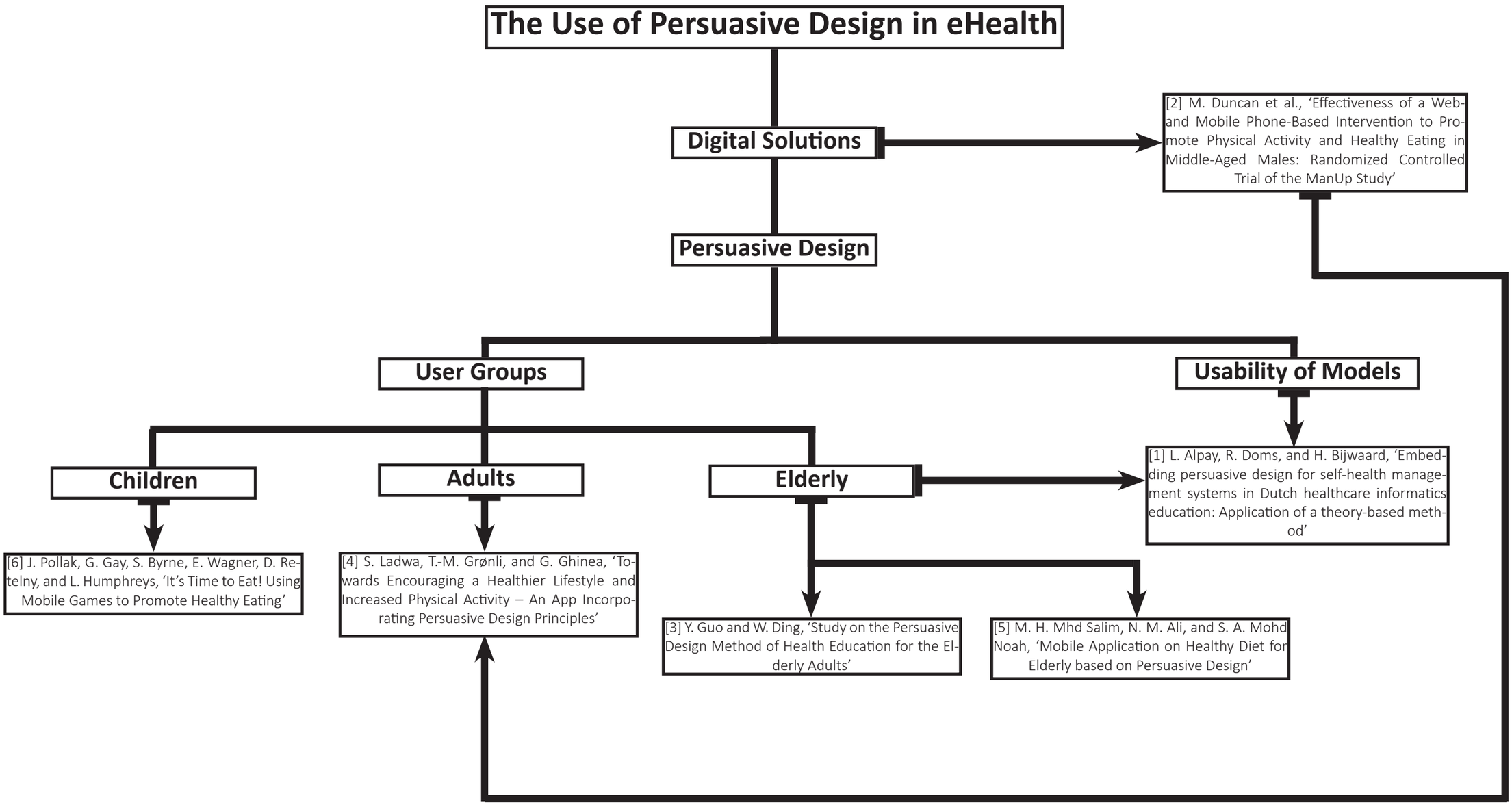

The topic for our group project has been to help people eat healthier and more sustainable, we've focused on students due to the ethical restrictions we have for our interviews and user tests. During our first research our focus was largely on sustainability, the applications made, and the research around it. Now our project has taken on another aspect, health, due to this I've been researching this topic, what is being utilized and how effective different solutions are. Through some preliminary research I have found that the two most common tools used to change people's behaviour seemed to be Technology and Persuasive Design. For our group project it could be valuable to get a deeper insight in how technology is being used within our space and how persuasive design compliments the technological solution. In addition to this, it would be equally valuable to find where these tools have failed, find out why and make sure that if we use these tools that we can avoid these issues. Lastly, apart from helping possibly utilise persuasive design one of the aims of my research is to find whether we should use persuasive design at all or if we should rather use a different method to change our users' behaviour. This has brought me to the following research question: "How is persuasive design and technology used to change behaviour related to health and how effective is it?".

[1] L. Alpay, R. Doms, and H. Bijwaard, 'Embedding persuasive design for self-health management systems in Dutch healthcare informatics education: Application of a theory-based method', Health Informatics J, vol. 25, no. 4, pp. 1631–1646, Dec. 2019.

