher et al., 2008). Namely, users who have less trust in the information they find on a public health website might be less likely to have a positive perception of their ability to manage their health using the website's

information. On the contrary, it is plausible that those with high health-management self-efficacy also have higher self-efficacy in other domains. Similar to the study by Hasan (2007), it is possible that those with higher health management self-efficacy also have higher computer self-efficacy, which predicts users' ease of use perceptions. Therefore, it is expected that usability evaluations and health management self-efficacy correlate.

## Methods

### Design

This study used a cross-sectional survey to investigate the relationship between SES and the evaluation of the usability of thuisarts.nl and the relationship between the use of thuisarts.nl and health management self-efficacy. The study group consisted of individuals from two different SES groups, selected from a sample of the general Dutch population. The domain on which statements were made is the evaluation of the public health information website www.thuisarts.nl at one specific point in time. Therefore, this study is cross-sectional.

### Participants

In total 137 participants were recruited and self-selected to participate via social media ($N$ = 88) and in a GP practice ($N$ = 49) in a low-SES neighbourhood in Leerdam. The research population consisted of participants who were above 18 years of age, were living in the Netherlands, had access to the internet in their daily lives and could read Dutch. Recruitment stopped when approximately 110 per cent of the required number of participants eligible for data analysis was met. The required sample size ($N$ = 73) was estimated based on the minimum sample size for mediation (Sim et al., 2021). The following participants were not eligible for data analysis: participants that did not give informed consent ($N$ = 6); did not

complete the questionnaire (*N* = 41); did not meet the inclusion criteria (*N* = 8). In total 80 participants were eligible for data analysis. After initial exploration of the data, outliers (*N* = 2) and participants with straight-lining answers (*N* = 2) were removed, resulting in 76 participants eligible for data analysis.

**Materials**

***eHIQ-NL:*** Two subscales of the Dutch version of the self-reported eHealth Impact Questionnaire by Kelly et al (2015) were used to measure users' perceptions of the usability of thuisarts.nl and their perceptions of their ability to use the information of thuisarts.nl to manage their health. The eHIQ-NL is a validated instrument by Neijenhuijs et al. (2019) that is proven to be feasible among Dutch patients and its subscales can be used independently. A study of 1287 participants evaluating a Dutch health website, showed that the questionnaire had acceptable to good internal consistency, test-retest reliability, and construct validity (Neijenhuijs et al., 2019). The sum of the scores of each item on the 13-item subscale of 'Information and Presentation' (Appendix 2.3) was used to measure users' evaluation of the *usability of thuisarts.nl*. Each of the 13 items were scored on a 5-point Likert scale. Answers ranged from 1: *strongly disagree* to 5: *strongly agree.* The minimum score for this scale is 13 and the maximum score is 65. The 'Information and Presentation' subscale was chosen since it is an appropriate instrument to measure the usability evaluation of a health information website from the perspective of the user. Items of the subscale relate to perceptions about ease of use, trustworthiness, understandability and appropriateness of information. For instance, the score on the item "The language used on the website was easy to understand" indicates participants' perception of the understandability of thuisarts.nl.

Next, the total score on the 10-item 'Motivation and Confidence to Act' subscale (Appendix 2.4) from the eHIQ-NL was used to measure participants' *health management self-efficacy* level. Therefore, the 'Motivation and Confidence to Act' was used to measure to

what extent participants believed they were able to manage their health after reading the information on thuisarts.nl. Each of the 10 items was scored on the same Likert scale as the 'Information and Presentation' subscale. The minimum score for this scale is 10 and the maximum score is 50. Items of the scale included; "The website gives me the confidence that I am able to deal with my health" and "The website encourages me to undertake actions that could be beneficial to my health".

***eHEALS:*** The total score on the Dutch version of the eHEALS questionnaire by Norman & Skinner (2006a) was used to measure participants' eHealth literacy levels (van der Vaart, Rosalie et al., 2011). The eHEALS consists of eight questions and was scored on a 5-point Likert scale (Appendix 2.2). Scores could range from 8 to 40. Examples of scale items were: "I know how to find websites with useful health information on the internet" and " I have the skills I need to evaluate the health resources I find on the internet".

***Demographic questions:*** Three demographic questions were used to measure *Age, Gender* and *SES (*Appendix 2.1*)*. To begin with, the open-ended question "What is your age" was used to measure participants' *age.* Next, the question "Which gender do you identify with" was used to measure *gender*. Finally, *SES* was measured by the question "What is your highest finished degree (with certificate)" since educational level is the most important and commonly used indicator of *SES* (Boshuizen et al., 2014). The answer options to this question ranged from 1: *No degree* to 8: *Scientific degree*. SES is the score on this question and scores range from 1 to 8. *No degree* is a score of 1 and a *Scientific degree* is a score of 8. In this study, scores 1 to 4 corresponded to low SES, and scores 5 to 8 to high SES.

***Thuisarts.nl****:* www.thuisarts.nl was used as the public health information website for users' usability and self-efficacy evaluations. When visiting thuisarts.nl, participants arrived on the home screen. The home screen offered multiple actions to undertake. Most prominently, a title appeared which read: "Reliable information about sickness and health"

and below this title was a search bar that read, “What is it you are looking for?”. Below this search bar, six options were presented: Subject A-Z; movies; pictures; choice cards; and choice help.

***Prior use of thuisarts.nl:*** The question “How often do you use thuisarts.nl?” was used to indicate participants' scores on *prior use of thuisarts.nl.* Participants had four answer possibilities: I (almost) always use thuisarts.nl, I sometimes use thuisarts.nl, I almost never use thuisarts.nl, and I have never used thuisarts.nl before. Participants answering *“*I (almost) always use thuisarts.nl” and “I sometimes use thuisarts.nl” were scored Yes to *prior use of thuisarts.nl.* Participants answering, “I almost never use thuisarts.nl” and “I have never used thuisarts.nl” before were scored No to *prior use of thuisarts.nl.*

**Procedure**

Firstly, participants were recruited and approached in person in a GP practice and via social media. Following this, all participants were briefed about the study and had to give informed consent to participate. Secondly, having given informed consent, participants answered demographic questions in Qualtrics, on a laptop or mobile device. Subsequently, participants were redirected from Qualtrics to the thuisarts.nl website by clicking a link. After having browsed thuisarts.nl, participants returned to Qualtrics and filled in two subscales of the e-HIQ. Finally, after completing the e-HIQ, participants answered one follow-up question about their prior use of thuisarts.nl.

***Approach****:* One part of the participants was approached at a GP practice in Leerdam. The GPs in this practice made their patients aware of the fact that there was a researcher in the practice who wanted to administer a questionnaire. Patients were approached in the waiting room. Patients could start participating by scanning a QR using their mobile device or start directly using a laptop that was provided by the researcher. The other group of participants was approached via various channels of social media including LinkedIn,

Instagram and WhatsApp. A short introduction to the study was included in the invitation message. Participants started the survey by clicking the link in the invite message.

