Social Media as Incentive Tool for Health Improvement for Students on High Schools

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ABSTRACT

Schools have much potential influence over the lives of students in terms of health improvement. However, there is no sign of schools investing in the improvement of their students’ health through social media. In this study, a solution is presented through which schools could improve the health of their students by using social media as an incentive tool. This solution is validated via a questionnaire and a prototype. The prototype is an application for a smartphone, which helps students track, improve and compare their eating and drinking habits. The conclusion is that this prototype mostly satisfies the students’ requirements, but that there needs to be done more research to determine if this solution actually improves the health of students.

Keywords

Adolescents, high schools, social media, health improvement, incentive tool

1. INTRODUCTION

1.1 Background

An unhealthy lifestyle is a big problem for people from all ages, all over the world. The World Health Organization has found that worldwide obesity has more than doubled since 1990, that more than 1.4 billion adults and 40 million children under the age of five are overweight and that 65% of the world’s population lives in countries where overweight and obesity kill more people than underweight. Obesity and overweight are the fifth leading risk for global deaths [44].

Youth is not an exception to this. In the United States, obesity among adolescents has tripled in the past 30 years and in 2010, more than one third of children or adolescents in the US were overweight or obese [7]. Holland is also a country where many students live unhealthy lives. The Dutch statistics bureau, the CBS, has found out that in the past 30 years, the percentage of students with overweight has increased with 40 percent. More than 13 percent of students are overweight, and more than three percent are obese [16].

The reason for this increase can be found in a number of factors, researched in Holland by TNO [43]. Firstly, there is little physical activity among youth. In 2010 and 2011, only 13 percent of youth between 12 and 17 years old reached the Dutch norm for healthy physical activity. That means that 87 percent of youth do not have enough exercise in their daily life. Secondly, a healthy eating pattern can prevent overweight. In 2011, 27 percent of the 12-17 years old youth ate enough fruit and 9 percent ate enough vegetables. Almost no adolescents have a healthy eating pattern. Parents often do not have the opinion that the physical activity or the eating pattern of their child needs to be improved: only about 20 percent of parents think so.

In a relatively short time, social media has become a very important element of the lives of people. About 1.5 billion people use social network sites [26]. About half of the internet users have a smartphone and most people use it to connect to social media. People do not use social media incidentally; it is a part of their daily life, 6 out of 10 social network users use social media every day, Facebook is by far the most well-known and used social network: almost 90 percent of internet users know it and almost 60 percent use it. The Netherlands also has high usage rates of social networks and belongs to the top countries in terms of social network usage [25].

Especially adolescents often use social media. 75 percent of adolescents have a profile on a social networking site; just over half of them use Facebook every day. It also has its impact on their life: it makes them less shy, more confident and less depressed. Furthermore, it helps their relationships with friends and family [12]. Despite this, they prefer face-to-face communication and value personal contacts over social media contacts. However, there are also disadvantages of the involvement of adolescents in social media. Cyber bullying, sexual harassment and inappropriate content being presented are examples of negative effects of Facebook [40].

It has been suggested that new technologies, such as social media, can trigger behavior change [19]. Social media can be used as a persuasive technology. Small case studies showed that people are more motivated to alter their behavior when social media is used [21, 23], even if it concerns a sensitive subject like politics [2]. Social media can motivate people to change the way they eat, do physical activity, live in an eco-friendly way or even who they vote for.

The focus in this paper is on students from 12-18 years old, having secondary education. Dutch: “middelbare school”. This is the group we refer to with the term “students” in this paper.

1.2 Problem statement

There is a variety of ways to improve the health of students. An important factor is the family a student is part of. Parents have much influence over the lives of their children. However, as shown before, parents often do not feel the need to change the behavior of their children.

Schools also have a big influence in the lives of adolescents. They spend much of their time at school. Therefore, schools
also have the opportunity to influence the way adolescents live and the lifestyle they have. However, only just over one third of secondary schools offer activities that can prevent or reduce overweight [43]. The most occurring measure schools take is to provide healthy food in the canteen (around 13 percent of all schools). Less than five percent of schools offer after-school sporting activities or give classes about healthy food, physical activity or a healthy weight. There are many opportunities for schools to use their influence to improve the health of their students, but schools currently do not use these opportunities.

