INTERNSHIP REPORT

Formative Evaluation of an eHealth Tool for Attention Problems in Higher Education

Qualitative Research to identify Students' User Experiences

MSc. Management, Policy Analysis & Entrepreneurship in Health and Life Sciences

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ATHENA SCIENCE SHOP

VU ✦ VRIJE UNIVERSITEIT AMSTERDAM

Colophon

Title:
Developing and Evaluating an eHealth Tool concerning Attention Problems in Higher Education: Qualitative research into design quality assessments of students

Key words:
Attention problems, Web-based technology, eHealth, User-centred design, End-user Involvement, User Experience, Formative Evaluation, Higher-educated Students

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Summary

Background: Dutch students increasingly experience pressure regarding their mental health, which manifests itself in fatigue complaints, anxiety attacks, and attention problems. A student's health can have an enormous impact on their capacity to concentrate. Students with the inability to focus attention could experience trouble concentrating on their academic performance. Studies consistently show that approximately 24-29% of the students are coping with attention problems. Attention problems may arise due to a variety of factors, such as attention deficit disorders, (study) motivational problems, medication use and side effect, substance use, human-technology interaction, sleep deprivation, vitality, and psychological health. A considerable number of students struggle with attention complaints about too long, without seeking adequate help. Therefore, a need has been identified for an appropriate solution. Since current students are well acquainted with the use of technology a web-based service can guide students to suitable methods to increase their knowledge and help them address attention problems more effectively. However, an online self-regulating service in order to address attention problems is still missing, both in the current healthcare and academic system. Therefore, following a user-centred approach, the aim of this research is to develop and evaluate a web-based eHealth tool to address attention problems among students in higher education by analysing, mapping, and incorporating the perceived user experiences of students. This results in a twofold research aim, with emphasis on the evaluation part.

Methods: First, a prototype web-based eHealth tool to address attention problems among students in higher education was developed in accordance with the Centre for eHealth Research (CeHRes) Roadmap, on the basis of existing research into the contextual background and value specifications for attention-related issues. Namely, the contextual background identified the consistent occurrence of attentional problems among students, as well as a need for preventive eHealth support in order to assist student. In addition, other research elicited and prioritized students' value assessments regarding attention problems, in which the value specification were covered. Therefore, the essence of this study consisted of the identification of students' user experiences regarding the system, content, and service of the newly developed eHealth tool. Therefore, qualitative research was implemented by conducting both usability testing (i.e. think-aloud method) and semi-structured user interviews among students. Both interview types were audio recorded and transcribed verbatim. The transcripts were analysed in order to identify specific patterns using a thematic approach.

Results: A total of nine interviews sessions (i.e. usability testing and user interview) were conducted, in which specific themes of usability problems and positive aspects have been

identified. The first theme concerned the website's content meaningfulness regarding its relevance and comprehensibility, hence the absence of experience stories and the lack of information clarity. The second theme predominantly highlighted the user-friendliness of the website's system, empathising the information excess, unclear information display, and the technical errors. The last theme emerged in the perceived usefulness of the service, regarding the added value it provides to the students.

Conclusions: A web-based eHealth tool to address attention problems among students in higher education is considered a feasible tool to provide students with self-sufficiency in case of attention problems. In particular, the students appreciate the personal advice from the test in order for the acceptance and confirmation of their attentional complaints. Consequently, the development of this eHealth tool regarding students' attention problems could be of added value for the improvement of the personalised self-sufficient care process. In addition, the perceived results of this research might be of value for the development of several other web-based innovations. This emphasizes that both eHealth technologies as well as non-health-related websites, that also focus on students in higher education, could consider the identified students' user experiences as a starting point or perspective for their own research.

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List of abbreviations

ADD	Attention deficit disorder
ADHD	Attention deficit hyperactivity disorder
CeHRes	Centre for eHealth Research
HvA	Amsterdam University of Applied Sciences
IVM	Institute for Responsible Medication Use
UvA	University of Amsterdam

1. Introduction

Dutch students increasingly experience pressure regarding their mental health, which manifests itself in fatigue complaints, anxiety attacks, and attention problems (i.e. symptoms of hyperactivity and inattentiveness) (Dopmeijer et al., 2018). A student's health can have an enormous impact on their capacity to concentrate (Takpor & Atayero, 2015). However, the ability to focus attention provides a contribution to learn efficiently (Johnson, Burridge, & Demain, 2013). Philosopher and psychologist William James (1890) remarked that:

> *Everyone knows what attention is. It is the taking possession by the mind, in clear and vivid form, of one out of what seems several simultaneously possible objects or trains of thought … It implies withdrawal from some things in order to deal effectively with others.*

1.1 The inability to focus attention

In order to focus on one specific task-performance at a time both sustained and selective attention are considered effective, in which Sohlberg and Mateer (1989) defined sustained attention as the ability to maintain concentration on a certain activity over a longer period and selective attention as the ability to focus on something personally important while ignoring distractions. Therefore, the ability to concentrate on one study-related task is positively related to the presence of both sustained and selective attention. However, an individual's attentional focus could be influenced by irrelevant distractions (Lavie, 2010; Moran, 2012). The inability to focus could affect the ability of a person to concentrate on a task-performance, resulting in attentional problems (Lavie, 2010). Therefore, students with the inability to focus attention could experience trouble concentrating on their academic performance.

Studies performed by the University of Amsterdam (UvA) and Amsterdam University of Applied Sciences (HvA) consistently show that approximately 24-29% of the students are coping with attention problems (Van der Heijde, Vonk, & Meijman, 2011, 2012b, 2014, 2015, 2016). These studies focus on all types of attention problems, ranging from mild forms of inattention or hyperactivity to serious attention disorders (i.e. attention deficit disorders with predominantly inattention [ADD], predominantly hyperactivity/impulsivity [ADHD], or a combination of both inattention and hyperactivity/impulsivity)

1.2 Factors influencing students' attention

Attention problems may arise due to a variety of factors, such as attention deficit disorders, (study) motivational problems, medication use and side effect, substance use, human-technology interaction, sleep deprivation, vitality, and psychological health.

Within an academic perspective, Heiligenstein et al. (1999) conducted research showing that students with attention deficit disorders experience significantly more problems in their academic performance than students without any attentional problems. Their research indicates both lower grades and attendance to study-related activities within the students with attention deficit disorders.

In addition, motivation is positively related to students' educational well-being, in terms of both study strategy and academic performance (Kusurkar, 2013; Takpor & Atayero, 2015). Therefore, a low motivation will affect the student's ability to focus and eventually their academic performance (Takpor & Atayero, 2015). Students with no clear goal of their task are less able to concentrate on the task at hand and showed high procrastination tendencies (Lee, 2005).

Furthermore, certain medication can, as a side effect, affect the ability to concentrate. Recently, a habit of studying with attention-enhancing drugs has emerged among students. Students use medication intended for people with attention deficit disorders as a performance-enhancing means of studying (De Bruyn, 2019). Since students are probably not familiar with the side effects of these medications, the Institute for Responsible Medication Use (IVM) strives for more extended information about the disadvantages of this medication use (GGZ nieuws, 2017).

In addition, the inability to focus attention can be associated with the dependency of smoking (Lerman et al. 2001). This association is described as a vicious circle since smoking is used as self-medication in order to expand focus or feel more relaxed, although abstinence from smoking increases symptoms such as inattention and hyperactivity/impulsivity (Ashare, & Hawk, 2012; Rukstalis, 2005). In parallel, research by Porter and Pryor (2007) shows that alcohol consumption is associated with a reduced academic performance. Supplementary, the substance use of so-called party drugs (e.g., ecstasy, cannabis, speed, and coke) can result in behavioural and concentration problems (Jellinek, 2006; Rijksinstutuut van Volksgezondheid en milieu, n.d.). For instance, excessive cannabis use at a very young age seems to affect school performance and lowers education levels (Fergusson, Horwood, & Beautrais, 2003).

Furthermore, the rise of human-computer interaction requires the ability to multitask (McFarlane, 1999). Research shows that the ever-increasing media multitasking leads to a decline in academic performance through a reduced ability to filter out interference from the trivial task set (Ophir, Nass, & Wagner, 2009). In addition, research associated with the use of telephones after light-out among students showed a significant relationship with insomnia (Zarghami, et al., 2015). Recently, van der Heijden et al. (2018) found a direct link that sleep deprivation and sleep problems could lead to attention problems and poorer study performance among Dutch higher educated students. Thereby, indirectly concluding that technology screen use after light-out impacts a student's concentration level and learning capability.

Moreover, physical activity has a positive influential effect, in which it enhances mental alertness, concentration, a positive self-image, and a higher level of ambition (Stegeman, 2007). Therefore, if a student lacks in physical activity, the capacity to concentrate will be limited.

1.3 Contribution of eHealth

Since a considerable number of students struggle with attention complaints about too long, without seeking adequate help (Van der Heijde et al., 2011, 2012b, 2014, 2015, 2016; Verouden, Vonk, & Meijman, 2010), a need has been identified for an appropriate solution. In addition, Dopmeijer et al. (2018) launched an action plan to improve students' wellbeing. One of the five pillars mentioned in this approach is creating awareness for students' wellbeing, highlighting an increase in mental health literacy. The term *mental health literacy* is defined as "knowledge and beliefs about mental disorders which aid their recognition, management, or prevention" (Jorm et al, 1997). Moreover, the action plan mentions the importance of providing preventive support and psychosocial interventions by investing in more blended eHealth assistance for students (Dopmeijer et al., 2018), in which Eysenbach (2001) defines *eHealth* as:

> *…an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.*

Furthermore, research by Kemperman, Geelgoed, and Op 't Hoog (2014) states that the affordability and accessibility of the healthcare sector are at stake. Therefore, the Dutch government acknowledges the development of eHealth as a contribution to the Dutch healthcare sector (Rijksoverheid, 2018). This involves online self-service that allows people to function independently and keep healthcare affordable simultaneously (Kemperman et al., 2014). Additionally, an online self-service, such as eHealth technologies, could reach a large population and have a significant impact on health accessibility (Kemperman et al., 2014).

In the realm of mental health problems, a variety of eHealth methods already are arising, ranging from mindfulness to self-help during smoke cessation (EMH toolkit, 2017; Nederlands huisartsen genootschap, 2018). These methods can be used alongside traditional medicine and are, therefore, primarily based on self-support. Moreover, recent studies indicate promising outcomes in preventing and curing diseases using web-based treatments (Buntrock et al., 2017; Ruwaard et al., 2012). Supplementary, Ruwaard et al. (2012) emphasize the proportionate effectiveness of online treatments and regular therapy for psychological problems.

EHealth methods are becoming more prominent and popular in the digital age (Kummervold et al., 2008). Since current students, mainly part of the "Millennial" generation, are well acquainted with the use of technology a web-based service can guide students to suitable methods to increase their knowledge and help them address attention problems more effectively (Stellefson, et al., 2011; Van der Heijde et al., 2012a). Moreover, previous research has shown

students' value and need appreciation for personal guidance and self-help (Moolenaar, 2015), therefore, a web-based eHealth tool regarding attention problems could be beneficial. However, an online self-regulating service in order to address attention problems is still missing, both in the current healthcare and academic system.

1.4 Research aim

Therefore, this study aims to develop and evaluate a web-based eHealth tool to address attention problems among students in higher education. This results in a twofold research aim, with emphasis on the evaluation part. Moreover, in order to increase the adoption rate of the eHealth tool, it will be evaluated confirming its user experience, thereby incorporating the relative advantage (i.e. superiority of the innovation), compatibility (i.e. suiting student needs), and complexity (i.e. easy to understand and use) of the eHealth tool (Rogers, 2010). The definition of user experience is described as "a person's perceptions and responses that result from the use or anticipated use of a product, system or service" (International Organization for Standardization, 2019). Hence, the evaluation of the eHealth tool implicates analysing, mapping, and incorporating the perceived user experiences of students. As a result, the overall research question is formulated as: 'What are students' user experiences with a newly developed web-based eHealth tool for attention problems?'.

