# How Should Web-Based Physical Activity and Healthy Eating Interventions be Designed for Young Office Workers? A Qualitative Approach

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## Abstract

Most young office workers do not reach current guidelines for physical activity (PA) and healthy eating. They find themselves in a critical phase of life which is characterized by changing daily routines and new demands. Web-based interventions are a promising approach aimed at promoting healthy behaviors. Nevertheless, usage and efficacy are often low and short-term. Target group participation is of growing importance to identify expectations and preferences of potential users. Four focus groups were conducted with 36 young office workers (apprentices). The discussions were audio-recorded, transcribed and analyzed by two researchers following the method of structuring content. Young office workers are looking for health information regarding PA and healthy eating which can be integrated into everyday life. The content should be available in an up-to-date mix of multimedia. Themes for increasing platform usage are: interactivity, regular updates, possibility of documentation, individualization, a calendar option with regular sports events, a location finder and a reminder function to stay motivated. Furthermore, it is also mentioned that smartphone suitability and credibility are basic prerequisites for using a potential intervention. This present study makes an important contribution regarding the conception of future web-based interventions for young office workers.

**Keywords:** Young office workers; Health promotion; Web-based interventions; Participation; Focus groups; Prevention

## Introduction

The positive impact of regular physical activity (PA) and healthy eating on the prevention of several chronic diseases is well documented [1]. Accordingly, adults should do at least 150 minutes of moderate-intensity aerobic PA or 75 minutes of vigorous-intensity aerobic activity per week, or a combination of both [2]. However, young adults who have just started working are often not able to follow these guidelines: In Germany 81.6% of women and 58.7% of men in the age range of 18-29 years are physically active less than 2.5 hrs/week and therefore do not meet current PA recommendations for adults [3]. In general, physical inactivity is a common problem in western countries [4]. Furthermore, it is well established that activity levels decline during the phase of young adulthood [5]. Besides the lack of PA,

young people are indeed aware of the value of healthy food and drink but do not necessarily adopt a healthy diet [6]. Mensink and colleagues [7] show that only 13.8% of German women and 5% of German men (aged 18-29) consume an appropriate level of fruit and vegetables. However, young office workers are an underrepresented target-group for health-promoting measures [8-10]. Members of this target group find themselves in a critical phase of life which is characterized by changing routines, increased autonomy and adult responsibilities [5,9,10], e.g. due to demands made by the world of work, by building a career and by founding own families [11]. They have to orient themselves within their vocational field and to take responsibility for their actions [11]. Furthermore, young adults are subjected to increased physical and mental strains, e.g. stress, high pressure to perform and, in the case of office work, long periods of sitting

[5,12,13]. The fact that most young adults do not achieve the PA recommendations and standards for healthy eating highlight the importance of target-group specific interventions [2,14]. Van Gemert- Pijnen and colleagues [15] emphasize the necessity of adapted strategies that consider the demands of living and working environments of young adults.

Current research shows that information and communication technologies (ICT), e.g. the interactive internet, are a promising approach aimed at promoting healthy behaviors [16-18]. Today, the internet has become an integral part of young people's everyday life. The level of internet access of young adults increased in Germany between 2002 and 2010 from 66% to 96% [19]. Simultaneously, internet use for health-related topics increased too; in particular among young adults [20]. Online communication offers independency from time and place and therefore allows wide access to different and new target groups at a relatively low cost.

However, systematic reviews and meta-analyses show that effect sizes of web-based interventions to promote PA were small and short or medium term follow up [16,21,22]. In addition to this, one of the major challenges is to sustain user engagement over a longer period [21,22]. Eysenbach [23] had already expressed this challenge of web-based health promotion more than ten years ago as "law of attrition".

In order to identify the expectations and preferences of the target audience, potential users must participate in the planning and conception phase of a web-based intervention [15,24]. This first step can lead to a more target- group specific intervention which increases engagement, effectiveness and accuracy [25]. However, there is currently little evidence regarding the expectations and preferences of young office workers within the framework of web-based health promotion [26].

The aim of our study is to identify relevant factors which have to be considered when planning an internet platform for increasing physical activity and improving diet of young office workers.

