Design considerations for technology in sustainable and nutritious food

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INTRODUCTION

In this contextual bibliography, I will explore "Design considerations for technology in sustainable and nutritious food", specifically looking at how this can apply to social mobile technologies. The choice of this specific area is due to the direction the team project is taking, where the team has decided to use gamification and influencers to create a social mobile technology revolving sustainable and nutritious food. This bibliography includes sources on gamification, such as active learning techniques and persuasive design to engage and motivate users to learn and change behaviours. It includes how we might measure which foods are sustainable, as we ourselves do not have this knowledge. It includes four different social mobile approaches in the field of sustainable and nutritious food, leaning more towards the sustainable aspect, and lastly, it includes how social media influencers may affect food intake. These sources have been selected to form a series of design considerations that our team have gone through and some considerations yet to be discussed. Moreover, these sources should be a good guideline to what considerations designers in this space should think through as many new technologies in this space will encounter the same dilemmas. This bibliography has been structured to first look at the barriers in the space and perceived benefits; followed by gamification considerations that may be discussed in this space; leading into examples on previous attempts in this space with considerations around what angle of sustainability one should focus on; and lastly how to measure which foods are sustainable. Towards the end of this contextual bibliography, the articles will be presented in a concept map, showcasing how they are interlinked followed by an overview statement that details the connections.

BIBLIOGRAPHY

J. Ede, S. Graine, and C. Rhodes, 'Moving Towards Sustainable Food Consumption: Identifying Barriers to Sustainable Student Diets', 2011.

This thesis, by Ede, Graine and Rhodes have set out to identify the barriers preventing students from eating more sustainable, students' definition of sustainable food, and the perceived benefits of eating sustainably. Eight focus groups were conducted in different universities across Australia, Europe and North America to explore these barriers and perceived benefits. The scope of the thesis is set to exclude local produce, food service providers and large scale environmental impact. This paper relates to design consideration for technology in sustainable and nutritious food in terms of identifying perceived barriers and benefits of sustainable food. Such information is integral to defining the issue one aim to tackle with building a new technology in the space. The researchers state their limitations as a self-selection bias where participants over and under-reported desired behaviours. Moreover, they acknowledge the effects language could have on the results. The study concludes that even though many want to eat sustainable, there are cognitive barriers hindering them from doing so. However, the study found that students were concerned about sustainable food, indicating it is starting to become an important factor for many in food selection. This thesis provides the barriers that prevent students from eating more sustainable. Using these barriers lets us make product decisions to can aid in mitigating the effects of these barriers and instead focus on the benefits of sustainable eating. This thesis forms the basis of my research as it illuminates one of the first considerations new technologies in this space should think of.

P. L. Chaney and L. Doukopoulos, 'An Active Learning Exercise on Sustainability and the Water Footprint of Food: The Dinner Party Menu Challenge', The Geography Teacher, vol. 15, no. 4, pp. 173–184, Oct. 2018.

In this paper, Chaney and Doukopoulos argue how an active learning experience on water usage in food production can engage students to perform at a higher cognitive level. They do so by making use of an active learning module with 25 participants, divided into five teams, from a university-level education programme. The scope of the paper is set to design an active learning experience to help students connect the outside world to what they are taught in the classroom. This paper proves useful for designing products in the space of sustainability and nutrition as it explores gamification as a means of not only educating people on sustainability but also to have them think critically about their own actions in terms of their personal sustainable impact. One significant limitation of this paper in terms of how it relates to designing a product, in the space of sustainability and nutrition, is that the study was conducted in a lecture setting. Where a lecture setting might have people in a learning mindset, a product developed in this space might not have the same luxury. The paper concludes that the gamified aspects of the study are advantageous compared to its lecture counterpart in terms of having students operate at higher cognitive levels and motivate them to do so. This study proves useful to my topic of design considerations for technology in the domain of sustainable and nutritious food as our research found a lack of literacy around sustainability and nutrition. Therefore, it is important to consider whether the technology should educate its users on sustainability and nutrition and how to do so effectively.