This paper investigates how schools can use social media to make their students live in a more healthy way. Schools and social media both have a large influence over the lives of students. Social media has proved to be a viable way to change human behavior and in the proposed research it will be applied to the context of schools.

There is a gap in the available literature: the combination of social media, schools and health improvement of adolescents has not been researched. Always, one or two of the subjects of the triangle are being studied, not the combination of all three. This study adds value by combining all three subjects and thus filling that gap.

1.3 Research questions
Main question: How could high schools use social media to improve the health of their students?

1) What is the current role of social media in the daily practice of schools, in the lives of students and as an incentive tool for health improvement?
2) What requirements do students impose on solutions that use social media to improve their health?
3) How can social media be used as an incentive tool: a solution to improve the health of the users?
4) Does the solution satisfy the requirements the students have?

1.4 Research method
In this study, several possible solutions that schools can use to improve the health of their students have been studied. Of those solutions, the most viable one was chosen. This solution was fleshed out and validated using a questionnaire.

The first step of this study is a background study, to see what information about the paper subject can be found in literature. Three main subjects can be identified: (1) how social media is being used by students, (2) how social media is being used at schools and (3) how social media is and can be used as a tool to improve the health of its users. These three subjects were researched using a combination of business and scientific literature sources. Using this literature study which is found in section 2, research question 1 is answered.

A solution should not only be effective in theory but also in practice. The next step to a solution that actually meets the requirements of the students, is determining those requirements. A questionnaire was created, based on the literature study done before. Using that questionnaire, requirements were found that students have on solutions that use social media to improve their health. This can be found in section 3 and will answer the second research question.

Combining the results of the literature study with the requirements of the students, a solution is presented in which social media is used as an incentive tool for improving the health of students, and worked out as an actual prototype. The solution was created, based on already existing apps about a healthy life, the literature study about social media and the results from the questionnaire. This answers the third research question and can be found in section 4.

Finally, the solution is validated using a questionnaire to see if it actually meets the requirements of the students. Using this validation, conclusions can be drawn to determine the usefulness of this study. The validation of the solution can also be found in section 4 and will answer the fourth question.

Finally, the results will be discussed and conclusions are drawn in section 5 and 6.

2. OVERVIEW OF LITERATURE
To determine what research has already been done and which conclusions can be drawn based on former research, a literature study has been done. This literature study will be used in the development of a questionnaire to determine the requirements of students.

The literature study is divided into three parts: the most relevant subjects for this study. First, the relationship between social media and adolescents is researched. After that, an overview is given of the usage of social media by schools. Finally, the usage of social media to improve the health of their users is studied.

2.1 Social media and adolescents
Determining the role of social media in the lives of adolescents is a complex task. How people are actually influenced by their usage of social networks, is difficult due to a combination of many factors. Several studies, however, give an indication of how people and especially adolescents use social networks.

The first indicator is the frequency of the usage of social networks. Almost everybody in the Western world knows what social networks are [26]. A large part of that group also uses social networks. This is certainly true of adolescents, who are in general more familiar with modern technology than adults. 51 percent of teenagers visits a social network every day [12]. This does not include the less frequent users, so in total, the amount of teenagers that use social networks is very high.

The reasons adolescents use social media are important indicators of the role social networks play. For people in general, the most frequently mentioned reasons are communicating, killing time and sharing information, photos and videos. By far, the most important activity on social networks is interactions between people [26]. Other studies confirm this conclusion: meeting new people, keeping in touch with friends, socializing and information exchange are frequently mentioned terms [5]. Social networks are also used by young teenagers to present their identity, to make them look
as interesting as possible. Older teenagers emphasize their relationships with others. Through all this, enjoyment is also very important [33]. Social media users choose to use it at moments where they could do something else as well: most mentioned occasions for social media use are during leisure time, while eating and while waiting [26].