# Methods

The conduct and report this paper followed the consolidated criteria for reporting qualitative research (COREQ) [27].

## Study design

A qualitative study using focus groups was designed to examine the expectations and preferences of young office workers regarding a web-based intervention to increase physical activity and to improve diet.

Focus groups offer the opportunity to identify feelings and thoughts of a special group concerning one specific topic. Participants appear as multipliers because of the interactive and natural atmosphere of discussion [28]. The researcher structures the discussion and gains the chance of generating qualitative data regarding a specific field of interest [29].

## Participants

Two vocational school classes with a total of 36 apprentices

were recruited via vocational school teachers using existing partnerships between the German Sport University Cologne, Germany, and vocational schools based in different urban districts of Cologne, Germany. In Germany, apprentices participate in a dual system combining vocational schools (2 days/week) and apprenticing companies (3 days/week). All participants were undergoing a vocational training for a commercial profession, which presupposes long sedentary periods in office.

There were no restrictions regarding gender, socio-demographic background and health status or activity behavior. The age range was not limited either; expecting vocational school students to be young adults perse.

## Procedures and data collection

A discussion guide was developed to structure the focus groups and to ensure that all relevant topics concerning the research question would be discussed. The development and structure of the discussion guide followed the recommendations of Krueger and Casey [28]. The discussion guide invariably consisted of open-ended questions to encourage participation. The questions were collaboratively collected and formulated by several researchers experienced in qualitative research prior to constructing a draft version. To optimize comprehensibility and time management, the constructed guide was pretested using a group of students from the German Sport University Cologne, Germany, who were representative of the actual discussion participants with regard to age and group size. None of the participants of the pretest were further involved in the described study. After the pretest, the discussion guide was modified according to the gained experience. The structure of the guide followed the categories of questions according to Krueger and Casey: opening question, introductory question(s), transition question(s), key questions and ending question(s) [28]. **Table 1** provides an overview of the main topics respectively the key questions of the final discussion guide. All questions aim at identifying different aspects that would encourage the target group to use the planned web-based intervention subsequently.

Four focus groups (two groups per vocational school class) with 8-11 participants (mean 9 ± 1.4 participants) were conducted between June and October 2015 in Cologne, Germany. The participants were asked to divide and to group themselves independently. The focus group studies took place during regular school lessons and were limited in time by the school timetable. Prior to all discussions, the discussion participants were informed that participation is voluntary and that the discussions would be audio recorded. Furthermore, the discussion leaders gave a brief introduction about their occupation, the current status of the web-based project and its aims (increasing physical activity and improving diet). No examples of content or comparable interventions were provided to minimize prior influence. The focus group surveys lasted 25 to 33 min (mean 29 ± 4 min).

The first researcher (aged 27) who led three of the four discussions attended a university education workshop on qualitative research, received knowledge of qualitative methodology and of conducting interviews and moderating group discussions. This researcher also conducted the pretest. The second moderator

(aged 31) who conducted the fourth focus group also functioned as lead researcher of the study and had alreadygained experience of qualitative measures. Both researchers are sports scientists with specific focus on web-based health promotion. Both used the discussion guide, flexibly adapting to the flow of the particular discussion but paid attention to raise each topic **(Table 1)**. Both also attached importance to creating a respectful and relaxed atmosphere and to meet the discussion participants on the same level.

After the discussion participants had been thanked for their participation and were asked to complete a short questionnaire (self-reported anthropometric data and demographic characteristics, PA via one single question (German translation of the question used by Milton and colleagues: "In the past week, on how many days have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate?" [30]). Finally, remaining questions from the participants were clarified and informed consents to ensure anonymity were collected. The participants received no incentives. The study was approved by the Ethical Committee of the German Sport University Cologne, Germany (118/2015).

## Data analysis

The recordings were transcribed verbatim. The participants were anonymized via codes. The transcripts were checked and corrected by an additional researcher to minimize transcription errors.