A. Coates, C. Hardman, J. Halford, P. Christiansen, and E. Boyland, 'Social Media Influencer Marketing and Children's Food Intake: A Randomized Trial', Pediatrics, vol. 143, no. 4, pp. e20182554-2554v1, 2019.

Coates et al. explore through a study on 176 children between the age of 9-11 the impact a social media influencer can have on a healthy lifestyle, by associating mock profiles of known influencers with unhealthy and healthy food. The study covers the effects of social media marketing of unhealthy and healthy snacks compared to nonfood items in a control group. This paper is useful in terms of how it suggests social media influencer promotion of healthy food does not seemingly affect food intake. As for limitations, the study acknowledges the limiting factor of using only two influencers, meaning that these influencers might not resonate with all the participants equally. Moreover, the study did not explore the long term effects social media influencers had on people food intake. The authors conclude that the paper shows a correlation on how social media influencers promoting unhealthy food can cause immediate unhealthy food intake in children, whereas the same cannot be said for healthy food. This paper is useful in terms of providing insight into the consideration of using social media influencers when building new technologies in the space of sustainable and nutritious food. When building a social aspect into the technology, there will often be certain self-made influencers on the platform. This study gives insight into how such influencers or more publically known influencers can affect food intake based on their actions. By far the most interesting aspect is how they seemingly do not have much effect on promoting healthy food intake.
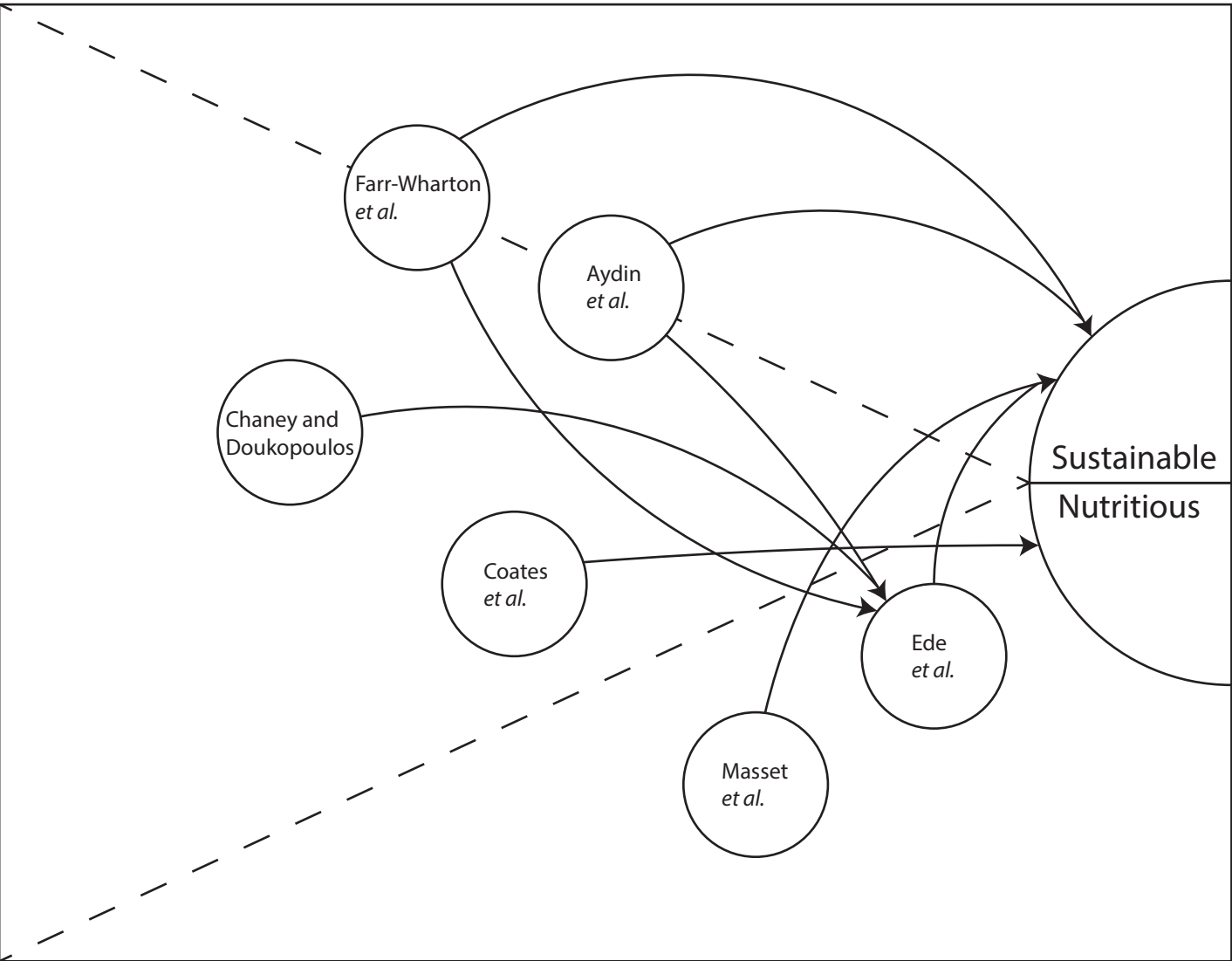
G. Farr-Wharton, J. H.-J. Choi, and M. Foth, 'Food talks back: exploring the role of mobile applications in reducing domestic food wastage', in Proceedings of the 26th Australian Computer-Human Interaction Conference on Designing Futures the Future of Design- OzCHI '14, Sydney, New South Wales, Australia, 2014, pp. 352–361.