Because social networks are being used so much, they also have personal effects. Adolescents experience a positive social impact on friendships, self-esteem and self-confidence [12]. Since social media are used for enjoyment [33], people using social networks will experience a positive impact on their lives. However, not all effects are positive. Adolescents indicate that they sometimes want to be disconnected from all social networks and that it cannot replace contacts in real life [12]. Furthermore, there are all sorts of privacy issues, because adolescents disclose more information on Facebook than adults and use the privacy settings less [9]. Sexual harassments and cyber-bullying frequently occur on social media and result in risks that adolescents need to take care of.

2.2 Social media and schools
Social media can also be used by schools, for education purposes. Some students already use social media for education purposes: 1/5 of German students that use StudiVZ, a social network similar to Facebook, use it for study-related knowledge exchange. Social media are mainly used for social interaction and integration, but the study implies that study-related knowledge exchange goes hand in hand with social integration [45]. Using social media in education has several advantages. Since social media are already being used by students, there will be an easier and better way for students to connect with teachers in an informal environment. Students can indicate their problems, teachers are able to provide suitable feedback and the traditional power hierarchies are less present [4].

Several pilot projects have been done to see what the effects are of using social media in schools. For example, experiments using Twitter in university and high school classrooms indicate increased participation and engagement of students, enhanced social presence and engagement in the professional community of practice [1, 18, 34, 38]. There is much attention for social media in schools, shown by, for example, a book with many ways of using social media in primary schools [37], a Dutch national congress about social media and education [20] and the Dutch protocol of social media use in education [10].

Despite this attention, social media is only scarcely used at Dutch schools [41]. This is because schools are not yet fully up to speed with the latest social media developments, especially primary and secondary schools. There is a gap between students and schools because of the different ways both parties use internet. In general, schools have an internet connection of lesser quality and with much filtering. Also, the internet is not always available to be used by students. This affects the way adolescents use internet at school. Students do use the internet for their school-related work, so there is a big opportunity for schools [31]. Another problem is that teachers use internet and social media in another way than students. Teachers use social media less often, they depend more on traditional technologies, such as email [39]. Also, teaching with social media requires a different teaching method than the traditional one. This is mainly the case in the academic world, which is not fully up to speed on teaching (with) social media [42]. There is caution because of the challenges that arise, of maintaining scientific and good teaching while working through social media [24]. To fully use the possibilities of social media, schools need to make social media a priority. As prof. Howard Rheingold states: “The issues around social media (...) aren't really being raised in academia. They ought to be because these topics, not only academically, in terms of the shifts in media and literacy that they’re triggering in the world, are where the students live and work.” [42]. Social networks have to be adopted and widely used by educational institutions to prevent them from becoming yet another technology that had potential for education, but has failed [39]. The last factor that indicates why there is not much usage of social media among schools is the absence of clear goals. Schools often think: we should really do something with social media, without really knowing what it is for [41]. In an experiment that integrated several devices in the teaching practice, students and teachers struggled to find the educational uses for the devices they experimented with [15]. Social media can be used to inform students and parents, as some schools in Holland already do [6, 11, 36]. It can also be used to support teaching and engage students. There have been several pilots, but there is almost no structural use of social media to support teaching purposes [1, 34, 38].

2.3 Social media as an incentive tool for improving health behavior
A person’s behavior is influenced by his social networks. Someone is more likely to become obese when people in his social network are becoming obese as well [8]. This is also true for online social networks, for example with ecologically friendly behavior [22] or political behavior [3]. There is a strong link between (online) social networks and behavior.

Health behavior is also strongly linked with social networks and internet in general. Deloitte’s health survey showed that the internet is an important source of information for customers and that customers want to control their online personal health records [29].

There are several examples of projects using online social networks to change health behavior. A project called VivoSpace, in which users could log all sorts of health information, showed that the participants liked the social aspect and found it motivating to change their behavior in a positive way [27]. A comparison of a social step counting program with a non-social one showed that there were more improvements when using the social version [23]. There are more examples of these projects where social networks were combined with health improvement programs [13, 14, 32]. Step counting programs were found the most, probably because step count is something that is measurable and concrete. No programs were found that were specifically aimed at adolescents or children.