Critique

In this paper, L. Alpay et.al explore the effect that persuasive design can have on eHealth systems. They explore existing models of behaviour change and apply them to the eHealth sector, they primarily use the "Model of Oinas-Kukkonen" and the "Model of Fogg". They tested the effectiveness of these models by letting their students utilize these in a variety of project and through this process both gage the results of the project, the student's performance and the student's perception. Using these methods, the students managed to complete their project with only a few issues during the beginning of their projects. They conclude with the fact that although the projects were largely successful that successful persuasive design is just a part of the solution. Before claiming that persuasive design is the answers to eHealth application, the attrition rate must be analysed to see whether it is truly viable. This paper presents both answers and questions, it is highly valuable to my topic by testing and evaluating existing persuasive design methods, this gives me a basis on which to work of. Due to the positive finding in the paper, it may prove beneficial for us to use persuasive design principles in our design as well, however, due to the time it took for their student to implement their designs a complex system may be out of our grasp. The fact that this paper directly covers the use of these models in one of the two main factors within our domain provides us with valuable insights on how we could proceed using these. Using these models can help us utilise our own findings to their full potential, utilising the user's motivations and help identify crucial features for the system.

[2] M. Duncan et al., 'Effectiveness of a Web- and Mobile Phone-Based Intervention to Promote Physical Activity and Healthy Eating in Middle-Aged Males: Randomized Controlled Trial of the ManUp Study', Journal of Medical Internet Research, vol. 16, no. 6, p. e136, 2014.

Critique

In this paper, M. Duncan tests the effectiveness of web/ and mobile based systems to increase the health of middle-aged males. He did this by sampling a random group of males randomly divided between paper-based and technology-based solutions and comparing the results. He found that the target group itself was hard to target resulting in a much smaller sample size then he had aimed for, regardless of this he found that both systems saw significant improvements, however technology-based solutions did not have any higher impact then the paper-based solution. Although this paper disproves the fact that technology can me more useful, this suggests that technology alone may not be the answer and that persuasive design and social features are needed, since neither are included since this paper covers neither, more research or testing is needed. That said, this is a quantitative research paper using online surveys to measure and analyse the results of the tests. This means that more qualitative research should be done to validate this research since survey-based evaluation can be misleading, give some misinformation if not analysed properly and is prone to misinterpretation by participants. Even though the results of this paper should be verified to an extent, it does provide valuable insights on both the space and the use of technology-based solutions to affect behaviour. The fact that the target group is much older than the target group of our own project does provide some solace since younger people are more likely to be comfortable and welcoming of new technologies and therefore may have an increased effect.

[3] Y. Guo and W. Ding, 'Study on the Persuasive Design Method of Health Education for the Elderly Adults', in Human Aspects of IT for the Aged Population. Design for the Elderly and Technology Acceptance, 2019, pp. 22–33.

Critique

In this paper, Y. Guo and W. Ding explore the effects of persuasive design on the elderly regarding health education focusing on what motivations should be paired with different persuasive design principles. They utilise several analysis tools ranging from starting surveys to group interviews giving them both quantitative and qualitative data resulting a well-rounded research paper. Throughout their paper they utilise several models, there among the Fogg model and the Oinas-Kukkonen model and adapting these to their segments. Seeing these models in use and what results they can produce can guide us in the use of these models and creates some idea of what results can be expected. Although their target group is far from ours this paper still gives valuable insight into how they adapt methods to fit their own segment and how the effectiveness of these methods vary based on segments. In addition to this, the fact that these models and methods worked on the elderly suggests that persuasive design should have a similar or greater effect on the younger population since they are much more in tune with more advanced technology. This is, however, an assumption that should be confirmed through user research. Lastly, even though they utilise some persuasive design models this paper, they focus health education and not using persuasive design to improve healthy eating. This makes it adjacent to my topic meaning that any results from this paper should be tested and confirmed before being used, however, that does not make this paper less valuable as it still provides valuable insight on the methods used.

[4] S. Ladwa, T.-M. Grønli, and G. Ghinea, 'Towards Encouraging a Healthier Lifestyle and Increased Physical Activity – An App Incorporating Persuasive Design Principles', in Human-Computer Interaction. Interaction in Context, 2018, pp. 158–172.

Critique

In this paper, S. Ladwa et.al investigates the effect that technology and persuasive design can have on improving the health of young adults. This paper presents the development of an application to deal with the obesity problem in the UK. Although the field itself is only adjacent to our research field since this paper focuses mostly on exercise, not healthy and sustainable eating the similarities between these two research fields are prominent enough to give valuable insights. In addition to this, their target audience matches ours, making it likely that the results from this paper can be applied to our project. Although the paper focuses on exercise it does also include some insights on the effects of persuasive design on food habits, especially the fact that for persuasive design to be effective, change should be incremental and the application should be unobtrusive and be perceived as helpful to the user. For our project this means that the use of motivations and frustrations becomes increasingly important to create a proper useful application. An especially valuable insight that is gained by this article is the fact that their participants generally preferred positive reinforcement rather they negative, something that should be applied to our own project. The paper concludes with that fact that although their perceived their project to be a success, whether the application will provide long lasting change in behaviour in uncertain are impossible to confirm or disprove on a short project. The same will be for our project, although we may find that the application has the potential to improve behaviour, it will be impossible to confirm this unless a long form research is done after the completion of the application.