Farr-Wharton et al. explores in this paper how mobile technology can be used to promote behavioural change to reduce food waste and food sharing. Throughout this study, the researchers conducted a three-week-long observational study followed by post-observation interviews with 12 participants using the three different mobile applications: Fridge Pal, EatChaFood and LeftoverSwap. With these, the paper focuses on the role of mobile applications in reducing domestic food waste and consumer literacy. This is interesting as Farr-Wharton et al. look at sustainability from a domestic waste and food management viewpoint which is a highly specific issue to tackle in the broad context of what sustainable food is. As this is a vast space, one can not hope to solve all issues in sustainable food with one solution. Therefore, design considerations must be made to guide development in one specific direction, whether it is domestic waste and food management, food production, or purchasing the most sustainable food. The authors state the study's limitations as technical shortcomings in the prototype, few participants and high attrition rates of study participants. With that said, the study concludes that all applications had a positive impact on the user's food literacy and food management. Moreover, they present three social circles of food sharing, known people, known community, and the general public, and how they all relate to the comfort of food sharing. This paper illuminates the design considerations that must be made according to what aspect of sustainability technology should tackle. Moreover, it showcases three examples and three different ways social mobile technology can engage with the space of sustainable food.

A. Aydin, A. Micallef, S. Lovelace, X. Li, V. Cheung, and A. Girouard, 'Save the Kiwi: Encouraging Better Food Management through Behaviour Change and Persuasive Design Theories in a Mobile App', in Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems - CHI EA '17, Denver, Colorado, USA, 2017, pp. 2366–2372.