Next to these specific programs described in literature, there are numerous health applications for smartphone available that combine social networks with health improvements. Data about health can be entered into an application; performance can be compared with friends inside the application network or on other social networks. Health applications are still in the early stages of development and not much research has been done about the effectiveness and users’ experiences.

Often, design requirements were derived from project outcomes, based on psychological theories about human behavior. Projects were carried out using people from all ages, not specifically students. The elements that are present in almost every analysis are social, positive, unobtrusive and controllable. The social aspect of changing health behavior, the system giving positive feedback on actions, the system not interfering with daily routines and the user being able to have control over his own data and life are factors that improve the effectiveness of a system, according to theory [13, 14, 28].
There is no standard approach or model that is being used. It is hard to measure the actual effectiveness of social media in changing health behavior [30].

3. REQUIREMENTS

3.1 Questionnaire
A questionnaire was set up to find out requirements that students have on solutions that use social media to improve their health. The questions are based on the literature study done before, in which an overview of existing literature was presented. Questions were asked about how students perceive their health, what elements of a healthy life are important to them and what elements they want to improve. Six important categories of a healthy life were determined, based on the literature study, general information about health and applications that address health issues relevant to adolescents. These categories are as follows: eating more healthy food like fruit and vegetables, eating less unhealthy food like fast food, having regular physical exercise, having less stress, doing homework and making efforts for school, drinking or smoking less.

Also, questions were asked about the students’ opinions regarding solutions using social media. Furthermore, other questions about social media in general were asked to validate the results of the literature study.

The questionnaire was filled in by 52 students from three classes of the school Greijdanus in Enschede. Their age varied from 12 to 16 years old, there were about as much boys as girls. They were from mixed school levels, “vmbo”, “havo” and “vwo”. They have around two hours of physical education classes and two hours of biology-like classes every week. For more information about the questionnaire, see Appendix A.

3.2 Results
The results from the filled in questionnaire are as follows.

The most important aspects of a healthy life are the following: (1) Eating enough fruit and vegetables (2) Physical exercise (3) Not eating too much unhealthy food (4) Making efforts for school and (5) Not having too much stress. The alcohol and smoking aspect was not applicable because of the age of the respondents. The students learn about a healthy lifestyle at physical education and biology-like courses. Some students indicated that they like to share and compare their health statistics with others, some students indicated that they would rather not do this (23 out of 52, see figure 3).

The students were asked how much they would like to use the solution in two situations: when the solution would be free to use and no obligation was present. The students indicated that they would more likely use the application when the usage was not obliged (3.2 out of 5 vs 2.8 out of 5).

Social media, especially Facebook, is used by almost everybody among the respondents. Some respondents use Twitter and the other social networking sites are barely used. Despite this social media activity, the majority of the students prefers a smartphone application over a page on a social network. The school also uses Facebook to inform students and their parents. However, this is scarcely used by the students. No social media is used in courses to support and facilitate learning.

The Greijdanus has not got a canteen, but only has a food vending machine which mostly contains unhealthy snacks. The machine is barely used by the respondents.

A number of core requirements for solutions was drawn from the data that was acquired using the questionnaire, combined with the purpose of this study.

1. The solution should provide information about one or more of the subjects (which students find the most important): eating healthy, exercise and sport, eating less unhealthy
   i. Based on the results of the questionnaire (see figure 6, chapter 5.2)

2. The solution should be an application for a smartphone
   i. Based on the results of the questionnaire (see figure 2)

3. The solution should contain the possibility to share results and statistics and compare them with others via social media
   i. Based on the results of the questionnaire (see figure 3)

4. The solution should give feedback to the student based on the statistics of the past
   i. Based on an open question about what features students found the most important.

5. The solution should be able to provide information to students about how they can live more healthy
   i. Based on an open question about what features students found the most important, combined with the goal that the solution should be used at schools

6. The solution should be able to be used in one or more of the school courses about living healthy
Based on the purpose of using this solution at schools

4. SOLUTIONS

4.1 Fleshing out

A prototype application was built. With the demonstration of this prototype, students could see a possible implementation of their requirements in a solution.