In order to address this question, this research paper is organized in several chapters. First, Chapter 2 elaborates on the theoretical underpinnings, such as the Centre for eHealth Research (CeHRes) roadmap presented by van Gemert-Pijnen et al. (2011). Furthermore, this chapter emphasizes the manner and importance of formative evaluation of innovations during development, after which, the application of these theories into a conceptual model for this research project is discussed. Finally, Chapter 3 deals with the research approach, including the first step of developing the eHealth tool. Thereafter, to scrutinize this study's overall objective, students' user experiences in regard to the developed eHealth tool will be identified in a qualitative manner, using semi-structured interviews and the think-aloud method. Chapter 4 will summarize the results of this qualitative research, after which they will be further interpreted and compared with existing literature in Chapter 5. Finally, Chapter 6 will provide a closing summary and conclusion, answering the research question.

2. Theoretical background

2.1 The Centre for eHealth Research (CeHRes) roadmap

The development of eHealth innovations is associated with supply- and technology-oriented manner, which results in a limited uptake of the eHealth innovations (Politiek & Hoogendijk, 2014). If a needs-driven approach is considered during implementation, the acceptance of the use of technology will be positively affected (Politiek & Hoogendijk, 2014). Therefore, user-engagement is important for the development of a sufficient user-interface design (Nielsen, 1994; Stone, et al., 2005). In addition, the involvement of stakeholders' knowledge, social values, and standards ensures an integrated knowledge base that strengthens the innovation (Gudowsky & Peissl, 2016). Consequently, a successful innovation focuses on the common needs and characteristics of involved stakeholders, and in specific the end-user (Politiek & Hoogendijk, 2014). The CeHRes roadmap presented by van Gemert-Pijnen et al. (2011) connects user-centred design with eHealth business modelling, as depicted in Figure 1. This roadmap emphasises the importance of stakeholder engagement during the entire development process of an eHealth technology (van Gemert-Pijnen et al., 2011). Therefore, the CeHRes roadmap is a suitable approach for the development of the web-based eHealth tool concerning attention problems
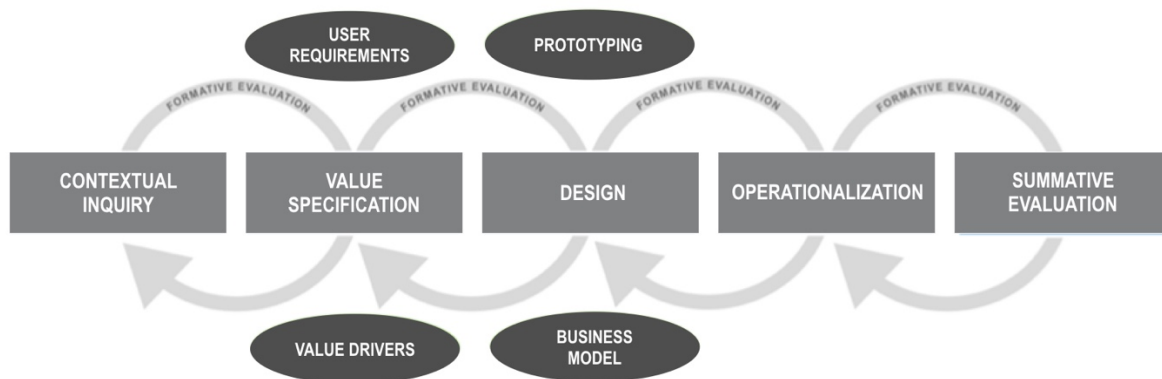
Figure 1: CeHRes Roadmap for the development of eHealth technologies. Retrieved from van Gemert-Pijnen et al. (2011).

In line with the CeHRes roadmap, the complete development of an eHealth technology is structured through five stadia (van Gemert-Pijnen et al., 2011). The first stadium of the CeHRes roadmap implements the contextual inquiry, whereas the environmental factors of the technology are considered, consisting of the importance of identifying the problem and if eHealth is an appropriate solution to this problem (van Gemert-Pijnen et al., 2011). Furthermore, the second stadium in the roadmap is labelled as value specification, containing the identification of the

importance of engaging stakeholders' needs in the development process (van Gemert-Pijnen et al., 2011). The ranking of these specific needs helps to compare and accumulate the values for the development of the design. Following the next stadium, called the design phase, where the contextual inquiry and corresponding identified stakeholders' values are implemented in technology prototypes (van Gemert-Pijnen et al., 2011). Hence, the fourth stadium, known as the operationalization phase, is regarded as the actual implementation of the technology into practice (van Gemert-Pijnen et al., 2011). Finally, summative evaluation elaborates on the end-user's assessment of the actual implementation and the stated impact of eHealth technologies (van Gemert-Pijnen et al., 2011). All these phases are formative evaluated and therefore the development is an iterative and dynamic process.

2.2 Formative evaluation and design quality criteria

Formative evaluation cycles are considered moments of reflection which are used frequently throughout the development process to support the integration of a better product overall (van Gemert-Pijnen et al., 2011). Moreover, formative evaluation of a user-centred design gives stakeholders the ability to identify specific quality needs or issues of user-friendliness for the design and implementation of an eHealth innovation (Herzlinger, 2006). During the design stadium, these formative evaluation phases focus on both heuristic evaluation and user testing (Nielsen, 1993). In which heuristic evaluation centres on identifying usability design problems based on expert reviews, while user testing has the purpose to engage end-user's experiences of the eHealth technology prototype considering e-service quality (Nielsen, 1993).

Although plenty of research has been done in service quality, little has been known about the specification of e-service quality. This could be related to the complexity of e-services. As such, the term e-service quality is defined as: "the extent to which a Web site facilitates efficient and effective shopping, purchasing, and delivery" (Parasuraman et al., 2005, p.217). A literature review provided by Ladhari (2010) considers several studies on e-service quality scales in the area of e-commerce. However, none of these quality criteria are specified for the health sector.

Nevertheless, the CeHRes roadmap assesses design-specific quality criteria for eHealth technologies in particular (van Gemert-Pijnen et al., 2011; Yusof et al., 2008). For this purpose, the CeHRes roadmap has established a specific CeHRes design quality assessment that focuses on system, content, and service quality of eHealth technologies (Nijland, 2011; van Gemert-Pijnen et al., 2011). This CeHRes design quality assessment defines system quality as the usability and safety of the technology, content quality as the meaningfulness and intelligibility of technology, and service quality as the adequate provision of the technology (Nijland, 2011).

2.3 Application of the CeHRes roadmap for this study aim

Since this study aims to develop and evaluate a web-based eHealth tool to address attention problems among students in higher education, incorporating students' user experiences during the development of the eHealth tool is considered valuable. Therefore, the theoretical lens throughout this research establishes on the CeHRes roadmap of Van Gemert-Pijnen et al. (2011) applied to a web-based eHealth tool concerning attention problems. Since previous research identified the consistent occurrence of attentional problems among students, as well as a need for preventive eHealth support in order to assist student, the first stadium of the CeHRes roadmap has already been completed (Dopmeijer et al., 2018; Van der Heijde, et al., 2011, 2012b, 2014, 2015, 2016; Van der Heijde & Vonk, n.d.). Other research elicited and prioritized students' value assessments regarding attention problems, in which the value specification phase of the CeHRes roadmap is covered (Molenaar, 2015).

Therefore, this study applies the CeHRes roadmap to formative evaluate the design phase of the newly developed web-based eHealth tool, by incorporating the CeHRes assessment of design quality, including; system, content, and service quality (Van Gemert-Pijnen et al., 2011). In which, a comprehensive overview of the CeHRes assessment of design quality is provided in Appendix 1.

Furthermore, in order to identify students' user experiences of the newly developed web-based eHealth tool concerning attention problems the following sub-research questions are established:

1. What are students' user experiences regarding *the system* of a developed web-based eHealth tool concerning attention problems, following the CeHRes assessment of design quality?

2. What are students' user experiences regarding *the content* of a developed web-based eHealth tool concerning attention problems, following the CeHRes assessment of design quality?

3. What are students' user experiences regarding *the service* of a developed web-based eHealth tool concerning attention problems, following the CeHRes assessment of design quality?

3. Methodology

3.1 Study design

During a 20-week-period, a prototype web-based eHealth tool concerning attention problems was developed and evaluated in accordance with the CeHRes roadmap (Van Gemert-Pijnen et al., 2011), on the basis of existing research into the contextual background and value specifications of attention-related issues (Molenaar, 2015; Van der Heijde et al., 2011, 2012b, 2014, 2015, 2016; Van der Heijde & Vonk, n.d.). However, the emphasis was shifted to the evaluation part, as the essence of this study consisted of the identification of students' user experiences concerning the newly developed eHealth tool. Therefore, a qualitative user-centred development approach was implemented through both usability testing (i.e. think aloud method) and semi-structured user interviews amongst students.

3.2 Unit of analysis and justification of qualitative approach

Since the entity of focus during this study lies upon formative evaluation of the newly developed eHealth tool, the newly developed eHealth tool as an end in itself is considered the unit of analysis. However, since the evaluation of a service is correlated to a person's assessment with this service (Gray, 2014), the identification of students' user experiences is essential in order to actually evaluate the newly developed eHealth tool. Since this study manifests itself in an exploratory fashion of as user-centred manner on identifying students' user experience, a qualitative approach was the most suitable (Gray, 2014). As emphasized by Arksey and Knight (1999) qualitative methods "examine the context of thought, feeling and actions, and can be a way of exploring relations between different aspects of a situation". Moreover, such a methodology offers the possibility to gauge specific personal knowledge and opinions (Cohen, Manion, & Morrison, 1997). Therefore, the values, expectations and experiences of the students in regard to the newly developed eHealth tool were determined in an in-depth and open-ended manner by adopting qualitative research (Arksey, & Knight, 1999). In which, students were interviewed functioning as the unit of observation.

3.3 Participants, and procedure

Hence, the study population of this research consisted of nine students, who cope with attention problems, aged between twenty-two and twenty-five-years-old, at both universities and universities of applied sciences. The sample size was dependable on the achievement of saturation, in conjunction with time management of this research.

Participants were recruited through the social environment of the researcher using brochure publication (Appendix 2). Furthermore, purposive sampling was used to maximise the variety of students' user experiences (Green & Thorogood, 2018), in which students with specific inclusion criteria varying in age, gender, educational level, or specific causes relating to attention problems (e.g., attention deficit disorder, using concentration influencing medication, low motivation, dissatisfied with study, insomnia, physically and mentally unfit, or substance use) were selected.

Ultimately, on the basis of this sampling strategy, nine students with the appropriate inclusion criteria were approached to be interviewed by using e-mail and phone messages, in which the purpose of research and the interview time management was incorporated (Appendix 3). Moreover, the actual usability testing and user interview sessions were conducted during the months of May and July 2019. Prior to each session voluntary participation, informed consent (Appendix 4), and an explanation of the security manner of handling their data were emphasised. In gratitude to the students' participation, the participants received a twenty-euro bol.com gift voucher.

3.4 Data collection

The specific students' user experiences were identified through both usability testing (i.e. think aloud method) and semi-structured user interviews. The entire interview session lasted about 60 minutes and consisted of three parts. First, a user interview of a semi-structured character was conducted, which provided the opportunity to gauge the students' user experiences regarding the anticipated use of the newly developed eHealth tool (Gray, 2014). During this specific approach of evaluation, students' needs and limitations were considered instead of solely relying on the designer's preconceptions (Kushniruk, & Patel, 2004).