Aydin et al. explore the use of persuasive design to change consumer behaviour around food consumption to reduce domestic food waste. The study was conducted with 12 adult participants using the Save the Kiwi prototype application which included an A/B scenario testing, observations and think-aloud. In terms of scope, this paper focuses on the reduction of domestic waste through persuasion techniques and food storage information. This paper is particularly valuable given its insight into the effectiveness of the various persuasion techniques in terms of driving behavioural change around domestic food waste. The authors recognise their paper's limitations as having few participants, a limited timeframe, and not having a control group. Aydin et al. conclude the paper with a positive user response to the Save the Kiwi prototype application and that negative reinforcement and punishment was seemingly more effective in causing behaviour change than positive reinforcement. In terms of how this paper relates to design considerations for technology in sustainable and nutritious food, it has similar benefits to the work of Chaney and Doukopoulos[2]. Where Chaney and Doukopoulos focus on active learning through gamification, Aydin et al. focus on gamification through persuasive design to drive behavioural change. Persuasive techniques could be used in- our outside the context of a gamified technology, meaning that these papers both together or separately form important design considerations when building a new technology in this space, where the designers should consider whether gamification is the correct answer, and if so, how it should be done. Moreover, Save the Kiwi is another example of an attempt on social mobile technology in this space which has received positive feedback from its users.

G. Masset, F. Vieux, and N. Darmon, 'Which functional unit to identify sustainable foods?', Public Health Nutrition, vol. 18, no. 13, pp. 2488–2497, Sep. 2015.

Masset et al. aim to evaluate the two functional units of measuring sustainable food, per 100g and per 100kcal. They evaluate these units based on price, greenhouse gas emissions and nutrition, covering a spectrum of 374 different foods found to be consumed through The French Individual and National Dietary Survey. This study explores food consumed in an everyday French diet meaning that other cultural foods may be outside of the scope of this study. The usefulness of this study comes in how to best determine which foods are sustainable when building a new technology in the space of sustainable and nutritious food. As the scope of the study is set to only explore food intake in France can be considered a limitation for this paper as cultural specific foods might not have been included. The paper concludes with neither the 100g or 100 kcal functional unit being a better way of measuring sustainable food and that future research should be done to find a better way of measuring sustainable food that includes other criteria. This paper is valuable as designers building new technologies in the space of sustainable and nutritious food should consider how they evaluate what food is nutritious and sustainable. This paper concludes that there is no one right way of determining whether food is sustainable, which means designers have to make design considerations related to whether they should try to evaluate sustainable food at all, or how they wish to evaluate sustainable foods if they choose to implement such a feature.

OVERVIEW STATEMENT

The papers presented in this contextual bibliography, in terms of the research focus, are connected both indirectly through all revolving around food and also in many ways directly. Looking at the concept map, we can see that there is a divide between social, mobile and non-social mobile, in addition to sustainability and nutrition. Farr-Wharton[4] and Aydin et al.[5] are both presenting social and mobile technologies directly focusing on sustainability in terms of food waste, where they at the same time are connected to the barriers found in Ede et al.[1] as they are both trying to figure out a solution to more sustainable habits. On the social side of the concept map, we have the articles that explore gamification and learning, Chaney and Doukopolos[2], and Coates et al.[3]. Where the former is directly tied to teaching about sustainability connecting the paper to the barriers found in Ede et al.[1], the latter is not looking at barriers, but rather direct influence, connecting this work to nutrition directly. On the non-social mobile side of the concept map, we have Ede et al.[1] and Masset et al.[6] where the latter is only tied to how to measure sustainable food, and the former, discussing barriers and perceived benefits of sustainable eating, is the centre of most articles in this bibliography, as most others try to adjust or straight up remove these barriers. Throughout our team's progress, we have discussed all of these aspects and found some similarities from our own research. Although specific testing into the form of gamification and persuasive design has yet to be done, an attempt has been made to implement this feature into the project to engage users and motivate them to form new habits. Moreover, the team has opted to include influencers as a core feature of the product. Even though Coates et al. state that social media influencers with healthy food did not impact users in the same way as social media influencers with unhealthy food, our research still found that many users tend to find their inspirations from influencers. As for choosing a functional unit to measure sustainable food, this is a feature we do not have the knowledge to implement, which we have determined to include but not finish at this stage of the development.

REFERENCES

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