The first goal of this fleshing-out is to validate the results from the questionnaire. If the students actually mean what they said in the questionnaire, they should give the application a higher rating than they did in the first questionnaire.

Also, information is needed about the chances that students are actually going to use this type of solutions and how much time and money they are willing to spend.

The prototype was built using several data sources. Of course, the requirements of the students are used to build the prototype. Another important source is the literature study about how social media can be used as an incentive tool. Also, existing health apps like MyFitnessPal [35] were reviewed and applied in the design of the prototype application.

4.1.1 Solution

There are several elements of a healthy lifestyle that the application could try to improve, but the students indicated that eating and drinking are the most important subjects to them.

Therefore, the built prototype is about eating and drinking habits and related subjects.

Also, an application about sporting and physical exercise was considered as a second prototype, but due to time restrictions, this idea has not been worked out.

There are four important screens and functionalities in the prototype. Firstly, there is the possibility of viewing one’s statistics of the past days, weeks or months. Improvements are easily visible so the students can receive positive motivation.

Reward badges are given for certain achievements. Badges and statistics can be shared with friends on Facebook. The next functionality is inserting new data into the application. Students can quickly indicate what they eat or drink and how much, and the application will process this information. Also, in this screen, several fun facts about food and drink are shown, so that students learn about a healthy lifestyle as they use the application. The third main functionality is the comparison of statistics between different classes, schools or cities. In this way, students also become responsible for their school’s performance and are more motivated to live a more healthy life, because of the social aspects involved. Also, these comparisons can be shared on Facebook.

The last main functionality of the prototype is the food knowledge database. Students can type in any kind of food or drink and the application shows information about the food, whether it is healthy or not and what eating or drinking it does to the human body. Through this, students get more insight in the effects of their eating and drinking behavior and are more likely to change it in a positive way.

4.2 Validation

4.2.1 Questionnaire

The development of the prototype is also based on the perceptions of the researcher. To see if this prototype actually meets the requirements of the students and is not just a projection of the researcher, the prototype needs to be validated. This is done by using a second questionnaire about the prototype, which is filled in by the same target audience.

Before the questionnaire was handed out to the students, a presentation was given about the main functions of the application. A demo was shown and the students could see how the application would work, as if it were a real application.

The questionnaire contains questions about the assessment of the application. Questions are asked about how, when and how often the students expect to use the application. Also, it contains questions that also occurred in the first questionnaire, so that the results from both questionnaires can be compared.

The questionnaire was filled in by 22 students from the school Greijdanus in Enschede, a sub-group of the respondents of the first questionnaire. Their age varied from 14 to 16 years old.

There were as much boys as there were girls, their school level was “havo” or “vwo”. They have about two hours of physical education classes and two hours of biology-like classes every week. See for more information about the questionnaire Appendix B.

4.2.2 Results

Most questions were asked and answered using a five-point-scale. Students could give a score of one to five about a statement, with which they could agree, disagree or something in between.

The students think it is fun to use the app, just for themselves (3.74 out of 5) or with a course at school (3.95 out of 5). They are tentatively positive about the app helping them to live more healthy (3.36 out of 5). On average, they would not like to connect their application account directly to Facebook (2.21 out of 5) but comparing their data would be fun (3.26 out of 5). They are not willing to pay €2.50 for downloading the application (1.89 out of 5) but they are more likely to download the app when it is free (3.58 out of 5).

Also in this questionnaire, the students were asked how much they would like using the application in two situations: when the usage is obligatory for a course at school and when it’s the student’s own choice. This time, the adolescents were more enthusiastic about using the application when it was obliged at a course at school (3.9 out of 5 vs 3.7 out of 5).

A question was asked about which aspects of a healthy life are the most important to the students, and the results were practically the same as the first questionnaire: (1) Eating healthy food (2) Eating less unhealthy food (3) Sporting and
exercise (4) Making efforts for school and (5) Not having too much stress. The students were asked how this application could be improved. A number of improvements were mentioned. The most important ones were: improving the design and layout of the application, including a section about sport and exercise in the application and giving concrete tips about what and when to eat. The students thought the application was, in general, a good way to improve their health (4.16 out of 5).

