

Domain research

Health & Wellbeing

How to enable university students to engage in social activities to reduce their sedentary behavior in daily life and help with their physical and mental health?

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Introduction

The domain we defined is “How to enable undergraduate students to engage in social sports to reduce their sedentary behaviour in daily life and help with their physical and mental health?”. University students as our domain focused group got less attention in the sedentary behaviour area, most of articles mentioned workers’ long time sedentary behaviour and proposed plan for addressing this problem to help workers. However, we found that majority university students which as an ignored group also encounter secondary behaviour issue, which make a negative impact on their physical and mental health. The reasons cause their secondary behaviour are various, like too much homework, playing game, or even just sitting on the chair without doing nothing, some of them even do not realize that they are experiencing a long-time sedentary behaviour. Addicted to mobile technology is also a reason of undergraduate students who have sedentary behaviour, it means that it is very common for undergraduate students to use mobile technology. The aim of our research is for exploring suitable ways for undergraduate students to help them improve sedentary behaviour and increase their physical activities. Thus, compared to other ways, using mobile technology to attract these undergraduate students is easier, they are more likely to accept this way to improve their sedentary behaviour and participant social activities. Nowadays, people are hard to keep using a fitness app for doing exercise, because it is very easy to get boring after they are using the app after a while, thus, the interesting social element is also crucial for a mobile app to encourage undergraduate students into physical activities.

Literature research

J. Maitland and K. A. Siek, ‘Technological approaches to promoting physical activity’, in *Proceedings of the 21st Annual Conference of the Australian Computer-Human Interaction Special Interest Group on Design: Open 24/7 - OZCHI ’09, Melbourne, Australia, 2009*, p. 277. doi: 10.1145/1738826.1738873.

Abstract: “This paper reflects on the HCI community’s current and potential contributions to the problem of promoting physical activity. It does so by first presenting a conceptual overview of existing research, and then draws from the findings of a study of attitudes towards health and health-related behaviour to frame a critical review of the current state of the art. In doing so, we identify an area of outstanding need and opportunity for future research: conveying the value of physical activity to those unconvinced of its importance.”

Critique: The article outlines its classification of apps that promote physical activity into three categories: exercise diaries, shared awareness apps, and sports games. And physical activity monitoring is a basic part of each type.

Exercise log: The advantage of the digital version is that it can help individuals establish routines and maintain continuous motivation through increasing sensing capabilities, progress feedback, and comparisons with others.

Shared activity awareness applications: These lightweight social awareness applications represent a new type of health promotion technology. They promote physical activity through socialization and at the same time create resources for content related to physical activity. This type of application is characterized by tracking and sharing activity data, combined with cooperation and competition.

Exergames: It can improve the level of physical activity of gamers and people with sedentary behaviour.

The study conducted focus groups and interviews with 17 female participants between the ages of 20 and 56. Its purpose is to study their perceptions and behaviors about health and health-related behaviors. The results show that lack of time and fatigue are the main reasons for their inactivity.

The research results emphasized a special direction that deserves our consideration in the process of problem research, that is, to convey the value of the physical activity to people who do not believe in the importance of physical activity. The research made some suggestions based on the important elements of the physical activity promotion system. Among them, the degree of attention includes the gradual participation from partial attention or occasional attention, and the nature of publicity activities, such as the richness of information, is worth learning from.

A. Turchaninova, A. Khatri, I. Uyanik, and I. Pavlidis, 'Role model in human physical activity', in *Proceedings of the conference on Wireless Health*, Bethesda Maryland, Oct. 2015, pp. 1–6. doi: [10.1145/2811780.2811917](https://doi.org/10.1145/2811780.2811917).

Abstract: “Physical activity is an area of life in which social influence plays a major role. Observing the activity of a sedentary person may cause the observer to exercise less; observing a persistently active person can serve as a motivating factor. The goal of this research is to determine how to optimally pair individuals in order to facilitate motivational relationships with respect to physical activity. This research performs an observational study of data collected from a mobile health and fitness application, iBurnCalorie, which allows users to follow each other in addition to tracking physical activity. Through this social feature, this study examines the influence of users on each other's activity patterns. Our preliminary results indicate that some users have chosen effective role models without any intervention. If this natural effect can be

replicated, such a novel interventional networking feature could have a significant impact within iBurnCalorie and all similar applications.”