***Briefing:*** Before the briefing, GP practice patients were made verbally aware of the existence of eligibility criteria. Participants recruited via social media were explicitly made aware of the existence of the eligibility criteria before the informed consent form. Eligible and interested patients were briefed about the goal and the procedure of the study; participants were verbally or textually made aware that they had to answer a few demographic questions, browse a health website, and had to answer questions about their experience with the website. Furthermore, participants were briefed about their rights, privacy and handling of their data. From here, everything applies to both GP practice participants and social media participants**.**

***Informed consent:*** Before the participants could start the questionnaire, they had to read the consent form and give informed consent in Qualtrics. The consent form also contained information about their anonymity, data storage, and the procedure. To ensure eligibility, participants had to answer eligibility criteria questions after having given informed consent. Patients who did not meet the criteria were redirected to the end of the survey.

***Demographic questions:*** Participants answered three demographic questions in Qualtrics consisting of highest finished education, age and gender. Education level was questioned to measure SES and age and gender were questioned because the demographic variables corresponding to these questions could have had a relationship with usability.

***eHealth:*** Subsequently, participants had to answer eight questions of the eHEALS. The answers to these questions were used to measure participants' eHealth literacy levels.

***Thuisarts.nl:*** Having answered all prior questions, patients arrived at a page in Qualtrics with instructions about the next step. On this page, they were given the task to explore thuisarts.nl for a maximum of 5 minutes and find information about a subject that

was relevant to them.

***eHIQ-NL*:** After the patients were finished exploring, they could close the thuisarts.nl website to return to Qualtrics. In Qualtrics they had to answer 23 questions of the eHIQ-NL. 13 of these questions were from the "Information and Presentation" subscale and 10 from the "Motivation and confidence to act" subscale.

***Follow-up question:*** One question in Qualtrics followed the eHIQ-NL and was related to participant's prior use of thuisarts.nl and was used to potentially account for the effect of prior use of thuisarts.nl on participants' evaluation of the usability of the website.

***Finish:*** After filling in the eHIQ-NL, participants finished the questionnaire. Participants arrived at the end page where they were thanked for their participation and had the final opportunity to obtain the researchers information that could be used to ask questions or to address any concerns.

***Duration:*** Filling in the survey and browsing thuisarts.nl took approximately 10 to 15 minutes in total.

***Data collection duration*:** Data was collected on multiple instances covering three weeks.

**Data Processing & Analysis**

To begin with, data was collected using Qualtrics and data from eligible participants (*N*=80) were exported to SPSS. The exported data was cleaned and subsequently transformed: the scores on two items (2 &12) of the Information and Presentation were inverted (Appendix 2.4); *educational level* was recoded into a dichotomous variable with the values low-SES and high-SES; and *prior use of thuisarts.nl* was recoded into a dichotomous variable with level one is Yes, and level two is No. Following this, the data was explored using descriptive statistics. After exploring the data, assumptions were checked and as a result, two outliers and two participants with straight-lining answers on two or more

subscales were removed. Additionally, based on the explored correlations between variables, *prior use of thuisarts.nl* and *age* were selected as covariates. The assumptions of normality, homogeneity, linearity and multicollinearity were all met. Subsequently, the data was analysed using inferential statistics.

***Primary outcome:*** The hypothesized moderated mediation model (Figure 1) was analysed using a bootstrapping method to test the significance of the indirect effects at varying levels of the moderator (Hayes, 2017). A bootstrapping approach was chosen since multiple studies have pointed out that this is the optimal approach to test moderated mediation and mediation models and is a more reliable method than the Sobel test (Hayes & Rockwood, 2017; Hayes, 2009; Preacher & Selig, 2012). The analysis was run with *SES* as the predictor variable, *age* as moderator, *eHealth literacy* as the mediator, *usability evaluation* as the outcome variable and controlled for *prior use of thuisarts.nl*. The moderated mediation analysis tested the conditional indirect effect of the moderating variable *age* on the relationship between the levels of *SES* on outcome variable *usability evaluation* via the mediator of *eHealth literacy* (Hayes, 2015). The "PROCESS" macro, model 7 v4.2, was used to test the moderated mediation model. Subsequently, after concluding that a mediation model without *age* as a moderator was more appropriate to test the hypothesis, a second analysis was conducted and thus *age* was excluded as a moderator. The mediation model was tested using a bootstrapping approach for the same reason as previously mentioned. The analysis was run with *SES* as the predictor variable, *eHealth literacy* as the mediator variable and *usability evaluation* as the outcome variable. *Prior use of thuisarts.nl* and *age* were included as covariates because the correlation table showed that both variables relate to the outcome variable. Using the "PROCESS" macro v4.2, model 4 for mediation, the relationship between *SES* and the outcome variable *usability of thuisarts.nl* via mediator *eHealth literacy* was tested. An alpha of 5 per cent was chosen and the indirect effect was considered

significant if zero was not found in the confidence interval. Finally, to identify which specific usability aspects the low-SES group evaluated differently than the high-SES group, a Man Whitney-U test was conducted. This analysis enabled to investigate whether usability aspects, such as trustworthiness, which are considered important for low-SES individuals according to the literature, are indeed evident. The non-parametric Man Whitney-U test was chosen since it is an appropriate test to compare means between groups on single Likert items, which have an ordinal nature (Sullivan & Artino Jr, 2013).

***Secondary outcome:*** The second hypothesis was tested in SPSS by conducting a Pearson correlation between *usability evaluation* and *self-efficacy.*

***Missing data:*** After removing the outliers and participants with straight-line answers, no missing data points existed.

### Ethical considerations

All participants participated voluntarily and could stop participating at any time. Participants had to give informed consent to participate and were informed about their (data)rights, privacy and the procedure. No sensitive questions were asked, participants remained fully anonymous, and the participant burden was kept to a minimum. Finally, to ensure all participants could read the briefing, two questionnaires were made, one with B1/B2 and one with C2 level Dutch.

## Results

### Descriptive statistics

Table 1 provides an overview of participants' demographic characteristics. Table 2 presents the means, standard deviations and correlations of the variables included in the primary hypothesis.