Secondly, usability testing was conducted, which is described as a method of observing the potential end-user with the system (Barnum, 2010, Kushniruk, & Patel, 2004). Involving end-users is an indispensable method of usability, in which immediate information emerges about the user experience and potential usability problems (Holzinger, 2005). In the realm of this study the think aloud method was selected for the usability testing, which is a direct method of usability testing where the interviewee thinks aloud by verbally reporting their thoughts during the actual use of the eHealth tool, with a minimized distortion of the participants thoughts (Beatty & Willis, 2007; Holzinger, 2005; Jaspers, 2009). This method was preferable in order to achieve specific results whether the newly developed eHealth tool is experienced as user-friendly and whether adjustments are needed (Holzinger, 2005; Nijland, 2011). However, as the achieved data during a think-aloud method mainly consists of subjective opinions, potential end-users were crucially incorporated in order to identify representative usability problems (Jaspers, 2009).

Furthermore, Holzinger (2005) emphasises the importance of data triangulation by combining both direct and indirect usability tests. In which a direct method, such as think aloud,

measures the actual use of the system, and indirect approaches inquire the end-user's retrospective opinions (Holzinger, 2005). In addition, Jaspers (2009) addresses the necessity not to interfere the participant during a think aloud session as this may distort the validity and reliability of the data. Therefore, the think aloud method is complemented by a consecutive semi-structured user interview to identify the students' retrospective user experiences.

3.5 Instrument development

3.5.1 Development of the web-based eHealth tool

Throughout this research, a prototype of the web-based eHealth tool concerning attention problems was presented as the website: https://beterconcentreren.nl. The newly developed prototype contained a questionnaire to trace possible causes of attention problems, which ultimately led students to specific informative web pages. Since the essence of this research emphasizes the evaluation of the Etool, the detailed information on the development of the prototype is further elaborated in Appendix 5. In addition, the visual representations of the prototype are shown in Figure 2, 3, and 4. Since heuristic usability inspections need to be combined with user usability tests (Holzinger, 2005), several heuristic analyses were carried out during and after the development of the prototype by the researchers (DA, CvdH, PV) of this study. Subsequently, the identified usability problems were remedied, after which the prototype was accessible for qualitative research into students' user experiences.
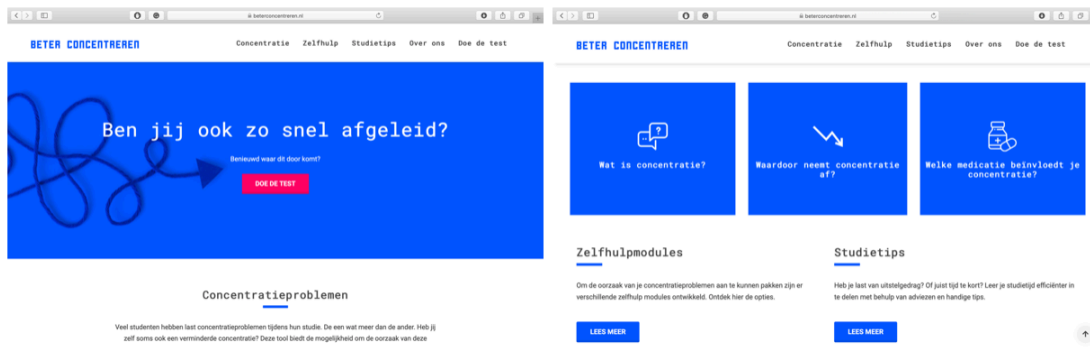
Figure 2a,b: Visual representation of the home page of the website: https://beterconcentreren.nl. (a) First page that pops up when opening the website, (b) block division when scrolling down the homepage.
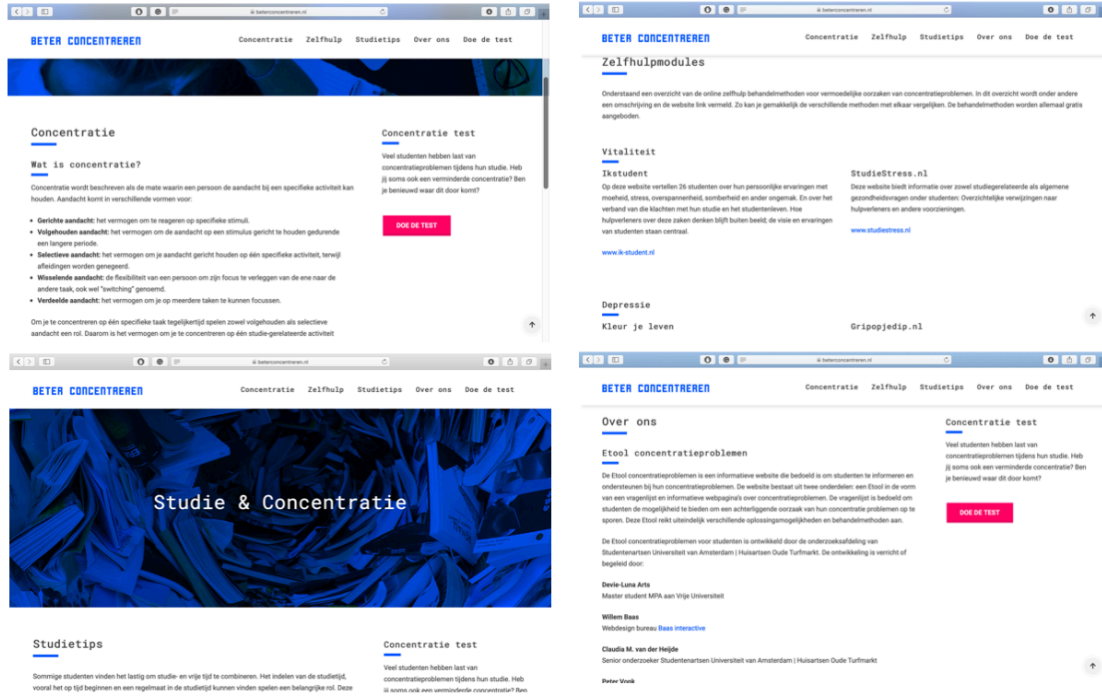
Figure 3a,b,c,d: Visual representation of the general informative pages of the website: https://beterconcentreren.nl. (a) Page on explanation of attention problems, (b) page on self-help modules, (c) page on provided study tips, (d) purposive 'about us' page.
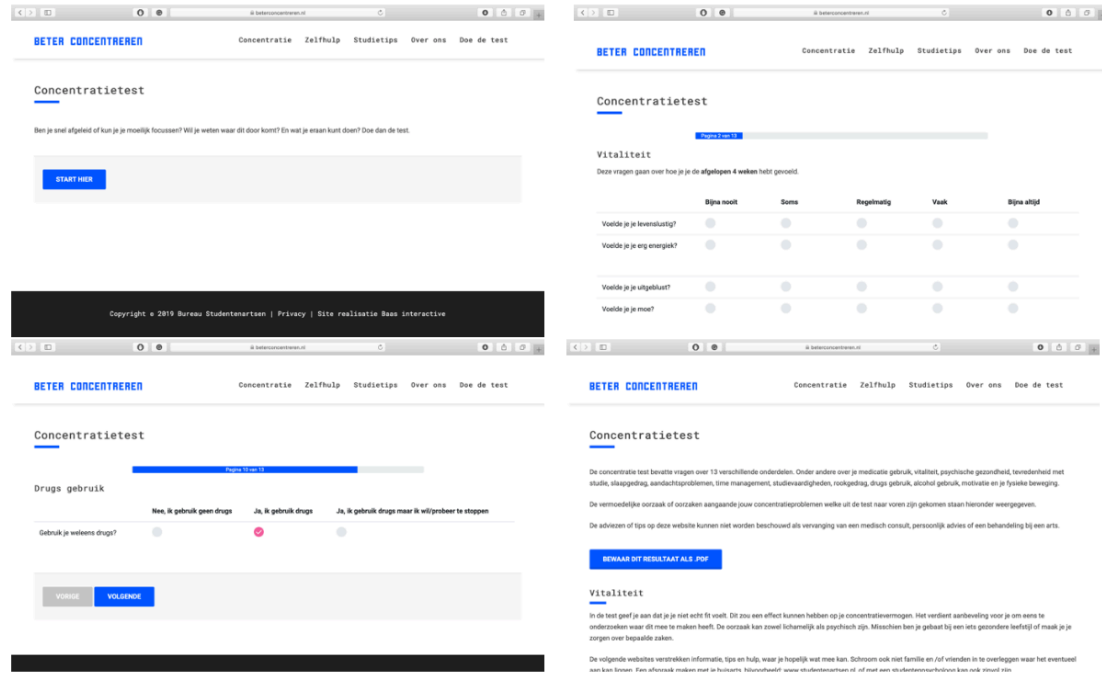
Figure 4a,b,c,d: Visual representation of the test and advice pages of the website: https://beterconcentreren.nl. (a) Opening page prior to start the test, (b) test question about vitality using a Likert scale, (c) test question about drugs using simplified answers such as no, yes, and yes, I do but I want to quit, (d) Part of the advice page showing option to PDF format.

3.5.2 Interview guide development

The interview guide was established on the applied CeHRes assessment of design quality criteria, including: system, content, and service quality. The applied CeHRes assessment of design quality was selected to function as a checklist (Van Gemert-Pijnen et al., 2011), thereby leaving the possibility of providing additions to the design quality criteria based on the students' perceptions. Ultimately, the interview-guide was subdivided into specific parts elaborating on system, content, and service quality. Therefore, the interview guide consisted of open questions regarding the value of the Etool, what is expected from it, whether it has contributed to their prior knowledge about attention problems, how they experienced the technology, and whether they would recommend it to people in their surroundings (Appendix 6).

3.5.3 Coding scheme development

Prior to data analysis, specific selection criteria were established in a coding scheme. The specific codes within this scheme were retrieved from the CeHRes assessment of design quality (Van Gemert-Pijnen et al., 2011). Since the in advance developed coding scheme, analysis was predominantly deductive (Gray, 2014). However, new theories or patterns arose during analysis in which the inductive character of the research emerged (Gray, 2014). The resulted coding scheme was ultimately used to formulate answers in response to the research question (Appendix 7).

3.6 Data analysis

In regard to the data analysis, thematic analysis was applied, which is defined as "a method for identifying, analysing, and reporting patterns (themes) within data" (Braun & Clarke, 2006, p. 6). Table 1 represents the six phases of thematic analysis described by Braun & Clarke (2006), which follow a non-linear approach. Thematic analysis is applicable for both inductive and deductive research, hence this analytical approach is suitable for both data-driven and theory-based research (Clarke & Braun, 2017).

Table 1: Phases of thematic analysis

1. Familiarising yourself with your data	Transcribing data, reading and rereading the data, noting down initial ideas
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code
3. Searching for themes	Collating codes and gathering all data relevant into each potential theme
4. Reviewing themes	Checking if the themes work in work in relation to the coded extracts and the entire data set, generating a thematic 'map' of the analysis
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme.
6. Producing the report	Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of analysis.