Critique: Because most people use mobile phone in their daily life, this paper use mobile app “iBurnCalorie” to collect data. During the process of collecting data, participators are supported to monitoring their physical activities by using this app. This app also allows users to interact with each other. After conducting the study, the paper presented those users in this app are competitive and they always following a person in the app for performing better to achieve this person’s record. This study also compared the individual user and users in pairs, authors found that the outcomes of users in pairs are better than individual user, it means interactive process could encourage users into more physical activities. This psychology phenomenon motivates users in pairs to keep doing exercise, thus, it makes positive impact on their health and wellbeing. However, negative competition would discourage people and result in giving up attending physical activities. How to ideally motivate people to do exercises without negative impact is important.

Why it is important for my design space:

Because our domain is about how to help undergraduate students reduce their sedentary behaviour and encourage them into physical activities. This paper discussed about how one person got motivated from another person and to do more exercise. It implies that it is very difficult for people to effectively reduce sedentary behaviour individually, in order to encourage students to do more exercise, a social platform is necessary to be provided to allows people see other’ achievement and get motivated from others. However, it is necessary to mention private issue during the sharing data process.

D. Foster, C. Linehan, B. Kirman, S. Lawson, and G. James, ‘Motivating physical activity at work: using persuasive social media for competitive step counting’, in Proceedings of the 14th International Academic MindTrek Conference on Envisioning Future Media Environments - MindTrek ’10, Tampere, Finland, 2010, p. 111. doi: 10.1145/1930488.1930510.

Abstract: “Previous research has suggested that social and competitive interaction over online social networking sites could be harnessed in order to motivate behaviour change in users. This paper presents the design and in-the-wild evaluation of StepMatron, a Facebook application designed to provide social and competitive context for daily pedometer readings in order to motivate physical activity in the working environment. A study was conducted in order to determine whether interactions between users via the application more successfully motivated physical

activity than simply recording daily step counts in a similar application. Ten participants (1 male), all nurses working in a UK hospital, used the application across two conditions over the course of the study. In the socially-enabled condition, participants could view each other's step data and make comparisons and comments. In the non-social condition, participants could only view their own personal step data. A significant increase in step activity was observed in the socially enabled condition. Our findings highlight the potential of social media as a means for generating positive behaviour change. They also suggest that simple mobile devices can function as an inexpensive, accessible and powerful trigger towards this behaviour change without necessitating the use of overly complex and expensive mobile applications or devices."

Critique: This article reports the use of simple mobile devices (SMD), namely digital pedometers and social applications to improve physical health. The team combines Facebook and SMD, a very popular contemporary online social network, to allow participants to participate in their stepping activities in a timely and interesting way. Its purpose is to demonstrate the use of social media applications for data recording and feedback, and to test the feasibility of using social applications to promote behavior change.

The team developed the Facebook-based application Step Matron and conducted user research based on the application. Participants are 10 registered nurses who work in the same hospital and know each other, including 9 females and 1 male. Participants submit their step count data as a task in the Step Matron application. The two modes for each participant to participate in using the application include social and non-social. In the social mode, participants can view their own and friends' step data, leaderboards, and comment on other people's activities. In non-social mode, participants can only see their own steps.

The team conducted quantitative and qualitative analysis on the data obtained. From these data, it can be found that basically all participants took more steps in the social mode than in the non-social mode. And participants spent more time browsing rankings and comments than other parts. These data show that user communication in social media can help motivate people to improve physical activity.

Although the paper describes relatively small-scale research on the specific environment of the workplace, its research results provide a basis and ideas for solving the problem space we put forward through social technology. The advantage of social applications such as Step Matron in improving physical activity compared to other methods is that it is easier and more interesting. Users motivate each other through special social cooperation and competition with others. In addition, competitions triggered by social applications are not only played when users use the application, but also potentially affect users during the rest of the time. We can consider using social applications to encourage sedentary college students to participate in sports activities.

Y. Wang, A. Fadhil, and H. Reiterer, 'Supporting Action Planning for Sedentary Behavior Change by Visualizing Personal Mobility Patterns on Smartphone', in *Proceedings of the 12th EAI International Conference on Pervasive Computing Technologies for Healthcare*, New York NY USA, May 2018, pp. 396–401. doi: 10.1145/3240925.3240962.