The transcripts were analyzed following the method of structuring content analysis that is appropriate if the main objective of the analysis is to resolve prominent issues and aspects [31] (the method is comparable to the framework method for the analysis of qualitative data [32]). This form of analyzing qualitative data consists of a concurrent deductive and inductive approach. First, the transcripts were read by two researchers to confirm the main categories that were already based on the discussion guide (deductive). In several subsequent analyzing steps, additional categories and sub categories were formulated developing an analytical framework (inductive). During various meetings, the two researchers compared their assigned text fragments until a consensus was reached before finally analyzing the data. Analysis was supported by using MAXQDA 12 software (VERBI Software GmbH). The following results are presented in the chronological order of the key questions **(Table 1)**.

# Results

## Participants

The total sample consisted of 19 female and 17 male apprentices. The age range was 19 to 33 (mean 22.3 ± 2.7 years). Following the Body mass index (BMI)-classifications of the WHO [33], one half of the sample was overweight or obese (mean BMI 24.7 ± 5.1 kg/m$^2$). The recommendations of the World Health Organization (WHO) regarding daily PA, which consists of five days of at least 30 min of moderate intense activity per week [2], were met by 22% of the sample (mean 3.6 ± 1.7 days). **(Table 2)** gives an overview of the sample.

## Themes

Based on the discussion guide, four main themes were discussed: Content, form of presentation, technical functions and design. During the analyses, further important and recurring themes were identified: mobile availability and credibility. The results are complemented with representative quotes.

### Theme 1: Content

**Physical activity:** The young office workers often included their everyday working life while discussing topics such as physical activity and exercises*: "A training schedule for vocational students should be designed in such a way that you can maintain your fitness status with little time requirement. Especially during the week after work you have just little time" (overweight male who did not meet PA recommendations*). All proposed training schedules should be short and be able to be included in the time-consuming daily work routine. Additional mentioned wishes were motivation tips and support to maintain physical activity despite the daily work life. Participants stated that physical fitness would help them to handle their everyday working life. Fitting to these statements, the participants listed back pain, tensions and lack of exercise as main burdens of their daily work life. Several discussants wanted preventive exercises that can be performed at the workplace and exercise tips that can be easily integrated into the everyday life to counteract burdens and inactivity. Some participants also mentioned that they would like to know how they could change their workplace to create a healthier work environment: *"In the office you do not move at all but sitting all day. Exercises for in-between would be interesting, maybe involving your chair or anything" (underweight female who did not meet PA recommendations), "Maybe some useful tips how to integrate more movement, e.g. walking the stairs instead of taking the elevator" (overweight male who met PA recommendations*).

**Nutrition:** Comparable to the category "physical activity", the young office workers mentioned their everyday working life when talking about nutrition-based content. They wanted recipes that are cooked within a short time and nutritional plans that can be integrated into their time-consuming everyday life. Furthermore, they wanted to know what healthy dishes they can take to the office: *"Many of us have a lot of sweets in their desk drawers. But there are certainly some healthier options for snacks you can take with you to work, and healthy recipes for lunch break" (obese female who did not meet PA recommendations).*

### Theme 2: Form of presentation

Several participants expressed their expectations regarding video

**Table 1** Key questions of the main topics of the discussion guide.

| Topic | Key question |
|---|---|
| Content | "What are your content-related preferences with regard to the platform?" |
| Form of presentation | "In which way should the mentioned content and topics be prepared and presented?" |
| Technical functions | "Which possibilities have to be provided to increase in your interest in the platform?" |
| Design | "How should the platform be designed in order that you would enjoy it?" |

**Table 2** Characteristics of the sample (n=36).

| Characteristic | Mean ± SD or n (%) |
|---|---|
| Female sex | n=19 (53%) |
| Age | 22.3 ± 2.7 years |
| BMI | 24.7 ± 5.1 kg/m$^2$ |
| Weight status[1] | |
| Underweight (BMI <18.5) | 1 (3%) |
| Normal range (18.5-24.99) | 16 (44%) |
| Overweight (≥ 25-29.99) | 14 (39%) |
| Obese (≥ 30) | 4 (11%) |
| Missing data | 1 (3%) |
| Active days[2] | 3.6 ± 1.7 days |
| Met daily PA recommendations[3] | 8 (22%) |
| Did not meet daily PA recommendations | 22 (61%) |
| Missing data | 6 (17%) |

clips which explain the correct way to execute exercises: *"Videos alone are very good because you can see relatively well how you should perform the exercises" (overweight male who did not meet PA recommendations).* One participant even formulated the idea of videos with full workouts comparable to a virtual coach.