Note: Adapted from Braun & Clarke (2006, p. 35)

Throughout this study, phase one consisted of verbatim transcribing the interview audio recordings, in which the cognitive interviews only consisted of comments about the newly developed eHealth tool. Subsequently, during phase two interesting segments of the transcript data were pinpointed by initialising them with specific codes. Thereafter, in phase three the identified codes where collocated into theory-driven themes, in regard to the CeHRes assessment of design quality (Van Gemert-Pijnen et al., 2011). Consequently, phase four was specifically focused on critically evaluating the potential themes by considering their internal coherence and external dissimilarities. The fifth phase emphasized the need to discover the underlying essence of each individual theme, in order to create a story for the report write-up during phase six. Data analysis was carried out both manually and by means of the analytical software program Atlas.ti.

3.7 Validity, reliability, and ethical considerations

In order to conduct quality high research, validity, reliability, and ethical aspects were considered during the research process. The concept of validity is defined as the actual measurement of what is meant to be measured (Gray, 2014). In order to prepare a validated interview guide, first, it was tested among the researchers themselves. During the interview conduction, active listening (i.e. interview tactic including listening, summarizing, and reflecting) provided strong internal validity (Miller & Rollnick, 2002). After the conduction, the interviews were summarized and sent back to the interviewee in order to minimize misinterpretation and thereby increase both internal validity and reliability. For the enhancement of internal validity during the analysis process, data interpretation was strengthened through the use repetitive checks by peer researchers (Gray, 2014; Baarda, De Goede & Theunissen, 2009; Green & Thorogood, 2014). Since these other

peer researchers were not present at the interviews and therefore not influenced by the setting or the interviewee, they provided more objectivity in the coding process.

The ethical considerations within this research involved the privacy, confidentiality, and informed consent of the interviewee (Gray, 2014). Thereby protecting the right to voluntary participation and honouring reasonable promises regarding confidentiality. The participants were asked to sign informed consent and to give permission of audiotaping the interview, whereas afterwards the recordings and transcriptions were deleted (Autoriteit Persoonsgegevens, 2018). The Ethical Committee of the University of Amsterdam approved the study (#2019-EXT-10435).

4. Results

4.1 Participants' characteristics

Nine Dutch students coping with attention problems participated. The participants varied in age between twenty-two and twenty-five-years-old. The gender division was divided between four men and five women. All participants were enrolled for a study programme at either a Dutch university or university of applied sciences. Three participants were diagnosed with attention deficit disorders. Table 2 outlines the participants' characteristics.

Table 2: Participant characteristics (n=9)

Gender	5 females; 4 males
Age range (years)	Median: 23,5 years (range: 22-25 years)
Educational institution (n)	
▪ University	4
▪ University of Applied Sciences	5
Education attainment (n)	
▪ Bachelor degree	8
▪ Master degree	1
Diagnosis (n)	
▪ ADD	1
▪ ADHD	1
▪ Combined type	1

4.2 Thematic overview of students' user experiences

Since the entity of focus during this study consisted of the identification of students' user experiences concerning the newly developed eHealth tool, this specific section elaborates on the achieved students' user experience, occurred usability problems, and provided suggestions for improvement. The results of both the usability testing and semi-structured user interviews were merged and addressed jointly. Three central themes of students' user experiences emerged, namely; (1) the perceived meaningfulness of the eHealth tool, (2) the perceived user-friendliness of the eHealth tool, and (3) the added value to the potential end-user (see Table 3).

Table 3: Overview of the emerged themes and corresponding sub-themes

Theme	Sub-themes
1. Perceived meaningfulness of the eHealth tool	Comprehensibility of the content
	Credibility of information and privacy manners
	Relevance and completeness of information.
2. Perceived user-friendliness of the eHealth tool	Design persuasiveness
	Test execution
3. Added value to the potential end-user	Manner of provided feedback
	Personals' characteristics
	Feasibility of the advisable objectives

4.3 Theme 1: Perceived meaningfulness of the eHealth tool

In general, the way students experience the provided content on the eHealth tool is related to its meaningfulness, in which three subthemes emerged, namely: (1) the comprehensibility, (2) credibility, and (3) relevance of the provided information on the eHealth tool.

4.3.1 Perceived meaningfulness of the eHealth tool: comprehensibility

The students' perceived comprehensibility of the provided information highly depends on the applied writing style, including both language use and specific notation of content. Over all, the students experienced the information as comprehensible partly due to an easily provided language use. Some even mentioned not having noticed the vocabulary:

> *"It is similar to what Kuipers [Dutch soccer referee] once said that if you whistled a match as a referee and after the match you are asked who the referee was, then you whistled a good match. That is what I experience with the language [on this eHealth tool]. Not any clue. However, the information I had to extract from it, I did obtain. So, it is fine." (Quotation from student about not noticed language use)*

Nevertheless, a student deemed the terminology to be elitist, partly due to specific term use that increased the medical jargon of the information. This fact possible affected the students' ability to focus attention on the provided content, in which the perceived meaningfulness was diminished. Although, the utilization of professional and partial scientific-based language is considered to be conducive to the reliability of the information. However, several students indicated the language as currently being on a high level, which implicates a required need for an adapted version in order to make it user-friendly for a less educated population.

In addition, the correct notation of content seems to be a fundamental determinant of the students' comprehensibility. In particular, the text was considered to be static and, in some sense, repeatedly, in which a greater demand for easy-to-read and enjoyably written text has been recognised. Whilst the writing style of the informative pages is generally considered comprehensible, a number of difficulties with the notation of the test questions emerged (see Table 4). These ambiguities render the test questions incomprehensible, which could presumably contribute to incorrect completion of the test and a wrongful provision of the advice. Moreover, the ambiguities appeared both in the phrasing of the question and in the answer options. Furthermore, no consensus could be found on whether the students appreciated the scale change of the answer options. Some experienced it as positive, as it ensured their active focus on the test. However, several students recalled the transformation of the scale as challenging since they responded to the question wrongfully.

Table 4: Students' experience difficulties regarding comprehensibility of test questions (n is number of times mentioned among students)

Topic of question	Students' experienced difficulties
Motivation	- Question contains a vague concept (concept: 'good reasons') - Double negative in questions is confusing - Question lacks the word study
Alcohol	- Imbalanced answer options ('2-3 per week vs. 2-4 per month')
Depression	- More than one concept in a singular question makes it ambiguous
Medication	- No possibility between yes or no hinders the decision-making process for the answer - Unclear what medication is included
Physical activity	- unclear whether power training can be considered as part of heavy intensive exercise - misses clarity of time division in the question
Satisfaction with study	- Question contains a vague concept (concept: 'obtained study skills') - Too little nuance difference between questions
Study strategy	- Too little nuance difference between questions
Time management	- Question contains a vague concept (concept: 'proceed on a regular basis')
Drugs (ab)use	- No possibility between yes or no hinders the decision-making process for the answer
Smoking (cessation)	- No possibility between yes or no hinders the decision-making process for the answer - Too little nuance difference between answer option
Insomnia	- Question was wrongly interpreted (concept: 'problems with early awaken')
Vitality	- Question was wrongly interpreted (concept: 'high-spirited')

4.3.2 Perceived meaningfulness of the eHealth tool: credibility

Students attach value to the involvement of scientific parties, in which especially the engagement of medical experts, as well as scientific researchers of relevant academic institutions were underlined. Nevertheless, the students seemed to be unable to agree unilaterally on the importance of the extensive elaboration of the website's purpose and the presented relevant sources. In particular, most students consider the mere representation of the parties involved sufficient to create a reliable and credible character. While other students attached considerable value to the disclosure of these involved parties, thereby they initially viewed the 'about us' page during their visit to the eHealth tool. In addition, doubts emerged in regard to the added value of the listed references.

Along with the involvement of sources, the credibility is also considered essential when it comes to the security of handling personal information. The eHealth tool was provided with a privacy statement containing the careful handling of personal data. Nevertheless, none of the students made notice of this page, presumably due to this information being placed under a heading at the bottom of the website. Although, some students emphasized the absence of this specific information, subsequently suggesting presenting the privacy statement prior to initiating the test. Since the eHealth tool hardly contains or askes for any personal demographic data, all students seemed to feel secured with their personal information and presumably enhances the meaningfulness of the provided information. However, a student touches on the importance of mentioning that the advice is not to substitute with a medical consultation:

> *"… You have to make it clear that this is not a 100% diagnosis. And even with almost 100% diagnosis, you can also request a second opinion and so on, which means that you never really have 100% certainty. I think that is one of the risks of the internet, because you receive too much information and, therefore, you will start to worry about something that you do not actually possess."* *(Quotation from student about no substitution with medical consultation)*

4.3.3 Perceived meaningfulness of the eHealth tool: relevance

Prior to the actual use of the eHealth tool, several students referred to the limited access of information online or admitted scarcely searched for information owing to unconsciousness or merely disinterest of existing information provision. Therefore, an anticipated need for many different aspects of relevant information was identified. Among other things, the students indicated their preference need for practical tips, a biological explanation of attention problems, information provision concerning the effects of attention-enhancing drugs, demographical comparisons, and experiences stories in regard to attention problems. If the eHealth tool embraces this preference need, the obtained information will specifically enhance the perceived students' relevance.

Concerning the perceived retrospective students' user experience, there seemed to be an incomplete provision of information the student is seeking for. At this point, the anticipated need for practical tips was not yet extensively enough elaborated on. In particular, a student emphasizes his dissatisfaction with the referred website of Leiden University about time management and study strategy, in which the provided information was defined as being overly simplistic. Furthermore, even though the eHealth tool contained a referencing website regarding students' health-related experience stories, the students mentioned the lack of shared stories on the eHealth tool itself. Supplementary, there is still insufficient expansion of the causal relationship

between the presumable causes of attention problems and ability to focus attention, which might have a diminishing effect on the students' incentive to approach their attention problems.

> *"Now I guess a little more like awareness, some kind of oh well okay interesting. However, not that I really thought that if I do this better, it will really allow me to concentrate better. Perhaps if, the effect of sports on concentration and the effect of sleep on concentration, if that is better described then is seems more like an actual approach." (Quotation from student absence of causal relationship)*

In regard to the test, the students mainly perceived the test questions as well as the provided information as relevant. For example, the question concerning physical activity was experienced as positive since the student initially did not know it might affect your capacity to focus attention. Conversely, a preference emerged to adapt the questions about drugs and alcohol in terms of the gradation of the critical value more specifically to the behaviour of the students. Therefore, presumably it appears that students acknowledge their substance use without having the intention to adjust their use. Additionally, the identified absence of a question related to telephone use and social media might emphasis the knowledge students have in regard to the impact of students' overly use of mobile phones.

4.4 Theme 2: Perceived user-friendliness of the eHealth tool

The user-friendliness is associated with the obtained students' user experiences in regard to the ease of use of the newly developed eHealth tool. In which ease of use arises from the design persuasiveness and specific test execution of the eHealth tool.

4.4.1 Perceived user-friendliness of the eHealth tool: design persuasiveness

Presentation of content

In regard to the general use of the website, students especially appreciated having a rustic and well-organised website, because they already experience many stimuli in daily life. As a consequence, the ease of use linked to the general informative pages is mainly associated with the content presentation. The perceived content presentation is dependable on the colour and font usage, headings and menu bar, and the text provision (see Table 5).