5. DISCUSSION
5.1 Comparison results questionnaires with literature study
Firstly, the results of both questionnaires need to be compared to the literature study, to see if they match.

5.1.1 Social media and adolescents
The literature study indicated that Facebook was, by far, the most popular social network and that almost all adolescents use some online social network. The first questionnaire confirms this: almost every student uses Facebook one or more times per day. Other social networks are barely used. The main reasons for the usage of social media that were found in literature are pleasure, having fun, contact with friends and relatives, and avoiding being bored. The students that filled in the questionnaire indicated the most important reason to use social media is to keep in touch with friends. Also, about half of the students indicated that they use social media to avoid being bored. Another reason that is frequently mentioned is that social media are used to find out something, for example, at what time school will start. The results from the questionnaire mostly match the results from the literature study at this point.

5.1.2 Social media at schools
The most important conclusion of the literature study about this subject was that schools barely use social media in their daily teaching practice, and sometimes use it to inform parents and students. At Greijdanus, the school where the questionnaires were filled in, social media had not been used in classes to support the teaching. The school has Facebook and Twitter accounts and uses those to inform students and parents. Students do not use those pages a lot. The main reasons for the usage of social media that were found in literature are having fun, contact with friends and relatives, and avoiding being bored. Social media are used to find out something, for example, at what time school will start. The results from the questionnaire mostly match the results from the literature study at this point.

5.1.3 Social media as a health incentive tool
The literature study concluded that social media is sometimes being used as an incentive tool for health improvement and that there are a number of smartphone applications available to improve users’ health. Design requirements have been set up in different researches, but academic validation has not been done. The results from the questionnaire mostly confirm these formulated design requirements. For example, adolescents indicated they preferred feedback on their actions. Also, they did not like the possibility of the application uploading all their data on Facebook: the application should be controllable. The application should not cost too much time or money and should be easy to use, which confirms the design requirements regarding controllability and unobtrusiveness. Unlike the design requirement that states that a solution should be social, only a minority of the adolescents that filled in the questionnaire did not express a preference to a more social app.

5.2 Comparison two questionnaires
Conclusions are drawn from two separate questionnaires. To ensure that the results of both questionnaires match and do not exclude each other, the adolescents were asked the same question twice: once in both questionnaires. The question was about which health aspect they found the most important. All five aspects were scored from 1 (most important) to 5 (least important). As can be seen in figure 5, the order of importance is the same in both questionnaires.

Figure 5: Comparison results questionnaires
This supports the statement that the audiences for both questionnaires is the same and the questionnaires can be compared.

In both questionnaires, the students were asked how much they would like using the application in two situations: when the usage is obligatory for a course at school and when it’s the student’s own choice. The adolescents were more enthusiastic about the solution at the second questionnaire (see figure 6). This can be explained by the fact that they had seen the prototype when they filled in the second questionnaire. The application could be more concrete and the students would know better what to expect.

A minor difference between both questionnaires is that, in the first questionnaire, students expressed their preference for a situation where the usage of the application was not obliged for a course at school, while in the second questionnaire the situation where they would be obliged to use the application was preferred. This could be explained by the simple fact that the difference is too small to actually be significant. Also, the students concretely saw how the application could be used in a course, when they saw the prototype application. This could have positively affected their opinion because they liked what they saw.

5.3 Related research by Dennison et al.
During the time this study was held, a paper was published by Dennison et al. about the perspectives of adolescents on applications related to health behavior change. It included that adolescents especially value the abilities to record their own performances and goals and to acquire advice and gain information about how to improve their life. Explicit presence of social media like Facebook was considered unnecessary [17]. The recently published paper is similar to this study. However, there are a few key differences, so that this study adds value. This study focuses on a school environment, whereas the study by Dennison et al. is not carried out with a specific scenario. The target group is also different: this study is about

Figure 6: Likelihood usage of solution
adolescents from 12 to 18 years old and Dennison et al. focus on students of 18 years and older.