Abstract: "Scientific evidence has shown that long-term sedentary behaviour is detrimental to human health. Therefore, a trend appears in the field of healthy lifestyle promotion that more attention is drawn to sedentary behaviour rather than only physical activity. However, technology-based mobile health intervention tools targeting reducing sedentary behaviour are still lacking. This paper aims to explore a solution for sedentary behaviour change through supporting action planning. Action planning can not only bridge the intention-behavior gap in controlled motivation processes, but also enforce the cue-behavior association in unconscious processes. We present a smartphone-based personal mobility pattern visualization, with which we expect the users can make better action plans. The interactive visualization integrates temporal and spatial patterns of personal sedentary and walking behaviour, to provide explicit hints on when, where, and how to reduce sedentary behaviour and increase daily steps. We also present our experimental design to evaluate the visualization-based intervention tool."

Critique: This article introduces a smartphone-based visualization tool for personal mobility patterns, focusing on action plans that support changes in sedentary behaviour. The team encourages users to walk more as a means to reduce sedentary behaviour. And put forward that the action plan is an irreplaceable component of the sedentary behaviour change intervention.

The app designed by the team puts forward the idea of visualizing sedentary and active time based on movement patterns. The idea is to provide more contextual details about the sedentary behaviour of users. The interactive interface contains maps and bar graphs. The bar graph illustrates the temporal pattern, and the map illustrates the spatial pattern. Through all modes based on time, space and walking route information, it supports users to easily understand their movement patterns and make action plans. In addition, the application uses a state-based method including time-based information collection to efficiently collect mobility data.

In addition, the article proposes a study to measure the effectiveness of its design. The requirement for participants is that they all have the idea of changing sedentary behaviour, and they want to increase the number of daily steps without goals and arrangements.

The method proposed in this study takes into account the location, time, and physical activity of users based on mobile technology. An interesting point is that the app proposes to mark places where the user spends a long time as a place of interest (POI). Then the conversion between POI and other factors contains information about

user activity. This visualization application can help users better understand their sedentary behaviour. Based on this, we can consider applying this visual mobility model and designing an action plan when solving problem spaces, so as to improve sedentary behaviour.

S. Cates, 'Physical Activity in the Classroom across the Curriculum', in *Proceedings of the 51st ACM Technical Symposium on Computer Science Education, Portland OR USA, Feb. 2020*, pp. 1320–1320. doi: [10.1145/3328778.3372607](https://doi.org/10.1145/3328778.3372607).

Abstract: “This work describes activities involving movement suitable for both advanced and introductory computer science courses. Ongoing work seeks to quantify the impact of such activities on student learning outcomes and student engagement.”

Critique: This paper aimed to find out whether physical activities added into classroom is good to students' learning. In the computer science major, it is very common to see that students sit at the computer tables for hours without any physical activities. In the study, some physical activities are added into class for reducing the negative influence on students' physical and mental health. As a result, adding physical activities could effectively increase students' concentration, engagement and academic performance. These physical activities are suitable in the workshop to encourage students have a higher participatory, less sedentary. However, finding suitable physical activities for the course is also a hard issue, the physical activities are also required to interesting enough to make students more active.

Why it is important for my design space:

Because the environment in this paper is the same as our domain, our domain environment is in the university. Physical activities are directly added into classroom, it is as an effective method to reduce students' sedentary behaviour. Students do not need to think about how to attend more physical activities in their leisure time, they just pay attention to the class and active in the class, then follow teachers' direction to get into the physical activities. Especially for the major like computer science, students always sit at the computer table and do not willing to attend physical activities in their leisure time, most of them has sedentary issue and do not realize. The results from this paper could help us know that physical activities in the class are positive to students' academic achievement, physical and mental health.

K. Dillon, S. Rollo, and H. Prapavessis, 'A combined health action process approach and mHealth intervention to reduce sedentary behaviour in university students – a randomized controlled trial', *Psychology & Health*, pp. 1–20, Mar. 2021, doi: 10.1080/08870446.2021.1900574.