Table 5: Students' user experienced strengths and weaknesses relevant to the content presentation

Topic	Strengths	Weaknesses
Colour usage	- Blue and white provide clean, pleasant, and appealing experience - Blue has credible and informative character - Pink colour is alluring in blue frame of homepage and provides immediate trigger to conduct the test	- Heavy contrasts in colours - Blue colour is distracting
Font usage	- Pleasuring and calming effect - Appropriate use of bold font - Positive association with font of headings - Capitalized text on the homepage ensures direct trigger for the test	Too many different fonts
Headings & menu bar	- Maintain rustic and uncluttered design - Limited headings in menu bar - No utilized drop-down menus - Beneficial theme headings	
Text provision		- Abundance of text provision - Absence of compact text, low use of bullet points - Low diversity in sources of information transmission (visualisations & multi media)

Prior to the actual use of the eHealth tool, several students mentioned the anticipated need for low colour use, after which, during the actual use the students experienced the predominant use of blue and white colours as clean, pleasant, and appealing. Such a clean presentation presumably limits the possible challenges of the students being distracted by irrelevant interference. Nevertheless, a student was distracted by the blue colour but emphasized his familiarity with the fact that a blue colour is often associated with better concentration; which was indeed verified by another student who appointed:

"… I think the blue colour always gives a kind of reliable and informative character, as well. Therefore, I think it fits the purpose of the site. In addition, the blue colour also appears in the pictures, therefore it is certainly a coherent design. Furthermore, I also think it serves the purpose in terms of design. Therefore, it seems fine to me." (Quotation from student regarding colour use)

Furthermore, the pink start button as well as the capitalized text were premeditatedly designed into the Ehealth tool to establish a direct trigger to the test. Several students indeed emphasized the immediate trigger to conduct the test through the most striking bright pink colour of the start button in the overall blue frame. Moreover, several students appointed their positive association with the font of the headings and in particular a student mentioned:

"... the first thing you see, capital letters, a question, do the test. Well, I think that will cause a bunch of people to start conducting the test very promptly." (Quotation from student about trigger to conduct test)

Supplementary, the appropriate use of theme headings and menu bars was appreciated. The students specifically acknowledged their gratification regarding the limited use of headings in the menu bar, they would have been distracted through the use of drop-down menus otherwise. Furthermore, a student mentioned noticeable benefits of the use of theme headings:

> *"Something I also appreciated about the results of the test was that you could easily find out in the headings what kind of help [advice] belongs to what, instead of being provided with a bunch of text but that you really do gain insight of okay well this is specific to this genre, in that manner." (Quotation from student regarding theme headings)*

Nevertheless, several students proclaimed themselves to be bored or less concentrated if the information gathering was too excessive. Therefore, a few students came up with the suggestion to provide the possibility to unfold the theme headings whenever one wishes. Ultimately, this suggestion will only provide the specific information the students are looking for, which might lead to a significantly reduced drop out of the students. In addition, students suggested using bullet-points or visualisations as it achieves a richer and more vivid information transfer in a compact manner.

> *"... Mostly the informative texts, in other words what was not personally about you. That was just where I thought it was a lot of text, that is where I would find it amusing if you could switch on some kind of voice that either explains it or ... I always enjoy it when it is sketched in some kind of way." (Quotation from student about visualisation and multimedia use)*

Technical support of the eHealth tool

The name of the website (i.e. beterconcentreren.nl) was indicated as overwhelmingly positive, as it contains the Dutch phrasing of concentrating better, which indeed seemed the term students use when seeking online methods to improve their concentration. Generally, students had a positive association with their guidance through the website, in which they remarked on the supportive manner of providing the option to start the test on every available page of the website. Furthermore, a student preferred an increased use of pop-up messages for less pro-active students. Although, student' satisfaction in regard to no utilized pop-up messages emerged.

Nevertheless, some students noticed minor technical errors causing a less structured guidance of the website. Aside from the fact that the opening of the advice page was not displayed entirely from the beginning, students had a negative experience with closing the advice page and afterwards not being able to trace back the results. This implies the students' interest in the obtained advice. Moreover, a student voiced a wish to implement some kind of message showing that your results will be gone when you exit the screen. However, the eHealth

tool already provided the option to download a PDF of the students test results, of which many students stressed their satisfaction of this option. Nevertheless, during the interviews hardly any of the students took their advantage of the option to download a pdf, probably since they were not occupied with their own computer. In addition, a student expressed his dissatisfaction with the opening of the referred websites, which he suggested should be placed on a new tab instead of the current one. Furthermore, the eHealth tool revealed to currently not perform properly on all internet web browsers (i.e. Safari, Google Chrome, Mozilla Firefox), explicitly Mozilla Firefox was evidenced by a deteriorated presentation of the eHealth tool's content. Despite the fact these technical errors are minor, it negatively affected the students' user experience in regard to the design persuasiveness.

Utilized system for the eHealth tool

Regarding the utilized system, a subdivision between hardware-related and software-related preferences can be made. Currently, there was no consensus among the students as to whether they prefer to utilize a computer or telephone for this eHealth tool. However, most students indicate their phone as a distraction mechanism for social media, therefore, they prefer their computer since it also guarantees their personal privacy.

> *"It seems isolated enough for me, so I can just do it in my room by myself. I would find it unpleasant on my phone. Because then you could click some of the complaints you have while someone is watching. Therefore, I would rather use a laptop where I can secure it against others." (Quote from student about preference to utilize computer)*

In terms of the students' software-related preferences, several students had no preferential interest in either an application or a website because in their opinion these are identical. Nevertheless, certain students refer to the dysfunctionality of a website's content presentation using a telephone. Hence, the choice to embed the eHealth tool to address attention problems in a website might be of positive influence for the adoption of the technology.

4.4.2 Perceived user-friendliness of the eHealth tool: test execution

During the execution of the test questionnaire on the eHealth tool, the students needed approximately five to nineteen-minutes to complete the test, with an average around nine minutes (see Figure 2). Most students easily completed the test and experienced it as short. Although, an absence of a time indication prior to the test was identified, which could, as acknowledged by a student, negatively influence the start of the conduction of test. Nevertheless, a student, who completed the test as one of the fastest, experienced it as a lengthy test. Therefore, the experience of time duration is potentially personally influenced.

.... Average time duration
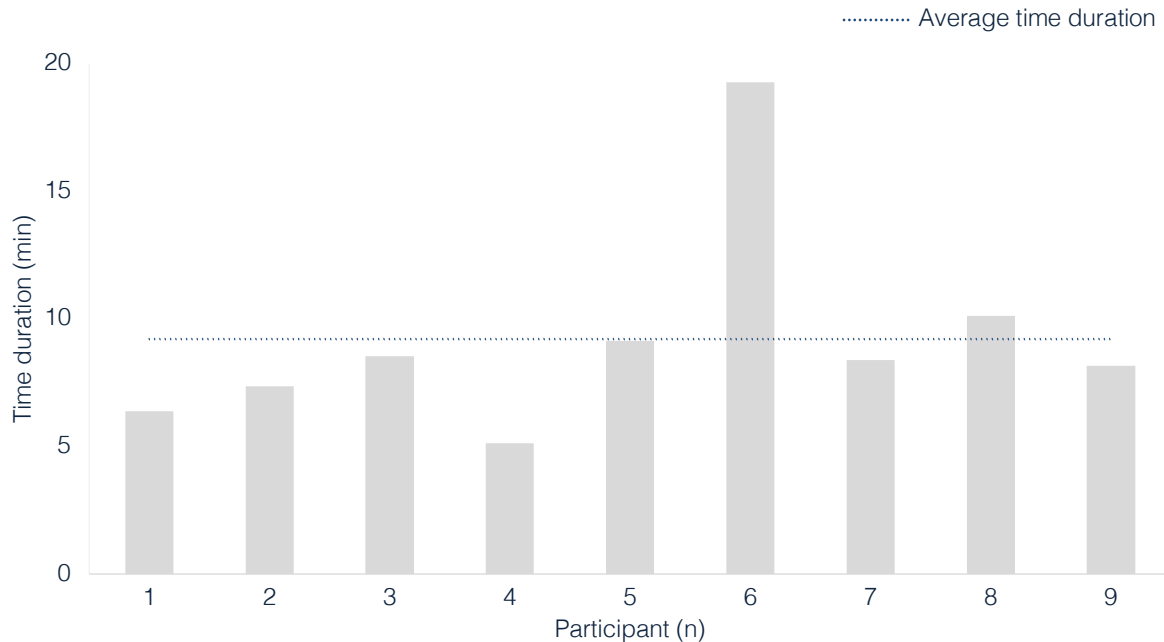
Figure 5: Time duration of the test. The grey boxes illustrate the participant specific time duration and the dotted line indicates the average time duration of 9.21 min.

4.5 Theme 3: Added value to the potential end-user

Although the opinions of the students were heterogeneous, students mainly obtained the most added value from the test and the accompanying advice, as this provided them with a personalised comprehensive overview of causal relationships in terms of their attention problems. However, the encouragement of the actual incentive to approach is highly dependable on the manner of provided feedback, the personals' characteristics, and the feasibility of the advisable objectives.

4.5.1 Added value to the potential end-user: Manner of feedback

The method of providing feedback has a substantial influence on the interpretation of the student. Prior to the interview sessions, several students indicated the advice being general and neutral since it was provided by a computer system. However, approximately all students preferred obtaining supportive feedback in a personal customised manner. In addition, some students mentioned being confronted with the information of the test and advice, however, none of these students experienced this as a real nuisance. In fact, one student indicated it as an important

element to alert the students. In particular, the students emphasized the advice being of positively enhanced influence on the acceptance and confirmation of their complaints and immediately encouraged them to approach their problems. Therefore, some students positively remarked on the use of motivational providing feedback.

"I noticed that in fact almost every sentence started with 'it can be difficult from time to time' or 'it might be pleasant now and then', which is just a little bit like the top tip method. At least I thought to read this for a bit. Firstly, something pleasant about it or maybe that it does not matter that much. And afterwards, however it can be a hindrance for yourself if you have a bad motivation and you should go and talk to your student counsellor. Therefore, I thought it [the advice] was good." (Quotation from student about notation of advice)

4.5.1 Added value to the potential end-user: Personal characteristics

However, the students themselves all have specific personal characteristics being of influence to the actual impetus for an approach. Certain students indicate their disagreement or lack of agreement with their obtained advice and would therefore not pursue their advice. Hence, one may observe that the actual impetus for an approach depends on the student's motivation for solving his or her attention problems. For example, some students mentioned no need for tackling their problems even though their academic performance is hampered, or due to laziness they did not feel obligated to immediately start the approach. Even though, the eHealth tool may provide the students with some kind of options or tips of advice, eventually students mention the incentive to approach being upon yourself.

4.5.2 Added value to the potential end-user: Feasibility of objectives

Preliminary, the student recalled on the impetus of approach being personal and dependable on the feasibility of the advice. Therefore, the feasibility of the objectives may have a strong impact on the student's specific incentive to approach their problems. Subsequently, the students defined the eHealth tool being merely a selection method in providing many different options to attempt without actually encouraging them towards an effective approach. On the other hand, the students were pleased the eHealth tool did not provide a direct obligation to actually tackle their problems. This presumably also reflects the tendency of students not to feel the impetus to tackle their problems from their own personal perspective.

5. Discussion

The study was aimed to develop and formative evaluate of a web-based eHealth tool to address attention problems among students in higher education. Since a successful eHealth tool should provide clear added value for the relevant stakeholders, in particular the end user (Politiek & Hoogendijk, 2014), the eHealth tool has not solely been analysed as a tool in itself, but the contextual added value for self-sufficiency of attentional problems was also addressed. Therefore, the eHealth tool has been developed and evaluated on the basis of the CeHRes roadmap and the associated user-engagement (Van Gemert-Pijnen et al., 2011). The involvement of students during formative evaluating the newly developed eHealth tool has contributed to the identification of specific quality needs or issues of user-friendliness for the design and thereby presumably increasing the usability of next prototypes (Herzlinger, 2006).