**Table 1**

*Sociodemographic Characteristics of Participants*

| Baseline characteristic | All Participants | | | Low Education | | | High Education | | |
|---|---|---|---|---|---|---|---|---|---|
| | *N (76)* | % | *SD* | *n (13)* | % | *SD* | *n* (63) | % | *SD* |
| Gender | | | | | | | | | |
| Female | 33 | 43 | | 10 | 76.9 | | 23 | 36.5 | |
| Male | 43 | 57 | | 3 | 23.1 | | 40 | 63.5 | |
| Age (mean) | 39.5 | | 17 | 59.2 | | 14.3 | 35.4 | | 14.5 |

**Table 2**

*Descriptive Statistics and Pearson Correlations.*

| Variable | *n* | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1.Usability | 73 | 52.5 | 5.3 | - | - | - | - | - | - |
| 2.eHealth Literacy | 73 | 31.8 | 4.6 | .26** | - | - | - | - | - |
| 3.Education* | 73 | 1.8 | 0.4 | .29** | .03 | - | - | - | - |
| 4.Age | 73 | 39.5 | 17 | .27** | -.12 | -.53 | - | - | - |
| 5.Sex* | 73 | 1.4 | 0.5 | .02 | .01 | -.31** | .22** | - | - |
| 6.Prior Use* | 73 | 1.3 | 0.5 | -.31** | -.35** | .05 | .22** | .24** | - |

**Dichotomous variable with levels 1 and 2, ** $p < .05$.*

**Primary hypothesis**

The hypothesised moderated mediation model was tested using a bootstrapping approach with model 7 in the "PROCESS" macro. Model 7 was used to test whether the relationship between predictor variable *SES* and outcome variable *usability evaluation* was mediated via *eHealth literacy level* whereby *age* moderates the effect of path a (Figure 1). The model was controlled for *prior use of thuisarts.nl*. Contrary to the primary hypothesis, age was not found to moderate the relationship between SES and eHealth literacy, as shown by the interaction term $B = 0.02$, 95% CI [-0.17, 0.21] ($t(71) = 0.1$, $p = .823$. Therefore, the moderated mediation model was adjusted to a simple mediation model with *SES* as the

predictor variable, *eHealth literacy level* as the mediator and *usability evaluation* as the outcome variable. Since *age* correlates with the outcome variable, it was added to the *prior use of thuisarts.nl* variable as a covariate instead of a moderator. To test whether eHealth literacy level mediates the relationship between SES and users' usability evaluations of thuisarts.nl while accounting for users' prior use of thuisarts.nl and age, a second bootstrapping analysis was carried out using mediation model 4 in the "PROCESS" macro.

In line with the hypothesis, SES positively related to users' usability evaluations of thuisarts.nl: high-SES individuals evaluated the usability of thuisarts.nl higher than those with low-SES $B = 3.90$, [CI 0.36, 7.45] $t(71) = 2.20$, $p = .031$. In contrast to the hypothesis, this relationship was not mediated by eHealth literacy level, as zero exists in the confidence interval $B = 0.06$, 95% CI [-0.58, 0.87]. Following this, SES groups did not differ significantly in their eHealth literacy level as *SES* was not related to *eHealth literacy* $B = 0.36$, 95% CI [-2.83, 3.55] $t(72) = 0.22$, $p = .824$. Finally, users' eHealth literacy level did not predict their usability evaluation of thuisarts.nl $B = 0.18$, CI [-0.08, 0.44] $t(71) = 1.38$, $p = .171$. Table 3 provides an overview of the standardized betas for each variable predicting *usability evaluation.* Additionally, Table 3 illustrates that individuals who had prior experience with thuisarts.nl evaluated the usability of the website significantly higher than those who did not. Also, Table 3 illustrates that users' age was not related to their usability evaluations of thuisarts.nl.

**Table 3**

*Regression Model Predicting Usability Evaluation (N=76)*

| Variable | Unstandardized Coefficients | | Standardized Coefficients | *t* | *p* |
|---|---|---|---|---|---|
| | *B* | *SE* | Beta (β) | | |
| Education | 3.89 | 1.77 | .73 | 2.2 | .031* |
| eHealth Literacy | 0.18 | 0.13 | .16 | 1.38 | .171 |
| Prior Use | 3,11 | 1.37 | -.26 | -2.27 | .027* |
| Age | -0.14 | 0.04 | -.04 | -0.34 | .737 |

* $p < .05$. *Note.* Constant = 44.15, $F(4, 71) = 4.87$, $p = .002$, $R^2 = .216$

To compare SES groups on single usability evaluation items a Mann-Whitney U test was conducted. Table 4 shows that the low-SES group evaluated thuisarts.nl significantly lower than the high-SES group on usability aspects related to range of information; understandability of information; trustworthiness of information; appreciation of websites' advice; perceived disturbance of images; and websites' ease of use. Since item 12 *perceived disturbance of images* was inverted, the low-SES group evaluated the images on thuisarts.nl as more disturbing than the high-SES group. Additionally, Table 4 illustrates that SES groups did not differ significantly in their evaluation of usability aspects related to positive view of website; confusion by website; usefulness; understandability of language; relevance of website; comfort by website; and appropriateness of images.

**Table 4**

*Mann-Whitney U Test Comparing Ranked Mean Scores Between SES Groups on Single Usability Evaluation Likert Items.*

| Item | *M* (N=63) | | *SD* | | *U* | *p* |
|---|---|---|---|---|---|---|
| | Low Education (n=13) | High Education (n=63) | Low Education | High Education | | |
| 1.Perceived positive view of website | 3.8 | 3.7 | 0.4 | 0.8 | 392 | .792 |
| 2.Perceived confusion by website | 3.8 | 4.1 | 0.8 | 0.7 | 307.5 | .112 |
| 3.Perceived usefulness of website | 3.8 | 4.1 | 0.6 | 0.6 | 300.5 | .070 |
| 4.Perceived range of information on website | 3.9 | 4.4 | 0.4 | 0.6 | 207.5 | .002* |
| 5.Perceived understandability of website's language | 4 | 4.3 | 0.4 | 0.6 | 296 | .067 |
| 6.Perceived understandability of websites' information | 3.9 | 4.5 | 0.5 | 0.6 | 215 | .002* |
| 7.Perceived relevance of website | 3.8 | 3.8 | 0.6 | 0.8 | 402 | .915 |
| 8.Perceived trustworthiness of website's information | 3.7 | 4.3 | 0.8 | 0.8 | 241 | .011* |
| 9.Perceived comfort by website | 3.8 | 3.9 | 0.4 | 0.8 | 356.5 | .416 |
| 10.Appreciation of websites' advice | 3.9 | 4.2 | 0.4 | 0.6 | 263.5 | .016* |
| 11.Perceived appropriateness of images | 3.8 | 3.9 | 0.4 | 0.8 | 381.5 | .668 |
| 12.Perceived disturbance by images | 3.3 | 3.8 | 0.6 | 0.9 | 263.5 | .028* |
| 13.Perceived ease of use of website | 3.9 | 4.3 | 0.6 | 0.7 | 240 | .007* |

** $p < .05$.*

**Secondary Hypothesis**

A Pearson correlation coefficient was computed to assess the relationship between users' usability evaluations of thuisarts.nl and their perceptions of their ability to manage their health after visiting the website. There was a strong positive correlation between *usability evaluation* and *health management self-efficacy* $r(74) = .567$. This relationship was significant $p = < .001$. Thus, increases in users' usability evaluations of thuisarts.nl were correlated with increases in users' health management self-efficacy and vice versa.