Still, we will see if the conclusions of Dennison et al. match our results. The most important functions in the prototype application created in this study are the recording of personal eating and drinking, the ability to view statistics about that and the possibility to get more information about food and drinks. The students liked the application and declared the application satisfied their wishes. In the second questionnaire, a number of students also indicated that they would like extra feedback on their eating and drinking patterns, like recommendations about what to eat. The students generally disliked the opportunity to directly connect Facebook to their application. These likes and dislikes are also the main conclusions of the study of Dennison et al.

6. CONCLUSIONS

In this paper, we tried to discover how schools can help students to live a more healthy life with the use of social networks. First, a literature study was done about several related subjects. Then a questionnaire was set up and filled in to find out requirements students have about solutions that use social media to improve their health, in combination with the involvement of schools in that process. From those requirements a prototype was fleshed out. This prototype was validated using a second questionnaire.

6.1 Answers to research questions

6.1.1 What is the current role of social media in the daily practice of schools, in the lives of students and as an incentive tool for health improvement?

Social media are currently being used by a large number of schools, but just for information purposes. Schools barely use social networks for teaching purposes. Often there is confusion about the purpose of social media and how schools could and should use it. The usage of social networks by schools is in the early stages of development.

A majority of the adolescents uses social media very often. Facebook is the most important social network. Students use social media to keep in touch with friends and relatives, for entertainment and to prevent being bored.

A number of pilot studies indicate that social media can trigger behavior change. This includes health behavior. Also, health applications for smart phones are popular and widely used. Research needs to be done about the actual effectiveness of social media and smart phone applications on health behavior change.

6.1.2 What requirements do students impose on solutions that use social media to improve their health?

The following core requirements resulted from the first questionnaire, combined with the literature study:

1. The solution should provide information about one or more of the subjects (which students find the most important): eating healthy, exercise and sport, eating less unhealthy
2. The solution should be an application for a smartphone
3. The solution should contain the possibility to share results and statistics and compare them with others via social media
4. The solution should give feedback to the student based on the statistics of the past
5. The solution should be able to provide information to students about how they can live more healthy
6. The solution should be able to be used in one or more of the school courses about living healthy

6.1.3 How can social media be used as an incentive tool: a solution to improve the health of the users?

The requirements were worked out in a prototype solution: an application for a smart phone. The application aimed at recording and improving the eating and drinking habits of adolescents. Furthermore, improvements in patterns can be seen through statistics and achievements which can be shared with friends and compared between different groups. The application also focuses on extending students’ knowledge, so that the application also has educational value.

6.1.4 Does the solution satisfy the requirements the students have?

The students mostly indicated they liked the application and that it would be a good way to improve their health. The students were significantly more positive when they had seen the prototype, compared to the first questionnaire. This means that that prototype satisfies their requirements more than the general idea of a solution does. However, we cannot be sure that their requirements are completely fulfilled. Therefore, we can conclude that their requirements are mostly satisfied.

6.1.5 How could high schools use social media to improve the health of their students?

High schools could use a smart phone application to improve the health of their students. They could add value by connecting the application to one or more of their courses, so that adolescents not only can change their lifestyle to a healthier one, but also learn while they do that.

However, it is not determined if these kind of applications will actually improve the health of students. More research needs to be done and the application has to be tested to draw conclusions about the actual usage and utility of such an application.

6.2 Contribution work

This paper contributes value by confirming a number of design requirements found in literature for the specific target group of students. Previous research about these design requirements was done looking at people of all ages, not specifically students.

Also, suggestions are given about the connection between a student’s health, school and social media. In other studies, two of these three elements are present, but in this study, all three elements of the triangle structure are present, to see how they can be combined to improve students’ health.

6.3 Future work

There are several points where this research could be changed to improve the value of the results.

Firstly, the questionnaires were held at just one school and both questionnaires were filled in by, in total, around 80 adolescents. The results could be different if the questionnaires were held in different schools, with other social media usage and other ways of teaching, or with a larger target audience.