Moreover, the study findings demonstrate that the newly developed web-based eHealth tool obtained students with an added value of online self-sufficiency in case of attention problems. In particular, the students were directly triggered to conduct the test due to specific colour use. Afterwards, the students specifically appreciated the personal advice in order for the acceptance and confirmation of their complaints. Nonetheless, usability problems emerged. The usability problems were mainly in the eHealth tool's meaningfulness with regard to the comprehensibility (unclear information) and relevance (lack of experience stories), and its user-friendliness (i.e. technical errors, too much text provision, low visualisations, and unclear navigation).

5.1 Meaningfulness of the eHealth tool

In regard to the meaningfulness of the eHealth tool, the students perceived this as incomplete. Specifically considering the limited practical study tips, absence of experiences stories and non-existing question regarding phone use and social media. Concerning the latter, research emphasis the reduction of academic efficiency among college students caused by excessive social media use (Wang, Chen, & Liang, 2011). In addition, several medical specialists at the Student Medical Service of UvA (personal communication, July 8, 2019) appointed the excessive social media and telephone use among students of important to consider. Therefore, supplementing a question concerning the usage of mobile phones and social media is presumably deemed to be meaningful and of added value.

In addition, content ambiguities occurred which rendered the test questions as incomprehensible. According to Monkman & Kushniruk (2015) it is considered crucial to use the correct eHealth literacy for the development and success of technology, in which the term *eHealth literacy* is described as "the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a

health problem" (Norman & Skinner, 2006). Especially, since these ambiguities could presumably contribute to incorrect completion of the test and a wrongful provision of the advice the correct use of eHealth literacy is imperative.

5.2 User-friendliness of the eHealth tool

Previous research has explored specific usability factors related to a student-centred website, highlighting the importance of emphasizing colour and font usage, clear definition of objectives, stimulating visualization, and the essence of interactivity and navigation (Nathan, Yeow, & Murugesan, 2008). In addition, preference lies in cooler colours (Cyr, Head & Larios, 2010), with the colours blue, green and white being considered suitable for health-related websites (Maguire, 2011). Furthermore, the participants of this research experienced the eHealth tool as clear and uncluttered, partly due to colour use. As emphasised during the think-aloud sessions, the small amount of pink in the test button gave the participants the extra trigger to start the test. Therefore, the colours of the eHealth tool are presumably considered well chosen. However, the participants mentioned ambiguous information, abundance of text provision and, thereby, a lack of graphic and multimedia use. As a result, the eHealth tool apparently neither meets the standards and values of the participants, nor the usability factors regarding a student-oriented website (Nathan et al., 2008).

5.3 Added value to the potential end-user

Since the value of students and their need for appreciation for personal guidance and self-help already emerged from previous research (Moolenaar, 2015), it is presumably no coincidence that students gained the most added value from the test which provided them with personalised advice. Currently, educational institutions offer the services of a student counsellor or psychologist as part of their approach to the welfare of students. Hence, the rising prevalence of attention problems and incline of enrolled students (Dienst Uitvoering Onderwijs, 2018), student psychologists are dissatisfied with the extent to which they can adequately help students with their current capacity (Interstedelijk Studenten Overleg, 2016). As the workload of health professionals has increased significantly, this leads to the inability to provide sufficient personalised care, leading to longer waiting times. In addition, professors play a contributing role in identifying academic difficulties experienced by students or the referral to health professionals. In addition, professors are not capable of providing individual academic advice. Consequently, the development of this eHealth tool regarding students' attention problems could be of added value for the improvement of the personalised self-sufficient care process (Rijksoverheid, 2018; Nictiz & Nivel, 2018).

Nevertheless, the actual impetus for an approach may be dependable on the personal characteristics of the individual student. This is indeed verified by the transtheoretical approach of Prochaska and DiClemente (2005), in which individuals transit uniquely through five different processes of health behaviour (i.e., precontemplation, contemplation, preparation, action, and maintenance). Applying this model to the newly developed eHealth tool and its provided advice, the students' incentive to approach their problems is reliant on their motivational readiness. However, the used tailoring methods (e.g. consciousness raising, self-reevaluation, and self-liberation) presumably enhanced the students' particular stage of health behavioural change (Prochaska & DiClemente, 2005).

In addition, the manner of feedback provision also affected the perceived added value of the students. Student positively experienced the provision of customized motivational feedback for the incentive to approach their problems. Furthermore, research reveals the importance of personal customized tailoring in order to increase the perception of the provided advice and its relevance to the individual student (Lustria, et al., 2009).

5.3 Strengths & limitations

A major strength of this research is the combination of both direct and indirect usability testing. Applying these methodologies in a parallel manner gave the opportunity to gain in-depth understanding of the perceived students' user experiences. Furthermore, complementing the direct method with a consecutive semi-structured user interview limited the distortion of validity and reliability of the obtained data during the think aloud session (Jaspers, 2009). In addition, this combined qualitative approach increased the triangulation of data (Holzinger, 2005).

However, a methodology limitation is regarded to the unnatural situation of a think aloud session (Nielsen, 2012). Generally, people think more in a self-conscious kind of manner when it comes to problem-solving thinking. Therefore, the think aloud sessions were complex to measure since it required the students to actively maintain their monologue (Padilla, & Leighton, 2017). In the realm of this study, not all students were equally extensive in expressing their thoughts. This made it emphatically difficult for the researcher, especially since Jaspers (2009) emphasised the importance not to hinder the participant during a think aloud session. This underlines the fact that the researcher of this study did not possessed the knowledge to conduct the appropriate user tests (Kujala, 2003). In order to vividly prepare the students for a think aloud session, an explanation demo video could have been shown (Nielsen, 2014).

Since the study population was relatively limited, the perceived students' user experiences in regard to the newly developed eHealth tool cannot be generalised. However, since a user-centred qualitative approach was applied, this was not expected either. In addition, research by Nielsen (2000) shows that with five participants, roughly 85% of the usability problems will be detected. Therefore, the nine participants of this research approximately identified most usability problems. Nevertheless, since the group of participants had a complete

variety in personal factors it was considered a representative of the average student in higher education, which is indeed the target group of the newly developed web-based eHealth tool. Therefore, the perceived results of this research might be of value for the development of several other web-based innovations. This emphasizes that eHealth technologies, that also focus on students in higher education, could consider the identified students' user experiences as a starting point or perspective for their own research. Especially, since the obtained values and needs within this research might be similar for other eHealth technologies aiming for students as potential end-user. Although, it could also be beneficial to consider the identified students' user experiences for non-health-related student-centred websites, since research by Nathan et al. (2008) identified similar usability preference needs of students.

Throughout this research the CeHRes roadmap and corresponding assessment of design quality were applied in order to structurally evaluate the newly developed web-based eHealth tool (Van Gemert-Pijnen et al., 2011), although it was not assessed whether other design approaches are better. However, the use of the CeHRes roadmap as the theoretical lens of this research provided the opportunity to identify specific user experiences of student within their own view and context in regard to the newly developed eHealth tool for attention problems. Additionally, since after the researcher's heuristic evaluations of the prototype several usability problems and preferences emerged during the user tests, it was considered of essential value to combine these evaluation methods. Therefore, as recommended by Holzinger (2005) the involvement of both heuristic usability inspections and user usability tests was a definite strength of this research.

Furthermore, the specific CeHRes assessment of design quality elaborates on the system, content, and service quality. Those three criteria all contain many sub-criteria which are divided according to a linear distribution (see Appendix 1). However, for the evaluation of the newly developed eHealth tool in regard to this research, the specific sub-criteria of the CeHRes assessment of design quality were not just a list of categories but that they were merely interrelated. Particularly, some sub-criteria were found to have a presumable overlap or instead difficult to be distinguished. As a result, it was difficult to thematically categorise the students' user experiences on the basis of the three predetermined criteria (i.e., system, content, and service) of the CeHRes assessment of design quality. In the context of this research, the students mainly appointed on the meaningfulness, user-friendliness, and added value of the eHealth tool. The perceived meaningfulness could be mainly allocated to the content quality, as well as adding it up with the credibility and reliability criteria of the service quality. In addition, the perceived user-friendliness is considered a partial combination of system quality (i.e. user-friendliness and design persuasiveness) and the responsiveness aspect of service quality. Last, the added value to the potential end-user is related to the perceived usefulness, social dynamics and psychological influence of the system quality category.

5.4 Recommendations for the eHealth tool

The usability problems need to be remedied in order to limit the potential interruptions for the uptake of the newly developed web-based eHealth tool into practice. After the design usability problems have been addressed, the web-based eHealth tool regarding attention problems may be implemented, following the operationalisation phase of the CeHRes roadmap Van Gemert-Pijnen et al., 2011). Although the students' user experiences in regard to the utilized prototype of the newly developed web-based eHealth tool throughout this research may represent the tool being feasible for self-sufficiency of attention problems, the uptake in an actual student environment are unknown. Therefore, after implementation of the revised eHealth tool summative evaluation into the actual use and user-friendliness is recommended in order to gain more insight about the eHealth tool's long-term acceptance. In order to monitor actual user behaviour, data logging, beta testing, and online surveys can be used (Abras et al., 2004; Fine, 2002). However, reflecting the creating awareness for students' wellbeing part of the action plan (Dopmeijer et al., 2018), marketing initiation with regard to the eHealth tool is essential.

5.5 Recommendations further research

Since this study only elaborated on the obtained students' user experiences, the effectiveness or impact of the eHealth tool on the actual incentive to approach attentional problems is not assessed. Therefore, further research should elaborate on whether the eHealth tool has the intended impact on the students. In addition, a required need for an adapted version in order to make it user-friendly for a less educated population was identified. This is verified by medical specialist and language expert F.J. Meijman (personal communication, May 17, 2019), who also addresses the importance of reviewing the comprehensibility of information of both the general pages and the test among lower educated people (i.e. perhaps secondary education). Additionally, F.J. Meijman (personal communication, May 17, 2019) evaluates the limited scope of the target population, as to him the eHealth tool can be of prospective added value to graduated students as well. These factors could increase the societal impact of the eHealth tool by broadening its scope to a more diverse audience.

6. Conclusion

The overall objective of this research was to develop and evaluate a newly developed web-based eHealth tool to address attention problems among students in higher education by analysing, mapping, and incorporating the perceived user experiences of students. Currently, the obtained students' user experiences revealed several usability problems of the eHealth tool. The usability problems of the eHealth tool were primarily in the meaningfulness of the eHealth tool's comprehensibility and relevance, and the user-friendliness of the eHealth tool. Concerning the theoretical lens of this research these usability problems mainly arose in both content and system quality. In addition, the eHealth tool, and in particular the test and its advice, appeared to possess considerable added value for the students. Nevertheless, the students' impetus to approach their problems is reliant on their motivational readiness. Therefore, concluding the quality of service of the eHealth tool being potentially perceived as useful, including specific personalized motivative support. After the usability problems will have been remedied, the web-based eHealth tool to address attention problems among students in higher education might be considered a feasible tool to provide students with self-sufficiency in case of attention problems.