Abstract: “Objective: This investigation evaluated the effectiveness of a Health Action Process Approach (HAPA) based planning intervention augmented with text messages to reduce student-related sitting time (primary outcome) and increase specific non-sedentary behaviours. Relationships between the HAPA volitional constructs and sedentary and non-sedentary behaviours were also explored. Design: University students (Mage = 21.13 y; SD = 4.81) were randomized into either a HAPA intervention (n = 28) or control (n = 33) condition. Main Outcome Measures: School-related sitting time, time spent in specific non-sedentary behaviours and HAPA volitional constructs were assessed at baseline, weeks 2, 4, 6 (post-intervention) and 8 (follow-up). Results: Significant group by time interaction effects favouring the intervention group were found for sitting time ($p = 0.004$, $\eta^2 = 0.10$), walking time ($p = 0.021$, $\eta^2 = 0.06$) and stretching time ($p = 0.023$, $\eta^2 = 0.08$), as well as for action planning ($p < 0.001$, $\eta^2 = 0.17$), coping planning ($p < 0.001$, $\eta^2 = 0.20$) and action control ($p < 0.001$, $\eta^2 = 0.20$). Significant correlations ($p < 0.05$) were also found between the HAPA constructs and sitting-related outcomes. Conclusions: Combining a HAPA-based planning intervention with text messages can reduce student-related sitting time in university students.”

Critique: In this paper, it showed that long-time students' sedentary behaviour has a negative influence on their mental health, like increased risk of anxiety, long-time sedentary also has negative impact on physical health, like cardiovascular disease. University students as a large group to have long time secondary behaviour, the period of their sedentary behaviour up to 14.35 hours/day. As for the study, because there are four school-related activities which are walking, standing, sitting and stretching, participants are required to record their activities in the school. As a result, offering frequently notification for students could be useful for reminding them to reduce sedentary behaviour and help them maintain their sedentary behaviour change for a long time. HAPA as a method to decrease students' sedentary behaviour is also useful. After using these two methods, the data showed that university students' sitting secondary time decrease 30 minutes a day on average, it means these two methods are useful for decreasing university students' sedentary behaviour.

Why it is important for my design space:

Because the domain of this paper is exactly the same as our domain. At the start of this paper showed the long-time sedentary behaviour would leads to negative physical and mental health for university students. At the body of this paper demonstrate the process of study to find out whether methods used in the study is effective enough to reduce students' sedentary behaviour. The result was positive, it means HAPA and

frequently notification are useful for helping university students reduce sedentary behaviour.

J. E. Barkley, A. Lepp, and E. L. Glickman, “Pokémon Go!” May Promote Walking, Discourage Sedentary Behavior in College Students’, *Games for Health Journal*, vol. 6, no. 3, pp. 165–170, Jun. 2017, doi: 10.1089/g4h.2017.0009.

Abstract: “Objective: To assess self-reported walking and sedentary behavior in young adults before and after downloading “Pokémon Go!”.

Materials and Methods: In September 2016, a sample of 358 (19.8 ± 2.1 years old, $n = 187$ females) college students who had downloaded “Pokémon Go!” on their cellular telephones (i.e., cell phones) were surveyed for weekly walking and sedentary behavior via the International Physical Activity Questionnaire. A single interview was administered to participants who estimated their walking and sedentary behavior at three time points: the week immediately preceding their download of “Pokémon Go!” (Baseline), the first week after downloading the game (Time 1), and the week the survey was completed (Time 2). Differences in self-reported physical activity and sedentary behavior across the three time points and across the two genders were compared via analyses of variance.

Results: There was a significant main effect of time ($F \geq 49.3$, $P \leq 0.001$) for walking and sedentary behavior. Participants reported greater ($t \geq 9.5$, $P < 0.001$) daily walking during Time 1 (218.6 ± 156.3 minutes) and Time 2 (182.7 ± 172.1 minutes) versus the baseline (108.5 ± 110.8 minutes). Walking behavior was also significantly greater ($t = 4.1$, $P < 0.001$) at Time 1 versus Time 2. Participants reported greater ($t \geq 6.5$, $P < 0.001$) daily sedentary behavior during baseline (346.6 ± 201.3 minutes) versus both Time 1 (261.7 ± 172.4 minutes) and Time 2 (284.3 ± 175.4 minutes). Sedentary behavior was also significantly greater ($t = 2.6$, $P = 0.03$) at Time 2 versus Time 1. There were no effects of gender ($F \leq 1.8$, $P \geq 0.17$).

Conclusion: Playing “Pokémon Go!” was associated with increased self-reported walking and decreased sedentary behavior. Such games hold promise as technology that may promote physical activity and discourage sedentary behavior.”