## Discussion

There were two aims of this study. Firstly, this study aimed to investigate the accessibility of public health websites by evaluating the usability of such websites through the perspective of users with different SES backgrounds. To achieve this, users from two different SES backgrounds have evaluated the usability of the public health website www.thuisarts.nl. The results indicate that there is a positive relationship between SES and usability evaluations of thuisarts.nl. The results also demonstrate that eHealth literacy does not mediate this relationship and has no direct effect on the usability evaluation of thuisarts.nl. Additionally, the data suggests that low-SES individuals evaluated thuisarts.nl significantly lower than high-SES individuals on usability aspects related to the understandability of information; ease of use; trustworthiness; range of information; and appreciation of advice of thuisarts.nl. Low-SES individuals evaluated the images on thuisarts.nl as more disturbing than high-SES individuals. The second aim of this study was to investigate how perceptions of the usability of public health websites relate to perceptions of one's ability to use the information of such websites to manage one's health. By having analyzed the relationship between usability evaluations and health management self-efficacy,

the current study found that users' usability perceptions of thuisarts.nl are associated with their self-efficacy in using the website for personal health management.

The most important result is that after keeping participants' age and prior use of thuisarts.nl constant, SES predicts how users evaluate the usability of thuisarts.nl. This finding shows that those with low SES evaluate the usability of thuisarts.nl lower than those with high SES. This result supports the hypothesis that SES is positively related to usability evaluations of public health websites. These findings are in line with research by Kim (2016) who found that low SES is related to less trust in online health information, which is an aspect of usability. Further analysis of differences between SES groups on individual usability aspects confirm the findings by Kim (2016) as they show that low-SES individuals have less trust in the health information on thuisarts.nl than high-SES individuals.

Other single usability aspects which the low SES group evaluated lower than the high SES group were the range of information and their appreciation of the advice on the website. Furthermore, those of low SES evaluated the images on the website as more disturbing than those of high SES. Social disparities in the evaluation of these usability aspects might be due to the misalignment between the information preferences of low-SES individuals and the presentation of information on public health websites. This finding supports research by Faber et al. (2021) who concluded that eHealth applications often do not align with the needs, preferences and health perspectives of low-SES individuals.

A second expectation of this study was that low-SES individuals would have lower usability evaluations of thuisarts.nl due to their eHealth literacy level. This hypothesis was based on research that showed that those with low SES have lower eHealth literacy levels than high-SES individuals (Guo et al., 2021a; Neter & Brainin, 2012). eHealth literacy level was expected to function as the mechanism that modifies users' usability evaluations as several reports have shown that individuals with low eHealth literacy have more trouble

understanding, using and navigating health websites (Cheng et al., 2020; Mackert et al., 2016; Norman & Skinner, 2006b; Rezakhani Moghaddam et al., 2022). These skills play an important role in one's perception of the usability of a website (Fisher et al., 2008; van der Heijden, H., 2003). In accordance with the expectations, the results show that low-SES individuals evaluate the usability aspects of *ease of use* and *understandability of information* of thuisarts.nl lower than the high-SES group. Nonetheless, the mediation analysis shows that eHealth literacy is not the mechanism explaining the relationship between SES and usability evaluations of thuisarts.nl, as SES and eHealth literacy levels are unrelated.

Moreover, the results show no relationship between one's eHealth literacy level and their usability evaluation of thuisarts.nl, which was also unanticipated. This finding contradicts the expectation that eHealth literacy predicts usability evaluations. A possible explanation for these surprising findings is a potential discrepancy between one's self-perceived eHealth literacy level and one's actual eHealth literacy level. Although multiple studies have found good validity for the eHEALS in various populations, a study by van der Vaart et al. (2011) with Dutch participants opposes this (Chung & Nahm, 2015; Foote et al., 2023; Joseph & Fleary, 2023). Van der Vaart et al. (2011) have pointed out that beliefs about one's eHealth literacy level do not necessarily correspond to actual abilities in online health-related tasks. This could explain the discrepancy between low-SES individuals' low evaluations on usability aspects that relate to essential eHealth literacy features, and the absence of eHealth literacy as the mechanism. Another possible explanation is that eHealth literacy might not be the mechanism that explains social differences in usability evaluations. It is possible that other characteristics of those with low SES, such as information preferences and general internet skills, explain the differences in their usability evaluations (Al-Dhahir et al., 2022; Faber et al., 2021; Martins et al., 2017; Petrie & Bevan, 2009).

Another interesting finding is that the moderated mediation analysis shows that age

does not interact with the relationship between SES and eHealth literacy, meaning that this relationship does not differ for individuals of different ages. This unfound relationship was unanticipated, as prior studies by Hsu (2019) and Richtering et al. (2017) did find a relationship between age and eHealth literacy levels using the same questionnaire as the current study. In contrast, the current findings are in line with research by Norman and Skinner (2006a) and Van der Vaart et al. (2011) who did not find a relationship between age and eHealth literacy using the eHEALS questionnaire. But, it is important to note that Norman and Skinners' (2006a) sample only included participants from the age of 13 to 21. Additionally, research by Joseph and Fleary (2023) concluded that the eHEALS is less appropriate to measure eHealth literacy in young adults. Thus, although the current study offers support for studies that did not find a relationship between age and eHealth literacy levels, we cannot firmly conclude that there is no interaction of age on the relationship between SES and eHealth literacy level.

Finally, the results show that users' usability evaluation is related to their health management self-efficacy. This is in agreement with the hypothesis and is congruent with prior research that found similar relationships between self-efficacy and usability evaluations in a different context (Buker et al., 2024; Holden & Rada, 2011; Talboom-Kamp et al., 2020). This study suggests that usability evaluations of public health websites are associated with one's perception of their ability to manage their health after using such websites. The results from this study show that those evaluating the usability of the website lower, have less belief in their ability to manage their health based on the website's information and vice versa. Potentially, users who perceive public health websites as more usable are better able to find information that is relevant to them and have therefore enhanced perceptions of their ability to manage their health with the websites' information. On the other hand, it is plausible that users who have higher self-efficacy also perceive health websites as better usable. However,

due to the cross-sectional nature of this study, it is impossible to interpret the relationship causally.