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Appendices

CeHRes guideline for the development of sustainable eHealth technologies, the design phase.

system quality (the degree to which the user assesses the technology as functional and free of discomfort or trouble):

User-friendliness:
- Ease of access: availability (service is provided at all times), equitability (service is for everyone), accessibility (easy log-in procedure, findability), speed (the ease and speed of accessing the eHt)
- Ease of use: simplicity of technology (how easy it is to understand and comprehend the system's functions)
- Absence of technical errors: absence of malfunctioning features
- Clear navigation structures: clear presentation of information (conveniently arranged, menu bar and headings)
- Efficient search functionality availability
- Efficient feedback channels: automation functions such as automatic replies
- Push factors: notification of newly available information of interest based on the user's profile
- Provision of technical support
- Readability of text: appropriate font size

Safety & technical security:
- Privacy and confidentiality assurance
- Encryption: data transmission security level
- Authentification: identification of users via username and password
- Interoperability

Design persuasiveness:
- lens for design (design with intent) perspective for design related to user requirements', values, needs, capabilities and behaviour change
- Presentation of content:
  - instructive, declarative
  - colours, symmetry

- empathic, affective, simplifying (step by step) - tunnelling (ecoaching)
        - tailoring/customization
        - suggestion/information at right moments
        - self-monitoring (support and awareness)
    - Observation (surveillance, Hygiene Guard tracks hand washing; rewarding compliance)
    - Conditioning (reinforcement, persistence)

Content quality (the degree to which the user assesses the information as meaningful):
- Accuracy: information is up-to-date
- Evidence-based: information is based on theories or standards (inclusion of references, use of behaviour change techniques)
- Relevance: provision of information the user is looking for; information is tailored to individual users' characteristics, needs or preferences
- Comprehensibility: provided information is understandable (appropriate language, avoid medical jargon)
- Completeness: provision of sufficient information
- Language and ethnicity: multi language delivery and culture conscious information; language expectancy
- Disclosure: the information context is clear for the user (the information source is made known)

Service quality (the degree to which the user assesses the service as adequately provided):
- Perceived usefulness: the service is of importance (has benefits to the user)
- Responsiveness: ability to provide prompt service (timely)
- Social dynamics: provision of motivational feedback (praise for good work, answering questions, reciprocity, etc.
- Psychological influence: support feelings, empathy, emotions, etc.
- Reliability: the service is provided dependably; keeping on to agreements (e.g., if the service provider says that the service will be provided within two working days, then hold on to that agreement)
- Credibility: the provider of the service is familiar and trusted (e.g., health risk assessment tools are valid)

Brochure publication for participant recruitment

Ben je <u>student</u> en wil je meewerken aan een <u>websiteonderzoek</u>?

Je ontvangt als bedankje een bol.com cadeaubon t.w.v. €20 euro.Toch mooi meegenomen;)

<u>We zoeken studenten die voldoen aan de volgende kenmerken:</u>

- Je hebt last van concentratieproblemen
- EN Je kunt je vinden in één van de volgende aspecten:
    - Je gebruikt medicatie voor AD(H)D, slaapmiddelen, kalmerende middelen en middelen tegen psychische stoornissen, pijnstillers, spierverslappers, allergie medicijnen of hoestmedicatie
    - Je voelt je lichamelijk of psychisch niet fit
    - Je bent niet tevreden met je studie of merkt dat je gedemotiveerd bent
    - Je ervaart problemen met je studiestrategie of de combinatie van studie en vrije tijd
    - Je rookt of gebruikt drugs
    - Je slaapt slecht
    - Je hebt AD(H)D

INTERESSE?

Stuur dan een e-mail naar
d.l2.arts@student.vu.nl

<u>Informatie onderzoek</u>

Tijdsduur: 1 uur
Locatie: in overleg

Appendix 3

Recruitment emails to participants, including the purpose of the research, the interview time management, the voluntary participation, and an explanation of the security manner of handling their data.

Beste Heer/Mevrouw,

Tijdens dit interview worden er enkele vragen gesteld betreffende de verwachtingen, inhoud en gebruiksvriendelijkheid van een Etool voor studenten met concentratieproblemen in hoger onderwijs.

Uit voorgaand onderzoek blijkt dat Nederlandse studenten een steeds hogere druk op hun mentale gezondheid ervaren. Dit manifesteert zich in vermoeidheidsklachten, angstaanvallen en aandachtsproblemen. Uit een onderzoek van de Universiteit van Amsterdam (UvA) en de Hogeschool van Amsterdam (HvA) bleek dat 29% van de 5169 deelnemende studenten worstelen met aandachtsproblemen. Omdat studenten in het digitale tijdperk zijn opgegroeid, kan een web-gebaseerde dienst studenten naar geschikte methoden leiden en hen daarmee ondersteunen om hun kennis te vergroten en aandachtsproblemen beter te kunnen aanpakken. Een zelfregulerende dienst met betrekking tot aandachtsproblemen bij studenten ontbreekt echter nog in het huidige systeem, daarom is een Etool ontworpen en willen we door middel van dit interview de mening van de student meenemen in het verdere ontwikkelingsproces.

Tijdens het interview zal naar algemene persoonlijke achtergrondinformatie worden gevraagd. Het interview zal ongeveer 60 minuten duren. Het afnemen van het interview is geheel vrijwillig.

Uw gegevens worden anoniem verwerkt. De gegevens die de studie zullen opleveren worden van persoonlijk te herleiden informatie ontdaan en van daaruit kan het worden gebruikt voor publicaties of vervolgonderzoek. De geluidsopname zal na transcriberen gewist worden.

Alvast hartelijk dank voor uw deelname,

Namens het onderzoeksteam van Studentengezondheidszorg, UvA
Devie-Luna Arts, student Management, Policy Analysis & Entrepreneurship in Health & Life Sciences

TOESTEMMINGSFORMULIER (informed consent)

Betreft: medewerking aan een onderzoek naar de gebruiksvriendelijkheid van een Etool voor studenten met concentratieproblemen uit hoger onderwijs.

Beste deelnemer,

Voordat het onderzoek begint, is het belangrijk dat u op de hoogte bent van de procedure die in dit onderzoek wordt gevolgd. Lees daarom onderstaande tekst zorgvuldig door en aarzel niet om opheldering te vragen over deze tekst, mocht deze niet duidelijk zijn. De onderzoeksleider zal eventuele vragen graag beantwoorden.

Doel van het onderzoek

Het doel van het onderzoek is te analyseren wat de kwaliteitsbeoordelingen zijn van studenten aangaande de ontwikkelende Etool voor studenten met concentratieproblemen uit hoger onderwijs.

Gang van zaken tijdens het onderzoek

Dit onderzoek zal bestaan uit drie onderdelen, gedurende ongeveer één uur. Tijdens dit onderzoek zullen er eerst een aantal globale vragen worden gesteld over uw algemene persoonlijke achtergrondinformatie en uw verwachting van een Etool voor concentratieproblemen. Daarna zult u op een computer de Etool doorlopen en de mogelijkheid krijgen om positieve of negatieve punten hardop te benoemen. Na het verloop van de Etool zullen er vragen worden gesteld over uw persoonlijke ervaring met de Etool.

Vrijwilligheid

Als u nu besluit af te zien van deelname aan dit onderzoek, zal dit op geen enkele wijze gevolgen voor u hebben. Als u gaandeweg het onderzoek besluit om te stoppen, dan kan dat op elk moment, zonder opgaaf van redenen en zonder dat dit op enige wijze gevolgen voor u heeft. U kunt binnen 7 dagen na het onderzoek verzoeken om uw onderzoeksgegevens te laten verwijderen.

Ongemak, risico's en verzekering

Zoals bij elk onderzoek van de Universiteit van Amsterdam geldt een standaard aansprakelijkheidsverzekering.

Uw privacy is gewaarborgd

Uw persoonsgegevens (over wie u bent) blijven vertrouwelijk en worden niet gedeeld zonder uw uitdrukkelijke toestemming. Uw onderzoeksgegevens worden nader geanalyseerd door de onderzoekers die de data hebben verzameld. Onderzoeksgegevens die worden gepubliceerd in wetenschappelijke tijdschriften zijn anoniem en zijn dus niet tot u te herleiden. Volledig geanonimiseerde onderzoeksgegevens kunnen worden gedeeld met andere onderzoekers.

Nadere inlichtingen

Mocht u vragen hebben over dit onderzoek, vooraf of achteraf, dan kunt u zich wenden tot de verantwoordelijke onderzoeker; Devie-Luna Arts (T: +316 24 453 024 of E: devieluna@gmail.com, Oude Turfmarkt 151, 1012 GC Amsterdam). Voor eventuele formele klachten over dit onderzoek kunt u zich wenden tot het lid van de Facultaire Commissie Ethiek (FMG) van de Universiteit van Amsterdam.

Met vriendelijke groet,

Devie-Luna Arts

T O E S T E M M I N G S V E R K L A R I N G

Dit formulier hoort bij de schriftelijke informatie die u heeft ontvangen over het onderzoek waar u aan deelneemt. Met ondertekening van dit formulier verklaart u dat u de deelnemersinformatie heeft gelezen en begrepen. Verder geeft u met de ondertekening te kennen dat u akkoord gaat met de gang van zaken zoals deze staat beschreven in de informatiebrochure.

Voor verdere informatie over het onderzoek, kunt u zich wenden tot de verantwoordelijke onderzoeker, Devie-Luna Arts. Voor eventuele klachten over dit onderzoek kunt u zich wenden tot het lid van de Commissie Ethiek.

Aldus in tweevoud getekend

[DEELNEMER]

- Ik ben 16 jaar of ouder.
- Ik heb de informatie gelezen en begrepen.
- Ik stem toe met deelname aan het onderzoek en gebruik van de daarmee verkregen gegevens.
- Ik behoud het recht om zonder opgaaf van reden deze instemming weer in te trekken.
- Ik behoud het recht op ieder door mij gewenst moment te stoppen met het onderzoek.

....
Naam deelnemer   handtekening deelnemer

....
Datum

[ONDERZOEKER]

- Ik heb de deelnemer geïnformeerd over het onderzoek.
- Ik ben bereid nog opkomende vragen over het onderzoek naar vermogen te beantwoorden.

....
Naam onderzoeker   handtekening onderzoeker

....
Datum

Appendix 5

Development of the web-based eHealth tool to address attention problems. Background information for the questionnaire and web pages of the developed eHealth technology

During the first part of this research a prototype of the web-based eHealth tool was developed and presented as the website 'beterconcentreren.nl'. The developed prototype contained a questionnaire to trace possible causes of attention problems, which ultimately led students to specific informative web pages. These web pages were intended to inform about various causes of attention problems and to provide different solution options and treatment methods.

The background information for the questionnaire and web pages were written by the researcher (DA) of this study. The information content for the questionnaire was derived from previous research on the frequency of students experiencing attention problems, the correlation with other health problems, and students' value assessments regarding attention problematic (Molenaar, 2015, Van der Heijde, et al., 2011, 2012b, 2014, 2015, 2016; Van der Heijde & Vonk, n.d.). In which, Table 3 provides an overview of the used scales in the eventual content for the questionnaire.

In addition, the structural and visual choices of the web-based technology were devised by the researcher (DA) of this study. Thereafter, Baas Interactive, a web design agency cooperated and developed the web-based technology. During and after the development of the prototype, multiple analyses and evaluations were performed mainly by the researcher (DA) and finally by the supervisors (CvdH, PV) in order to limit the existing usability problems before starting the qualitative analysis.

Table 3: Overview of validated used scales in the eventual content for the test questionnaire.