Also, the solution was fleshed out in a prototype, but it was not a prototype the adolescents could use. Furthermore, the
The adolescents rated the solution, solely based on the presentation of the prototype and not on their own experience using it. This could be improved by creating a usable application for a smartphone, and letting the adolescents use and experiment with it. Evaluating this will result in actual knowledge about how adolescents perceive those health applications. Also, conclusions could then be drawn about the effects of the usage of such an application on student’s health, an aspect that could not be studied in this study.

Also, due to limited research time, some conclusions from the questionnaire were drawn too quickly. For example, the choice for the subject of health and unhealthy food was just based on the results of one question in the first questionnaire. Having more time would mean that the questionnaire could be extended, so that the preferences of the adolescents could be determined in a more reliable way.

Also, research can be done specifically about schools. Initiatives like this health application are of very little use when schools do not know how to apply smartphone applications and online social networks in education. A big improvement could be made by schools when they learn to effectively use social networks for educational purposes. Little has been written about how teachers think of subjects like social media and smartphone applications. Future research should definitely not ignore teachers when looking at the application of social media at schools.

7. REFERENCES
[37] Pijpers, R., Sociale Media op de Basisschool2012.
APPENDIX

The questions from both questionnaires are presented here. Potential answers of multiple-choice questions are also presented. The questionnaires were originally written in Dutch, questions have been translated for convenience and coherence. Questions from the questionnaires that were not relevant for this study in the end, are not included in this appendix due to limited space.

A. QUESTIONNAIRE 1
A.1 Adolescents’ healthy life
1. Are you living a healthy life in the following aspects: (score from 1 to 5)
   a. Eating enough fruit and vegetables
   b. Not eating too much unhealthy food
   c. Having enough physical exercise
   d. Not having too much stress
   e. Doing one’s best for school
   f. Not smoking and drinking alcohol too much
2. Do you live as healthy, healthier or less healthy than your classmates?
3. What is the most important aspect for a healthy life? Sort the answers from question 1 from 1 (most important) to 6 (least important)

A.2. Health at school
4. Which courses at school are about living healthily?
5. Which food services has your school got? What products do they sell?
6. Do you ever buy food or drinks at any of those services?

A.3. A solution to improve adolescents’ health using social media
7. What would you want to improve using such a solution?
   a. The same answer categories as question 1
8. What would be the most convenient way for you to use the solution?
   a. Directly via social media, like Facebook
   b. Via an application for a smartphone
   c. Via the website of the school
9. Would you like to compare your performance with other students?
   a. Yes, I would like that
   b. No, I do not like others seeing my data
   c. No, I just do not want that
10. Would you like to use the solution in your daily life? (rate from 1 – definitely not to 5 – definitely)
    a. When the usage is obliged as homework by a course
    b. When you are free to use the solution, it is not obliged.
11. If there is one thing or function you would like to see in the solution, what would that be?

A.4 Social media and adolescents
12. Which social media do you use and how often? (Matrix question, with different social network on one axis and different time indications on the other)
13. Why do you use social media? (Multiple choice question with different reasons resulting from the literature study in this paper)

A.5 Social media at school
14. Does your school social media? If yes, which social media do they use?
15. With what purpose does your school use social media?
16. Have you ever used social media with your school work? If yes, how have you used it?

B. QUESTIONNAIRE 2
First, students get ten statements with which they, using a score from 1 to 5, can agree or disagree or something in between. The statements are the following:
1. I would like to eat and drink more healthy
2. This application would help me to live more healthy
3. I would like to use this application
4. I would like to use this application when it is part of a course at school
5. I would like to download this application
6. I would recommend this application to my friends
7. I want to connect this application to my account on Facebook
8. I would like to compare my performance with other classmates, schools or cities
9. If this application would cost €2.50, I would want to pay that
10. Courses at school, like Biology, would be more fun when this application could be used with it.

Furthermore, there were some other questions:
11. If you have downloaded this application, how often would you like to use it?
    a. Multiple times a day
    b. Once a day
    c. Every week
    d. Every month
    e. I would not like to use it, because…
12. What is the most important aspect for a healthy life? (Same question as question 3 from questionnaire 1)
13. Do you think this is a good application to improve your health? (Give a score from 1 – not good to 5 – very good)
14. What functions of this application could be improved?