The above-mentioned results have multiple implications. To begin with, the relationship between SES and the usability evaluation of thuisarts.nl improves our understanding of how SES relates to perceptions of the usability of public health websites. The finding that low-SES individuals evaluate the usability of a public health website lower than high-SES individuals adds to the growing body of research highlighting social disparities in various forms of eHealth applications (Hansen et al., 2019; Kontos et al., 2014; Nölke et al., 2015). This result supports the perspective that social inequalities permeate a wide range of eHealth technologies and emphasizes the importance of investigating social disparities across the entire spectrum of eHealth applications (Faber et al., 2021; Gilmour, 2007; Woolley et al., 2023). Furthermore, the absence of eHealth literacy as a mechanism for the prior mentioned relationship highlights the importance of investigating characteristics of low-SES individuals beyond eHealth literacy when evaluating the usability of eHealth applications, as has been argued by Faber et al. (2021). Moreover, the discrepancy between low-SES individuals' low evaluations on usability aspects that are crucial to eHealth literacy and the non-existence of eHealth literacy as a mechanism offers support for studies that question the validity of the eHEALS (van der Vaart, Rosalie et al., 2011). Finally, the findings of this study contribute to our knowledge about the relationship between usability and health management self-efficacy and show that this relationship exists in the context of public health websites. Furthermore, the finding functions as a starting point for future research to investigate the direction, and potential causality, of the relationship between usability and health-management self-efficacy.

These findings emphasize the need to include users from diverse SES backgrounds in usability evaluations of public health websites. Usability evaluations are dominantly executed

by experts and mainly focus on users with disabilities (Estevez et al., 2023). However, the current study demonstrates that next to individuals with disabilities, low-SES individuals also face unique challenges that affect their usability perceptions. This study shows that the presentation of information on such websites may misalign with the preferences of low-SES individuals. This insight underscores the importance of including users from different socioeconomic backgrounds in the development and evaluation of public health websites to ensure accessibility. Additionally, public health websites should not rely solely on experts when evaluating usability but should consider user perspectives, as their viewpoints offer unique insights. To achieve this, public health websites should adopt co-creation methods with users during the development phase to ensure alignment with users' needs (Sanders & Stappers, 2008). Other options include the adoption of various user-centred evaluation methods during and after development (Kushniruk & Patel, 2004). Including users from different socioeconomic backgrounds in these approaches ensures that public health websites meet the needs of all end-users.

This study has some limitations. Firstly, due to the cross-sectional nature of this study, it is impossible to make conclusions about the causal relationships between SES, perceptions of usability and health management self-efficacy. Possibly, confounding variables not included in this study might explain parts of these relationships. For instance, due to the scope of this research, health status, which potentially confounds the relationship between usability and SES, was not integrated into the study. Additionally, both perceptions of usability and health management self-efficacy are only proxies of actual behaviour. For instance, perceptions of usability only explain website usage partly, and perceptions about one's ability to manage one's health do not fully predict actual health behaviour. Additional research is needed to gain a more comprehensive understanding of public health website users' actual behaviour.

Secondly, bias may have been introduced to the study. Since participants could self-select, it is plausible that this study was fallible for self-selection bias. For instance, participants recruited via social media might have had better usability perceptions in general than those who could not be reached via that medium. Also, elderly people who participated possibly had a higher average eHealth literacy level than their peers. Future studies should therefore use random sample selection but simultaneously be cautious to ensure that enough low-SES participants are included. Moreover, since both the eHEALS and the eHIQ are self-report questionnaires, response bias might have been introduced, as demonstrated by the earlier-mentioned study of van der Vaart et al. (2011). Thirdly, to limit the participant burden, a short exposure to thuisarts.nl was chosen. It is possible that the short exposure to thuisarts.nl did not fully grasp one's health management self-efficacy or usability experience. Lastly, the low-SES group was relatively small. Potentially, the size of this SES group might not had enough power to detect the mediation effect.

In contrast, this study has several notable strengths. To begin with, this study has a solid real-world application. Focusing on the usability of the most widely used public health website in the Netherlands has ensured that the findings are directly applicable and relevant to the digital public health domain. Furthermore, the insights from this study can be used to make thuisarts.nl more usable for all layers of society, thereby enhancing equity in the accessibility of evidence-based health information. Subsequently, including a diverse participant group, compromising low-SES individuals who are hard to reach, improved the generalizability of the findings. By including a broad spectrum of user evaluations, this study provides a good understanding of how usability perceptions vary across different layers of the population. Thirdly, the usability evaluation instrument in this study covers a wide range of usability aspects, including understandability; ease of use; trustworthiness; range of information; and appreciation of advice. Moreover, usability aspects that are particularly

important for public health websites, such as the evaluation of the disturbance of images, were included in the usability evaluation. This evaluation approach ensured a comprehensive assessment of the various aspects that are important for public health websites.

Future research is needed that investigates the relationships between SES, usability perceptions and health management self-efficacy using a larger sample size. Next, experimental research with a follow-up study is required to determine whether a causal relationships between the variables exist. Further studies using an instrument that measures actual eHealth literacy performance is needed to investigate the role of eHealth literacy as a mediating mechanism in the relationship between SES and usability evaluations. Researching this will offer a more accurate understanding of eHealth literacy as a mechanism for discrepancies in usability evaluations by SES individuals and the interaction of age in this relationship. What is more, further investigations are needed to gain a better understanding of the role variables such as health status, general internet skills and information preferences play in the relationships between SES, usability perceptions and self-efficacy and use.

To conclude, this study has several important practical and theoretical implications. The results of this study improve our knowledge of the usability perspective of public health websites by individuals with different SES backgrounds, including the viewpoint of individuals who are hard to reach in research. The difference between SES groups in their usability evaluation of thuisarts.nl shows that social disparities exist in the accessibility of public health websites. The results from this study emphasize the importance of future research to investigate social inequalities in the accessibility of eHealth applications and the significance of the perspective of users with different SES backgrounds when developing eHealth applications. The absence of eHealth literacy as a mechanism for the disparities in the usability evaluation of thuisarts.nl shows that other underlying factors that could explain social differences in usability evaluations of public health websites should be explored. The

absence also underscores the need to use instruments that measure actual eHealth abilities instead of self-reported eHealth literacy levels. Finally, the association between usability evaluations and health management self-efficacy of public health websites offers a valuable starting point for future research to investigate a potential causal relationship.

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# Appendix 1

## 1.1 Geïnformeerde toestemming B1

**Uw mening over gezondheidsinformatie op het internet!** Ik ben Roan en ik doe onderzoek voor de Universiteit van Rotterdam. Ik wil meer weten over websites waarop informatie staat over gezondheid. In deze tekst staat uitleg over het onderzoek. Als u iets niet begrijpt, of vragen heeft, dan kunt u die aan mij (via e-mail) stellen. Als u wilt meedoen aan het onderzoek, vraag ik u aan het einde van de volgende pagina om toestemming te geven.

**Waarom is meedoen aan onderzoek belangrijk?**

Wetenschappelijk onderzoek doen we om te leren en om mensen te helpen. En is belangrijk voor de samenleving.