[5] M. H. Mhd Salim, N. M. Ali, and S. A. Mohd Noah, 'Mobile Application on Healthy Diet for Elderly based on Persuasive Design', International Journal on Advanced Science, Engineering and Information Technology, vol. 7, no. 1, pp. 222–227, 2017.

Critique

In this paper, M. H. Mhd Salim et.al develop an application to encourage their users to have a healthy diet, focusing on the elderly population. Their application uses the Body Mass Index as a basis for their project and defines the starting position of their users and their optimized end goal. Regardless of the difference in target audience, this paper is very useful to our space due to which degree of detail it goes into when exploring and explaining their own design. Since their project was successful provides us with valuable insights and inspirations for design. Due to the difference in demography the designs should be different, but they can still draw inspiration from these. Although this paper only addresses healthy eating the principles of design should be transferrable to sustainability if the right motivators can be found. In addition to this, the paper does not test any features related to a social experience, however, if they would have done so the results from these would not been as valuable since the younger generation has a very different relationship to social media resulting in the same features being received and interpreted very differently. Lastly, the biggest limitation of this paper is the fact that it has used a small non-diverse sample size of 9 people with similar background, due to this the results of these test, although good, may not be representative of the entire segment and may not be transferrable to other segments although testing is needed to confirm.

[6] J. Pollak, G. Gay, S. Byrne, E. Wagner, D. Retelny, and L. Humphreys, 'It's Time to Eat! Using Mobile Games to Promote Healthy Eating', IEEE Pervasive Computing, vol. 9, no. 3, pp. 21–27, Jul. 2010.

Critique

In this paper, J. Pollak et.al explore how mobile games can inspire and help children to eat healthier using persuasive technology. In general, their project is inspiring and shares their design principles and process in good detail. Their primary persuasive design feature is their digital pet that the user picks when opening the application for the first time. The way the pet is utilised is as a constant correspondent that gives feedback on the food that is consumed, praising when deserved and giving advice when needed. Although this may not be valuable in itself for an older generation, the way it is used is fairly similar to how a social feature could be implanted in a system for young adults and students. One of the most valuable findings was the fact that unless the user is adequately motivated to change it will almost be impossible to change their behaviour through persuasive design. This means that for a persuasive system to be successful, not only does the user need to be motivated but those motivations need to be used in the design for maximum effect. Although it is unlikely that we will be able to create such a system it is paramount that some personalisation is available to the user so that they can modify their application to best reflect their interest and present them with their own motivations. That said, the fact that the user needs to be motivated to change does not mean they have to be motivated before they use the application, through gaining food and sustainability literacy motivation could be created. Lastly, they found that people tend to have healthier habits when they know they are being monitored, this suggests that the results from the paper may be tainted but also that a social aspect to an application may be the catalyst that can motivate people to change through the motivation from friends and loved ones.

For my topic, as stated in the beginning, I have chosen to focus on persuasive design, what it is, how it is used and its effectiveness within our projects space. Our project is utilising technology to improve the user's sustainability and health, both focusing on dinner planning and food consumption as their means to improve. The works included above are all either using persuasive design to change their user's behaviour or technology alone giving me insight into how the different methods are used, whether they could apply to our project and what effect can be expected. Several papers have used some of the same models and tools to create their applications or analyse others that utilise persuasive design. L. Alpay et.al[1], Y. Guo and W. Ding[3], S. Ladwa et.al[4], M. H. Mhd Salim et.al [5] and J. Pollak et.al. [6] all used or analysed the effects of persuasive design on health-related topics, most used either the "Model of Fogg", the "Model of Oinas-Kukkonen" or both. All of these papers, however, use these models a differently, L. Alpay et.al [1] for example primarily tests the usability of these models by observing the results when their unexperienced student use them to complete their projects, this gave me valuable insights into the usability of these methods and the time it could take to apply them properly. Y. Guo and W. Ding [3] use the models to gauge what motivations best match up with different motivations giving me some inspirations into how these models are utilised and what motivations are best paired with the different methods. The rest of the papers use the methods more directly in projects, creating applications and other digital solutions using the models as a guide. These papers have given me direct insight into how the different models are used in projects, the effects they have and how they work on different segments ranging from young adults to the elderly population (55+). The last paper by M. Duncan [2] does not utilise persuasive design, but it attempts to modify behaviour through technology alone, this serves as a baseline or control showing the potential differences persuasive design can have on behaviour changing technology. All the papers except M. Duncan, explore the eHealth space further using the persuasive design methods, analysing the results the different persuasive design methods have and their effectiveness on different segments and in different situations. This results in the eHealth space to be further explored and further developing and testing the different persuasive design methods.