Concepts	Used scale	Author(s)	Sample item	Number of items	Alpha Sample 1	Alpha Sample 2	Alpha Sample 3
Vitality	SF-36 (subscale)	Aaronson et al. (1998)	How much of the time during the past four weeks…. Did you have a lot of energy?	4,00	.84	.74	.82
Depression	K-6	Kessler et al. (2002)	In the past month, have you felt worried, nervous, tense or anxious for the greater part of the time?	6,00	.87	.86	.87
Satisfaction with study	Satisfaction with study	Van der Heijde et al. (2015)	My learning experiences at the university make me feel: …	6,00	.86	.83	.85
Study Strategy	SMART (subscale)	Kleijn, Topman, & Ploeg. (1994)	While studying, I regularly check what will be asked and how it will be asked during the exam	5,00	.83	.70	
Time Management	SMART (subscale)	Kleijn, Topman, & Ploeg. (1994)	I have a hard time combining study and leisure	4,00	.83	.70	
Insomnia	ISI	Morin (1993)	How satisfied/dissatisfied are you with your current sleep pattern?	7,00	.90	.91	
ADHD	DSM-5 ASRS	Ustun et al. (2017)	How often do you have trouble concentrating on what people say to you, even though they talk to you directly?	6,00	.63	.72	.70
Alcohol (ab)use	AUDIT-C (subscale)	Bush et al. (1998)	How often do you have a drink containing alcohol?	3,00	.98		
Motivation	SIMS (subscale)	Guay, Vallarand, & Blanchard, (2000)	Why are you currently engaged in this activity? I do this study, but I am not sure it is a good thing to pursue it	4,00	.77	.78	.83
Drugs (ab)use	Drugs (ab)use	-	Do you ever use drugs?	1,00			
Smoking (cessation)	Smoking (cessation)	-	Do you ever smoke?	1,00			
Medication	Medication	-	Do you take medication that could affect your ability to concentrate, assess or react?	1,00			

Appendix 6

Interview guide for semi-structured interviews (in Dutch)

Introductie	
Intro & doel onderzoek	Uit een onderzoek van de UvA en HvA blijkt dat 29% van de 5169 deelnemende studenten worstelen met concentratieproblemen. Omdat studenten in het digitale tijdperk zijn opgegroeid, kan een web-gebaseerde dienst studenten naar geschikte methoden leiden en hen daarmee ondersteunen om hun kennis te vergroten en aandachtsproblemen beter te kunnen aanpakken. Een zelfregulerende dienst met betrekking tot aandachtsproblemen bij studenten ontbreekt echter nog in het huidige systeem, daarom is een Etool ontworpen en willen we door middel van dit interview de mening van de student meenemen in het verdere ontwikkelingsproces.
Onderwerpen	Eerst zullen een aantal algemene vragen worden gesteld over jouw ervaring met concentratieproblemen. Vervolgens zal er worden ingegaan op jouw verwachtingen van een Etool over concentratieproblemen waarna je de Etool ook daadwerkelijk zult gaan gebruiken. Op het te beëindigen zullen er vragen worden gesteld over jouw ervaring met de Etool. Geen rechten verbonden aan resultaat op website, niet te verwarren met dokters consult
Anonimiteit & vertrouwelijkheid	Dit interview is anoniem, dat wil zeggen dat jouw persoonlijke gegevens niet gebruikt of genoemd zullen worden.
Vrijwillige deelname & vroegtijdig stoppen	Als je tijdens het interview besluit dat je niet meer verder wilt gaan, dan mag je dat ten alle tijden aangeven. Wij zullen dan stoppen met het interview.
Opname	Vind je het goed dat dit gesprek wordt opgenomen op?

Topics, centrale vragen en subvragen	
Voorafgaand aan Etool gebruik	
1. Demografische gegevens Topics: - Gender - Leeftijd - Studie - Studiejaar - Studieniveau	Kun je kort iets over jezelf vertellen? Kun je iets over je studie vertellen?

- Universiteit of Hbo - Diagnose ADHD/ADD	

2. Algemeen
 	
Topics:
- Concentratieproblemen
- Steun zoeken
- Informatiebronnen
	Heb je weleens last van concentratieproblemen?
	
	    a. Wat versta je hieronder?
	    b. Kun je daar wat meer over vertellen?
	    c. Hoe vaak komt dit voor en onder welke omstandigheden?
	
	Als je last hebt van concentratieproblemen, wat doe je dan meestal?
	
	Heb je weleens steun gezocht voor je concentratieproblemen?
	
	`ZO JA:`
	    a. Welke informatiebronnen gebruik je in deze gevallen? (Vrienden, Huisarts, psycholoog, internet?)
	    b. Wat voor informatie heb je gevonden? (Beoordeel je deze als betrouwbaar?)
	    c. Wat vind je van beschikbare informatie? (Voldoende?)
	    d. Is er specifieke informatie die je mist? Welke?
	
	`ZO NEE:`
	    a. Wat is de reden dat je geen steun zoekt?
	
	Hoe speelt de beschikbare informatie een rol bij de manier hoe jij je concentratieproblemen aanpakt?

3. Verwachtingen system Topics: - Algemeen - Gebruiksvriendelijkheid - Indeling/uitstraling	Wat verwacht je van een Etool over concentratieproblemen in het algemeen? Waarom? a. Wat verwacht je van de van de test waarmee je de oorzaken van je problemen zou kunnen achterhalen? Wat zijn volgens jou belangrijke factoren die de Etool gebruiksvriendelijk zouden maken? (Opschrijven!!) Wat verwacht je van de indeling, uitstraling of presentatie van de Etool?
4. Verwachtingen content Topics: - Inhoud - Zinvolle informatie - Betrokken partijen	Wat verwacht je van de inhoud van een Etool over concentratieproblemen? Waarom? a. Wat verwacht je van de inhoud van de Test in specifiek? Welke informatie zou jij als zinvol/nuttig beschouwen voor op de Etool over concentratieproblemen? (Opschrijven!!) Waar verwacht je dat de informatie van de Etool op is gebaseerd? (Welke betrokken partijen?)

5. Verwachtingen service
 	
Topics:
- Meerwaarde Etool
- Advies opvolgen
	Wat verwacht je dat een Etool over concentratieproblemen je oplevert/ brengt/ meerwaarde? (Opschrijven!!)
	
	    a. Wat verwacht je dat de test waarmee je de oorzaken van je problemen zou kunnen achterhalen jou oplevert/ brengt/ meerwaarde?
	
	Zou je het advies van de test opvolgen? Waar hangt dat van af?
	
	    a. Wat zou je ervan vinden als er meerdere keuzes qua advies of behandelmethoden naar boven zouden komen voor jou?
	    b. Als de test een ander advies geeft dan de behandelmethode die jijzelf in gedachte had, wat zou dit met je doen?

Gebruik van de Etool	
Hardop-denk methode	Alles hardop uitspreken wat je denkt (op- of aanmerkingen over de inhoud of juist over de lay-out etc.) Dit terwijl je de gehele website en test doorloopt.

Topics, centrale vragen en subvragen	
Aansluitend na Etool gebruik	
Algemeen	Hoe heb je de Etool over het algemeen ervaren?

Ervaring system
 	
Topics:
- Gebruiksvriendelijkheid
- Indeling/uitstraling
- Beveiliging persoonsgegevens
	Gebruiksvriendelijkheid
	Heb je de Etool ervaren als gebruiksvriendelijk? Waarom? Linken naar verwachting
	
	Hoe heb je de test ervaren? (gemakkelijk? Waarom?)
	
	    a. Wat vond je van de tijd die het je koste om de test te doorlopen?
	
	Op welke manier heb je de indeling van de Etool ervaren? (overzichtelijk, menubalk etc, makkelijk?)
	
	    a. Begreep je alle functies van de Etool?
	    b. Kon je alles makkelijk vinden?
	
	Ontwerp
	Op welke manier heb je het design van de Etool ervaren? (kleurgebruik, tekstweergave?)
	
	Ondersteunt het design van de website om de test te doorlopen? (self-monitoring?)
	
	    a. Verheldert het design de verdere stappen die nodig zijn?
	    b. Komt de feedback op het goede moment?

	In welk opzicht had je het idee dat er bij de uitstraling (design) van de Etool rekening is gehouden met de normen en waarden van de student? Beveiliging persoonsgegevens In welk opzicht heb jij het idee dat er veilig is omgegaan met jouw persoonlijke gegevens?
Ervaring content Topics: - Relevantie, zinvol - Duidelijke informatie - Taalgebruik, gedetailleerd - Bron van informatie	Relevance: Wat vond je van de informatie op de Etool? (Voldoende? Variatie? Zinvol?) Waarom? Linken naar verwachting Wat vond je van de informatie in de test in specifiek? (Voldoende? Variatie? Zinvol?) In welke opzichten heb je het idee dat de karakteristieken, behoeften of voorkeuren van studenten zijn meegenomen in de informatieontwikkeling? Comprehensibility: Heb je de informatie of het gegeven advies als duidelijk ervaren? (Moeilijk, makkelijk?) Hoe werd voor jou duidelijk welke overwegingen je moest maken om de vermoedelijke oorzaak van je concentratieproblemen aan te kunnen pakken? Completeness: Wat vond je van het taalgebruik in de Etool? (Gedetailleerd?) Evidence based & Disclosure: Op welke manier werd voor jou duidelijk waar de informatie vandaan is gehaald? Op welke manier werd voor jou duidelijk of de informatie wel of niet wetenschappelijk onderbouwd is?
Ervaring service Topics: - Meerwaarde etool/test - Advies weergave - Vertrouwelijke, geloofwaardige informatie	Perceived usefulness In welke opzicht heb je het idee dat deze Etool een daadwerkelijke bijdrage zou kunnen leveren om je concentratieproblemen aan te kunnen pakken? Waarom? Linken naar verwachting a. Hoe zit dat met de test in specifiek? Op welke manier hielp de Etool jou om in aanraking te komen met keuzes over advies of behandelmethodes? Op welke manier beïnvloedt de Etool jouw plan om je concentratieproblematiek aan te pakken? Welk deel van de Etool had wat jou betreft de meeste invloed op de manier hoe jij je concentratieproblemen zal gaan aanpakken? Responsiveness Wat vond je van het advies dat ineens gegeven werd?

	Hoe heb je het ervaren dat je een pdf kon downloaden?
	Social dynamics & psychological influence Hoe heb je de manier van advies geven ervaren? (Vervelend, positief, negatief?)
	Reliability & credibility In welk opzicht ervaar jij de informatie op de Etool als betrouwbaar?
	In welk opzicht ervaar jij de informatie op de Etool als geloofwaardig?

Overig	Wat vind je ervan om een computer of het internet te gebruiken om tips en advies te krijgen over jouw concentratieproblemen en de vermoedelijke oorzaak daarvan?
	
	    a. Zou je het liever in een andere vorm hebben gehad? (Applicatie op je telefoon?)
	
	Op een schaal van 0-10, hoe waarschijnlijk zou je deze Etool aanbevelen aan je vrienden? (NPS)
	
	    a. Waarom? Waarom niet?
	    b. Met wie?
	    c. Wat zou je zeggen?

Afsluiting	
Afsluiting interview	Zijn er nog dingen die niet aan bod zijn gekomen in het gesprek maar die je wel graag zou willen vragen of toevoegen? Wat vond je van het interview? (Op- of aanmerkingen?)
Bedanken	Ik wil je graag bedanken voor je tijd en deelname aan het interview. Daarom heb ik een bol.com twv 20 euro voor je.
Anonimiteit & mogelijkheid tot terugtrekken	Nogmaals benadrukken dat dit interview anoniem is, dat wil zeggen dat uw persoonlijke gegevens niet gebruikt of genoemd zullen worden in de dataverwerking. Daarnaast zullen de dingen die u ons vertelt en de informatie die u ons geeft alleen voor dit onderzoek gebruikt worden. Als je nu of komende week nog besluit dat je niet meer verder wilt gaan met het onderzoek, dan mag je dat ten alle tijden aangeven. Wij zullen dan stoppen met het gebruiken van de door jou gegeven informatie.
Executive summary	Het interview zal worden uitgewerkt. Als je wilt kunt je hier een samenvatting van ontvangen. Email participant:
Contact gegevens	Als je nog vragen hebt, kun je bij mij (Devie-Luna Arts) terecht. Email/Telefoonnummer

Appendix 7

Coding scheme, party retrieved from the CeHRes assessment of design quality (Van Gemert-Pijnen et al., 2011)