**Waar gaat het onderzoek over?**

Dit onderzoek gaat over uw mening over een website waar u informatie over uw gezondheid kunt vinden. Ik als onderzoeker wil weten wat uw oordeel is over de gebruiksvriendelijkheid van de website. Uw antwoorden helpen om websites met informatie over gezondheid te verbeteren.

**Wat kan u verwachten?**

Het onderzoek duurt ongeveer 10 minuten. Als u meedoet aan dit onderzoek, dan doet u mee aan 2 dingen: 1. Het bezoeken van een website met gezondheidsinformatie. 2. Het invullen van een vragenlijst. *U kunt de vragenlijst zelf invullen. Als u mee doet in uw*

*huisartspraktijk kunt u de vragenlijst ook samen met mij invullen.*

**U kiest zelf of u meedoet**

Als u niet meedoet verandert er niks voor u.

U kunt ook altijd stoppen als u niet meer mee wilt doen.

**Wat zijn de risico's?**

Dit onderzoek heeft geen gevolgen voor u of voor de zorg die u krijgt.

**Wat levert het onderzoek voor u op?**

Als u mee doet helpt u om informatie over gezondheid op het internet te verbeteren.

**Welke gegevens heb ik van u nodig?**

Voor het onderzoek heb ik een paar gegevens van u nodig.

- Leeftijd
- Geslacht
- Opleidingsniveau

**Wie kan uw gegevens zien?**

- Ik sla al uw gegevens veilig op.
- Alleen ik en mijn collega’s van de Universiteit kunnen uw gegevens zien.
- Ik schrijf een rapport over de resultaten van het onderzoek.

• Er komen alleen gegevens over hele groep van deelnemers in het rapport.

**Hoe lang bewaar ik uw gegevens?**

Ik bewaar uw gegevens minimaal tien jaar.

Dit doe ik zodat andere onderzoekers mijn onderzoek kunnen controleren.

**Wat gebeurt er met de resultaten?**

Wilt u het resultaat ontvangen?

Laat het mij weten.

Mijn e-mailadres kunt u hieronder en aan het einde van de vragenlijst vinden.

Schrijf het e-mailadres op.

**Heeft u vragen over het onderzoek?**

Neem dan contact op met mij of mijn begeleider:

Naam: Roan Evers

Telefoonnummer: +31642354172

e-mail: 698854re@eur.nl

*Begeleider*

Naam: dr Paul Kocken

e-mail: kocken@essb.eur.nl

Ik heb uw *deelnamenummer* nodig om vragen over uw antwoorden of uw gegevens te kunnen beantwoorden.

U kunt uw deelnamenummer opslaan aan het einde van de vragenlijst.

Heeft u een klacht over uw privacy?

Mail dan naar fg@eur.nl (functionaris voor gegevensbescherming van de universiteit) of kijk op www.autoriteitpersoonsgegevens.nl. (T: 088 – 1805 250)

**Spijt van uw antwoorden?**

Tot u op verzenden klikt, kan u nog besluiten om niet mee te doen.

Neem contact op met mij of mijn begeleider als u spijt hebt van het meedoen.

Ik heb uw deelnamenummer hier voor nodig.

Uw deelnamenummer krijgt op de laatste pagina van de vragenlijst.

Schrijf deze op.

**1.2 Toestemmingsverklaring B1**

*Verklaring voor toestemming*

Ik heb de informatiebrief gelezen.

Ik begrijp waar het onderzoek over gaat en dat de onderzoeker gegevens van mij bewaart.

Ook kon ik vragen stellen.

De onderzoeker heeft mijn vragen beantwoord.

Ik weet dat ik mag stoppen.

Ik begrijp dat mijn naam niet wordt genoemd in het rapport dat de onderzoeker gaat schrijven.

Ik begrijp dat de onderzoeker dat andere onderzoekers mijn gegevens kunnen gebruiken voor ander wetenschappelijk onderzoek.

**Geef hieronder aan of u hier toestemming voor geeft.**

- ○ Ik geef toestemming aan de onderzoeker voor het verzamelen, gebruiken en bewaren van mijn gegevens
- ○ Ik geef GEEN toestemming aan de onderzoeker voor het verzamelen, gebruiken en bewaren van mijn gegevens

---

Om mee te doen aan het onderzoek moet u:

1. Nederlands kunnen begrijpen
2. 18 jaar of ouder zijn
3. Toegang hebben tot het internet in uw dagelijkse leven

**Ik voldoe aan de eisen om mee te doen:**

- ○ Ja, ik ben ouder dan 18, begrijp Nederlands en heb toegang tot het internet.
- ○ Nee

**1.3 Geïnformeerde toestemming C1/C2**

*Evaluatie publieke gezondheidsinformatie website*

**Inleiding**

Beste deelnemer,

Ik ben Roan en ik doe onderzoek voor de Erasmus Universiteit Rotterdam. Ik doe onderzoek naar gezondheidsinformatie websites. Ik voer dit onderzoek op een onafhankelijke manier uit. Hieronder leg ik dit onderzoek uit. Als u iets niet begrijpt, of vragen heeft, dan kunt u die (via e-mail) aan mij stellen. Als u wilt meedoen aan het onderzoek, kunt u dit aan het einde van dit formulier aangeven.

**Waar gaat het onderzoek over?**

Het doel van dit onderzoek is het evalueren van de gebruiksvriendelijkheid en impact van een publieke gezondheidswebsite vanuit het perspectief van de gebruiker.

**Waarom vragen wij u om deel te nemen?**

We vragen u mee te doen omdat uw evaluatie van de gebruiksvriendelijkheid kan helpen om de toegankelijkheid van publieke gezondheidswebsites te verbeteren.

**Wat kan je verwachten?**

Het onderzoek duurt ongeveer 10 minuten.

Als u meedoet aan dit onderzoek, dan doet u mee aan:

1) Het bezoeken van een publieke gezondheidswebsite

2) Het invullen van een vragenlijst

*U kunt de vragenlijst invullen op uw huidige apparaat na het lezen van de volgende pagina.*

**U kiest zelf of u meedoet**

Deelnemen aan dit onderzoek is geheel vrijwillig. U kunt op ieder moment en zonder uitleg stoppen.

**Wat zijn de mogelijke risico's en ongemakken?**

Wij verwachten geen risico's of ongemakken tijdens deelname aan dit onderzoek.

**Wat zijn de voordelen van deelname?**

Er zijn geen directe of financiële voordelen verbonden aan deelname aan het onderzoek, maar het delen van uw ervaringen zal meer licht werpen op de toegankelijkheid van publieke gezondheidswebsites.

**Welke gegevens heb ik van u nodig**

Tijdens de vragenlijst worden de volgende persoonsgegevens van u verzameld: Leeftijd, Geslacht en Opleidingsniveau.