Critique: In this paper, it stated that using internet-connected cellular phone is a very common behaviour among college-aged adults. In the aspect of providing medical care in the cell phone, it makes a positive impact on sedentary behaviour for undergraduate students by motivating them to be involved in physical activities. Some fitness apps are popular for students to do exercise but using this kind of app requires users to have a strong willpower. Thus, this paper demonstrated a game app called

“Pokémon Go!” to attract users and help them improve sedentary behaviour by playing game in this app. College students were covered in the survey and interview. After conducting the research, authors found that walking behaviour increased 68%, sedentary behaviour decreased 25% after downloading this game. It means this game app could effectively help college students decrease sedentary behaviour and increased walking. The results showed that participants’ sedentary behaviour was still decreasing after downloading one week. It means that this game could continuously motivates users to walking and reducing sedentary behaviour. Furthermore, this game supports multi-player mode, players could play together in the game through AR technology, this social function enhances the fun of the game and motivates more users to stop sedentary behaviour and play the physical game. However, this app still has a limitation, because this is a kind of AR game, it has possibility to get injured when users play the game.

Why it is important for my design space:

Nowadays, most apps are about monitoring users’ physical activities with less fun, this issue causes users hard to consistently use those apps. This app combined AR technology into a game, this idea is innovative and attractive for the group of college students. This game becomes very popular also because those users are familiar with the characters in this game and the story in this game. It implies that an AR/VR game app is attractive for college students to play and reduce their sedentary behaviour, but the characters and story covered in the game should not be complex, the aim of design the app is for helping students reduce sedentary behaviour, thus, easier story could help users faster to immerse in the game.

H. Brombacher, X. Ren, S. Vos, and C. Lallemand, ‘Visualizing Computer-Based Activity on Ambient Displays to Reduce Sedentary Behavior at Work’, in 32nd Australian Conference on Human-Computer Interaction, Sydney NSW Australia, Dec. 2020, pp. 760–764. doi: 10.1145/3441000.3441022.

Abstract: “Workplace health interventions have predominantly been designed around visualizations of physical activity data in the work routine. Yet, contextual factors, such as computer-based activity, appears to be crucial to support healthier behaviors at work. In this re- search, we explore the effect of visualizing computer-based activity to prompt physical activity at work, through desktop-based am- bient displays. Based on our prototypes Yamin and Apphia, we conducted an exploratory qualitative user study in a lab setting with office workers (N=16). Results showed that visualizing one’s computer-based activity could potentially increase the awareness, self-reflection, and social interactions for individuals to become physically active. With our findings, we discuss design implications for using computer activity data in

a physical form as a motivational factor to encourage physically active workstyles. We present directions for future field studies to gain further insights on this topic.”

Critique: This paper mainly discussed about how effective of using visualizing computer-based activities to encourage more physical activities for people at work. At the start of this paper mentioned that more and more people got diseases because of sedentary-focused behaviour at work. Authors attempted that visualizing computer-based working behaviour may increase workers’ self-awareness and self-reflection, these two realizations motivate them to have more physical activities. Then Yamin and Apphia as research probes were used to visualize participators’ computer-activity and their productivity. As a result, Apphia as the probe for recording work productivity is effective for participators to increase their self-awareness and realize their long time sedentary working behaviour, the higher self-awareness leads to higher motivation for them to have physical activity. Moreover, these two tools also could help workers to encourage each other by observing these two tools, if others sit at the computer for a long time, they are supported to remind these people, so these tools could help workers mutual supervision and encourage physical activities among co-workers. However, the gap of these tools is the private issue for users, due to workers could see others’ data, this reason could also result in negative competition.

Why it is important for my design space:

The environment of our selected domain is in the university, this environment is very similar to this paper, students are busy for their study and be used to sit at the computer table, so university students and workers are both have fewer physical activities because the long-time sedentary behaviour issue, therefore, the tools used in this paper could also be useful for our domain. Based on this paper, we found that increasing self-awareness of people is an important element to help people realize their long-time sedentary behaviour and encourage them to involve in physical activities. The tools used in this paper is very worth for learning for solve our design space’s problem. However, even if their tools could encourage social connection between people by presenting each person’s data, some issues were found from study, like private issue and negative competition. Our design need to use this paper as a reference and also avoid these issues presented in this paper.