Aan de Erasmus Universiteit voeren we wetenschappelijk onderzoek uit. Dit doen we om te leren, om mensen te helpen en bij te dragen aan de samenleving. Omdat wij een wetenschappelijke instelling zijn die wetenschappelijk onderzoek uitvoert, verwerken wij uw persoonsgegevens uitsluitend voor onderzoek op basis van algemeen belang.

**Hoe wordt er met mijn data omgegaan?**

Ik sla al uw gegevens veilig op. Enkel personen die betrokken zijn bij het onderzoek kunnen (een deel van) de gegevens inzien. Eventuele directe persoonsgegevens worden apart van uw antwoorden verwijderd. Over de resultaten van het onderzoek schrijven wij een artikel dat wij publiceren (het openbaar delen van de resultaten) in tijdschriftartikelen en in boeken. De resultaten zijn voor iedereen toegankelijk. Wij gebruiken uw specifieke antwoorden mogelijk in het artikel. Het onderzoek is volledig anoniem en geen van de antwoorden zijn naar u terug te herleiden.

**Hoe lang bewaar ik uw gegevens?**

Uw antwoorden worden voor 10 jaar bewaard na afronding van het onderzoek. Wij bewaren de gegevens zodat andere onderzoekers de mogelijkheid hebben om te controleren of het onderzoek juist is uitgevoerd.

**Uw gegevens gebruiken voor nieuw onderzoek**

(Een deel van) de gegevens die wij over u verzamelen, kan in geanonimiseerde vorm nuttig zijn voor bijvoorbeeld onderwijsdoeleinden en voor toekomstig onderzoek, ook op heel andere onderzoeksterreinen. Wij brengen niks naar buiten waardoor u herkenbaar bent.

Daarnaast kunnen uw persoonsgegevens (zonder naam, mailadres etc.) gebruikt worden voor

vervolg- of ander wetenschappelijke onderzoek. De gegevens die worden gedeeld zijn niet naar u herleidbaar. U kunt bezwaar maken tegen het verdere gebruik, u kunt daarvoor contact opnemen met mij of mijn begeleider.

**Heeft u vragen over het onderzoek?**

Heeft u vragen over het onderzoek of uw privacy rechten, zoals inzage, wijziging, verwijdering of aanpassing van uw gegevens, neem dan contact op met mij of mijn begeleider.

Naam: Roan Evers

Telefoonnummer: +31642354172

e-mail: 698854re@eur.nl

*Begeleider*

Naam: Paul Kocken

e-mail: kocken@essb.eur.nl

Ik heb uw ***deelnamenummer*** nodig om vragen over uw antwoorden of uw gegevens te kunnen beantwoorden. U kunt uw deelnamenummer opslaan aan het einde van de vragenlijst.

Heeft u een klacht over uw privacy? Mail dan naar de functionaris voor gegevensbescherming (fg@eur.nl) of kijk op www.autoriteitpersoonsgegevens.nl. (T: 088 – 1805 250)

**Spijt van uw deelname?**

Tot u op verzenden klikt, kan u nog besluiten om niet mee te doen. Als u stopt, worden uw gegevens niet opgeslagen. Nadat u op verzenden klikt kunnen wij niet meer achterhalen welke gegevens u met ons hebt gedeeld, tenzij u uw deelnamenummer met ons deelt. Neem contact op met mij of mijn begeleider, onder vermelding van uw deelnamenummer, als u spijt heeft van uw deelname.

**1.4 Toestemmingsverklaring C1/C2**

**Toestemmingsverklaring**

Ik heb de informatiebrief gelezen. Ik begrijp waar het onderzoek over gaat en dat er gegevens van mij worden verzameld. Ook kon ik vragen stellen. Mijn vragen zijn voldoende beantwoord.

Door dit formulier te ondertekenen

1. geef ik toestemming voor deelname aan dit onderzoek;
2. geef ik toestemming voor het verwerken van mijn persoonsgegevens;
3. bevestig ik dat ik ten minste 18 jaar oud ben;
4. geef ik aan dat ik begrijp dat deelname aan dit onderzoek geheel vrijwillig is en ieder moment kan stoppen; en
5. geef ik aan dat ik begrijp dat mijn gegevens anoniem gebruikt worden in publicaties, en verder gebruik voor onderwijs en onderzoek.

**Geef hieronder aan of u hier toestemming voor geeft.**

○ Ik geef toestemming aan de onderzoeker voor het verzamelen, gebruiken en bewaren van mijn gegevens

○ Ik geef GEEN toestemming aan de onderzoeker voor het verzamelen, gebruiken en bewaren van mijn gegevens

---

Om mee te doen aan het onderzoek moet u:

1. Nederlands kunnen begrijpen;

2. 18 jaar of ouder zijn;

3. Toegang hebben tot het internet in uw dagelijkse leven

**Ik voldoe aan alle criteria om mee te doen:**

○ Ja, ik ben ouder dan 18, begrijp Nederlands en heb toegang tot het internet.

○ Nee

# Appendix 2

## 2.1 Demografische vragen

Wat is uw leeftijd?

_____

Met welk geslacht identificeert u zich?

- ○ Man
- ○ Vrouw
- ○ Geen van beide
- ○ Zeg ik liever niet

Wat is uw hoogst afgeronde opleiding (met diploma of getuigschrift)?

- ○ Geen opleiding (lager onderwijs niet afgemaakt)
- ○ Lager onderwijs (basisschool, speciaal basisonderwijs)
- ○ Lager of voorbereidend beroepsonderwijs (zoals ambachts- of huishoudschool, lts, leao, lhno, vmbo-b, vmbo-k, speciaal- of praktijkonderwijs)
- ○ Middelbaar algemeen voortgezet onderwijs (zoals (m)ulo, mavo, vmbo-g, vmbo-t, mbo-kort, mbo-1)
- ○ Middelbaar beroepsonderwijs (zoals vakopleidingen bakker of kapper, mbo-lang, mts, meao, bol, bbl, mbo-2, mbo-3, mbo-4)
- ○ Hoger algemeen en voorbereidend wetenschappelijk onderwijs (zoals hbs, mms, havo, vwo, atheneum, gymnasium)
- ○ Hoger beroepsonderwijs (zoals kweekschool, hbo, hts, heao, hbo-v, kandidaats of bachelor wetenschappelijk onderwijs)
- ○ Wetenschappelijk onderwijs (doctoraal of master, postdoctoraal, hbo-master)

## 2.2 eHEALS

### In hoeverre bent u het eens over de volgende uitspraken?

| | Helemaal mee oneens | Mee oneens | Niet mee eens, niet mee oneens | Mee eens | Helemaal mee eens |
|---|---|---|---|---|---|
| 1. Ik weet hoe ik websites met nuttige gezondheidsinformatie op internet kan vinden | ○ | ○ | ○ | ○ | ○ |
| 2. Ik weet hoe ik het internet kan gebruiken om mijn vragen over gezondheid te beantwoorden | ○ | ○ | ○ | ○ | ○ |
| 3: Ik weet welke websites met gezondheidsinformatie beschikbaar zijn op internet | ○ | ○ | ○ | ○ | ○ |
| 4: Ik weet waar ik nuttige informatie over gezondheid op internet kan vinden | ○ | ○ | ○ | ○ | ○ |
| 5: Ik weet hoe ik de gezondheidsinformatie die ik op internet vind kan gebruiken om mezelf te helpen. | ○ | ○ | ○ | ○ | ○ |
| 6 Ik heb voldoende vaardigheden om de gezondheidsinformatie die ik vind op het internet op waarde te kunnen schatten. | ○ | ○ | ○ | ○ | ○ |
| 7: Ik kan onderscheid maken tussen gezondheidsinformatie van hoge en lage kwaliteit op het internet | ○ | ○ | ○ | ○ | ○ |
| 8: Ik voel me zelfverzekerd in het gebruik van informatie van internet om beslissingen over mijn gezondheid te nemen | ○ | ○ | ○ | ○ | ○ |

**2.3 Instructie bezoek thuisarts.nl**

Volg alstublieft de onderstaande instructies op:

1. Klik op de onderstaande link naar de website met gezondheidsinformatie. **Er zal een nieuwe pagina in uw browser openen.**

2. Neem tot ongeveer 5 minuten de tijd om naar de onderdelen van de website te surfen die **uw interesse hebben.**

3. Wanneer u klaar bent met surfen op de website, **keer dan terug naar deze pagina en klik op het pijltje rechts onderin om door te gaan** om de resterende vragen te beantwoorden.

Link: Website met gezondheidsinformatie

*(Houd er rekening mee dat uw sessie zal verlopen als u niet binnen 30 minuten naar deze vragenlijst terugkeert)*

**2.4 EHIQ-NL - Information and presentation**

In dit onderdeel wordt gevraagd naar uw oordeel over de website met gezondheidsinformatie die u zojuist heeft bekeken.

Denkend aan de website die u net bekeken heeft in hoeverre bent u het wel of niet eens met de volgende uitspraken?

| | Helemaal mee oneens | Mee oneens | Niet mee oneens, niet mee eens | Mee eens | Helemaal mee eens |
|---|---|---|---|---|---|
| 1. De website heeft een positieve kijk. | ○ | ○ | ○ | ○ | ○ |
| 2. De informatie op de website liet een gevoel van verwarring bij me achter | ○ | ○ | ○ | ○ | ○ |
| 3. De website bevat nuttige tips over hoe het leven beter te maken. | ○ | ○ | ○ | ○ | ○ |
| 4. De website biedt een breed scala aan informatie. | ○ | ○ | ○ | ○ | ○ |
| 5. De taal op de website maakte het gemakkelijk te begrijpen | ○ | ○ | ○ | ○ | ○ |
| 6. Ik kan de informatie op de website gemakkelijk begrijpen. | ○ | ○ | ○ | ○ | ○ |
| 7. De mensen die hebben bijgedragen aan de website begrijpen wat voor mij belangrijk is. | ○ | ○ | ○ | ○ | ○ |
| 8. Ik vertrouw de informatie op de website | ○ | ○ | ○ | ○ | ○ |
| 9. In zijn geheel, vind ik de website geruststellend. | ○ | ○ | ○ | ○ | ○ |
| 10. Ik waardeer het advies dat gegeven wordt op de website. | ○ | ○ | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| 11. Foto’s en andere afbeeldingen op de website worden passend gebruikt. | ○ | ○ | ○ | ○ | ○ |
| 12. Ik vond de afbeeldingen op de website verontrustend. | ○ | ○ | ○ | ○ | ○ |
| 13. De website is gemakkelijk te gebruiken. | ○ | ○ | ○ | ○ | ○ |

**2.5 EHIQ-NL - Motivation to act**

Denkend aan de website die u net bekeken heeft in hoeverre bent u het wel of niet eens met de volgende uitspraken?

| | Helemaal mee oneens | Mee oneens | Niet mee eens, niet mee oneens | Mee eens | Helemaal mee eens |
|---|---|---|---|---|---|
| 1. De website moedigt mij aan om acties te ondernemen die gunstig kunnen zijn voor mijn gezondheid | ○ | ○ | ○ | ○ | ○ |
| 2. Ik zou me meer geneigd kunnen voelen om op mezelf te letten na het bezoeken van de website. | ○ | ○ | ○ | ○ | ○ |
| 3. Ik heb iets nieuws geleerd van de website. | ○ | ○ | ○ | ○ | ○ |
| 4. De website bereidt me voor op wat er mogelijk gaat gebeuren met mijn gezondheid. | ○ | ○ | ○ | ○ | ○ |
| 5. Ik zou de website raadplegen als ik een beslissing zou moeten nemen over mijn gezondheid. | ○ | ○ | ○ | ○ | ○ |
| 6. De website geeft me het vertrouwen dat ik in staat ben om met mijn gezondheid om te gaan | ○ | ○ | ○ | ○ | ○ |
| 7. De website geeft mij het vertrouwen om mijn gezondheidszorgen aan anderen uit te leggen. | ○ | ○ | ○ | ○ | ○ |
| 8. De website helpt me om een beter begrip te hebben van mijn persoonlijke gezondheid. | ○ | ○ | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| 9. De website moedigt mij aan om een actievere rol te spelen in mijn gezondheidszorg. | ○ | ○ | ○ | ○ | ○ |
| 10. De website geeft mij meer vertrouwen om mijn gezondheid te bespreken met mensen in mijn omgeving (bijvoorbeeld mijn familie of collega's). | ○ | ○ | ○ | ○ | ○ |

**2.6 Vervolg vraag gebruik thuisarts.nl**

De laatste 2 vragen gaan over uw weet en gebruik van thuisarts.nl. Na deze twee vragen is de vragenlijst afgelopen.

Kende u www.thuisarts.nl al?

○ Ja, ik kende thuisarts.nl al voordat ik mee deed aan dit onderzoek

○ Nee, ik kende thuisarts.nl nog niet voordat ik mee deed aan dit onderzoek

Maakt u wel eens gebruik van www.thuisarts.nl om informatie over uw gezondheid op te zoeken?

○ Ja, wanneer ik informatie op wil zoeken over mijn gezondheid gebruik ik (bijna) altijd www.thuisarts.nl

○ Ja, ik gebruik www.thuisarts.nl soms om informatie op te zoeken over mijn gezondheid, maar niet altijd

○ Nee, ik gebruik www.thuisarts.nl (bijna) nooit om informatie op te zoeken over mijn gezondheid

○ Nee, ik heb www.thuisarts.nl nog nooit gebruikt