S. Santarossa and S. J. Woodruff, ‘#LancerHealth: Using Twitter and Instagram as a tool in a campus wide health promotion initiative’, J Public Health Res, Apr. 2018, doi: 10.4081/jphr.2018.1166.

Abstract: “The present study aimed to explore using popular technology that people already have/use as a health promotion tool, in a campus wide social media health

promotion initiative, entitled #LancerHealth. During a two-week period the university community was asked to share photos on Twitter and Instagram of What does being healthy on campus look like to you?, while tagging the image with #LancerHealth. All publically tagged media was collected using the Netlytic software and analysed. Text analysis (N=234 records, Twitter; N=141 records, Instagram) revealed that the majority of the conversation was positive and focused on health and the university. Social network analysis, based on five network properties, showed a small network with little interaction. Lastly, photo coding analysis (N=71 unique image) indicated that the majority of the shared images were of physical activity (52%) and on campus (80%). Further research into this area is warranted.”

Critique: This article reports on the use of Twitter and Instagram as a basis for a campus-wide SNS health promotion activity called #LancerHealth. In addition, the study evaluates the images tagged #LancerHealth and the social support of SNS to understand the views of school members on-campus health.

The study lasted for a year, and the participants were campus staff, students, and teachers. They were asked to express the health of the campus by posting photos on Twitter or Instagram and using the tag LancerHealth. The study used Netlytic to collect data from Twitter and Instagram. The images posted on social media are classified and coded by content, including physical activity, food, mental health, and others.

Unfortunately, few university members participate in the health promotion program. The research results show that there is a lack of opinion leaders participating in #LancerHealth. Although the social communication of the initiative was not as successful as it was originally, the results showed that the dialogue among participants was positive, health-conscious, and universities were frequently mentioned. This result shows that online conversations can help college students identify and promote campus activities. These activities are expressed positively and healthily from the perspective of the students.

In the health promotion of social media mentioned in the study, it is also interesting to identify whether the photos mentioned in the photo identification were taken on-campus or off-campus and whether the photos were posted by student-athletes, university teams or clubs. In this campus, participation in various health activities in school can be shared via social media. In addition, the research also provides a research direction for us to investigate the reasons why users use health promotion programs. These aspects will help us to further study the application of social technology to promote the health of college students.

H. Junaid, A. J. Bulla, M. Benjamin, T. Wind, and D. Nazaruk, 'Using Self-Management and Social Media to Increase Steps in Sedentary College Students', *Behav Analysis Practice*, Aug. 2020, doi: 10.1007/s40617-020-00445-8.

Abstract: "Physical inactivity increases the risk of many chronic diseases. Approximately 40% to 50% of college students are physically inactive. Research suggests that when students establish physical activity routines during their college careers, they have a greater chance of maintaining those specific behaviors over time. The current study sought to increase steps in sedentary college students by using a self-management intervention consisting of self-monitoring, goal setting, social media (Instagram), weekly meetings, and social feedback. Researchers used a multiple-baseline across-participants design with an embedded reversal to assess the effects of the packaged intervention. The intervention increased the physical activity levels of 3 of the 4 participants. The results of the current study suggest that multiple strategies such as the use of technological innovations, goal setting, and social media feedback should be considered and **leveraged in programs aimed at increasing the level of physical activity among college students.**"

Critique: This article studies how to improve the physical activity of college students. The team researched several factors that may affect the activities of sedentary college students. These factors include self-monitoring, goal setting, social media, weekly meetings, and social feedback.

The participants in the study were four full-time college students who were over 18 years of age, and they walked less than 10,000 steps per day. The study time is 4 months. First, the study used Fitbit Ace to track participants' steps. Participants can use the app to set goals and see if they have reached their daily goals, and the number of days they have been reached or exceeded. Second, each participant was also required to use the log and SCC to record their relevant data daily under the intervention conditions. SCC can provide quick feedback on participants' current and historical performance. The team uses the app Instagram as the basic material for public release, encouraging participants to comment and congratulate each other's posts. In addition, the team meets with participants every week to discuss the situation of the previous week. Finally, in the final stage of the study, the team conducted a social acceptance survey of the participants.

The team defines and measures physical activity by the number of steps the participants take each day and uses three dependent variables including frequency, bounce, and level to judge several sections of activity during the study. In addition, the team used the multi-baseline cross-participant design and multi-treatment reversal (ABCBA) add-on to measure the effectiveness of the intervention.

It is worth noting that the duration of the study includes the entire semester of college students. It covers the reality and actual situations experienced by students throughout the semester. And participants can walk at any time of the day, no matter

how long it lasts. The research conducted in this way fits very well with the dynamic nature of the university's lifestyle. In our solution, the participant's family or friends can be included in the social media group to obtain additional social support. In addition, web-based technology can be used to hold meetings to achieve intervention.

Overview

It is found that the existing technical applications that can promote exercise for health purposes can be roughly divided into three categories including digital exercise diary, contribution activity perception, and game activity through literature research. And these types of applications are based on physical activity monitoring as the most basic element. This shows that mobile technology is a key element in the design of promoting health and improving physical activity.

Games such as Pokémon Go that are based on physical behaviour monitoring also have significant effects in changing sedentary behaviour. Different from other purely mobile and activity monitoring games, the social aspects such as player battles of this game can also stimulate the behaviour of sedentary people especially sedentary players who are addicted to the game.

Compared with the other two categories, shared activity-aware applications are more in line with our research content on promoting social activities for health purposes. In the existing social technology applications that promote physical activity, the most common intervention is a combination of social media and data tracking. The characters of this method are tracking and sharing users' physical activity data, and introducing cooperation and competition to motivate users to improve their own activity levels. It is found that the application of social media plays an important role in promoting physical activity and changing sedentary behaviour through research. In addition, it is found that the application of social media is more effective through research on changes in sedentary behaviour among college students. The competition between college students and peers makes them feel interesting and relaxed. And this kind of competition and cooperation allows them to maintain this state when they are not viewing the application. This shows that the application of social technology in college students can enable them to persist longer in the process of changing sedentary behaviour and promoting health.

In addition, it is found that the application of data visualization technology is more effective in changing sedentary behaviour through research. The combination of this method and social technology is also worth thinking about.

Description of problem space

Scientific evidence shows that long-term sedentary behaviour is harmful to human health, such as increasing the risk of many chronic diseases. Therefore, people are paying more and more attention to sedentary behaviours rather than just physical activities in terms of healthy living. At present, many mobile monitoring-based technologies are aimed at changing the sedentary behaviour of office workers, while ignoring the serious phenomenon of sedentary lifestyle among college students. The sedentary lifestyle of college students may cause them to break away from social activities and affect their physical and mental health. Therefore, it is necessary to establish intervention measures of social activity for this group and apply social awareness to health promotion technology. It is worth to research that how to enable university students to engage in social activities to reduce their sedentary behaviour in daily life and help with their physical and mental health.

Idea

A mobile application for college students that can track, share activity data, as well as recommend and participate in social activities on campus. The application can track and visualize user activity data. Show the action track on the map, and show the bar graph of time and number of steps. The places where the user stays for a long time will be marked as places of interest to the user. Users can view the activities held in these locations and daily activity sharing from other students. Also, users can view the ranking of the steps of the students and friends on campus and the ranking of the enthusiasm for participating in the activity. In addition, users can share daily step data and activity data, as well as view and comment on friends' sharing. Through this model of cooperation and competition among peers, college students can be encouraged to participate in social activities and thus change their sedentary habits.

User research

Use interviews to conduct user research. Participants will choose at least 5 college students, especially those with sedentary behaviours or low daily activity. The purpose of this research is to understand the factors that can attract and motivate college students to change their sedentary behaviours, as well as their needs for the application of social technology in promoting college student activities.

Sketch



Literature research

Existing shared activity awareness applications mostly use a combination of social network intervention and mobile tracking devices, such as the solutions mentioned in the research of S. Santarossa and D. Foster. The research results of H.L.Tong and others also showed the effectiveness of mobile social network intervention. This type of application is characterized by tracking and sharing physical activity levels, combined with cooperation and competition. This way can effectively improve the level of physical activity. As mentioned by J. Maitland, this type of social awareness application represents a new type of health promotion technology. They promote physical activity through socialization. Participants provide motivational goals for each other by introducing interesting social competition with their peers. And H. Junaid's research shows that the introduction of social media has a great effect on improving the sedentary behaviour of college students.

Reference

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