Further statements dealt with pictures and animations, e.g. of the human body, to explain training effects. Information regarding healthy eating should be softened with pictures as well, e.g. meals. All text-based information should be brief and easy to understand to satisfy the wishes and interests of the young target group. A willingness to read long texts seemed to be relatively low.

One aspect remains obvious: The content has to be communicated in contemporary and varied topic-fitting ways (brief texts, pictures, clips, animations).

**Theme 3: Technical functions**

**Interactivity:** On the one hand, the participants preferred an interactive platform. They like to chat with others, to share experiences and achievements and to comment and discuss content: "*As user you should be able to tell your opinion, for example 'this helped me in my everyday life', so that you can discuss with the other users" (normal weight female who met PA recommendations*). On the other hand, some discussants mentioned criticisms regarding any eventual misuse of data or information by other users or third parties. They pointed out that it has to be individually configurable if users like to share and provide personal information. One participant proposed dividing the platform into one public section with information without any prerequisite of logging in, and one community-like section with profiles and aforementioned possibilities.

**Documentation:** Several participants would like to document their development and personal successes, e.g. in the form of diaries respectively self-monitoring tools. One discussion participant followed up this idea and suggested automatic feedbacks and hints regarding a healthy lifestyle based on the documented data.

**Calendar and spots:** A calendar that lists sports groups and events was described by several participants as a useful function.

The potential users wanted an overview, e.g. to be inspired when being bored: *"A daily calendar would be great to be able to see what is going on around your working place and what kind of sporty things there are" (overweight male who did not meet PA recommendations).*

The participants also mentioned that a platform could list possible activities in the surrounding area, e.g. jogging tracks: *"You could implement a location finder that can show you sports places nearby for example when you type in your actual location or postal code" (healthy weight female who met PA recommendations).* One discussion participant clearly described that a lack of knowledge regarding possible activities would be the first hurdle on the path to an increased PA.

**Reminder:** The function of a reminder was estimated differently by the participants. Several discussants mentioned that a reminder would help them to stay motivated, e.g. by being reminded to maintain an increased PA. However, some discussion participants voiced doubts, e.g. that a reminder is not necessary if the platform were to be interesting and worth revisiting, that a reminder must be individually adjusted, and it must be possible to switch it off. One participant even said that a reminder could be discouraging because it literally, periodically reminds the user of unreached goals and recommendations.

**Theme 4: Design**

One main aspect regarding the design became clear during the focus groups: clarity or rather structure. Two participants said that the first impression would play a major role concerning the decision whether to stay on or to leave a website. Clarity is in this context one primary driver for the first impression. *"Design and structure are mainly responsible for the initial impression. This has to be just right. Otherwise the users will leave without coming back ever again" (overweight male who did not meet PA recommendations).* One discussion participant even mentioned the labor and time intensive everyday life of young office workers and that information should be briefly and concisely presented.

The participants wanted a platform designed in bright and friendly colors. The platform should make a professional impression: *"If it looks like it was build 15 years ago you will lose your motivation to participate immediately" (overweight male who did not meet PA recommendations).* The look has to be up-to-date and comparable with other frequently used websites and applications to arouse the interests of the young internet-minded target group. Additional wishes were to waive emoticons and background music to maintain seriousness and to stay ad-free.

**Further themes**

Several participants mentioned that mobile availability and smartphone suitability are a basic prerequisite for the usage of a potential intervention. Smartphones are nowadays the most important and most frequently used access device. It was proposed that the intervention should be designed as an app from the start: *"I usually do not surf on websites. I am rather using my smartphone" (overweight male who met PA recommendations).*

The young office workers suggested that the platform has to offer regular updates and news to remain interesting and worth

revisiting: *"Regular updates are actually most important, because otherwise you will not log in again" (overweight male who met PA recommendations)*. In addition to this, the participants proposed that the planned platform should offer different categories or rather sections because of the target group's heterogeneity with respect to fitness and health status. Some participants voiced the idea that the platform could automatically guide the users to status-appropriate information based on an online check-up or entered data in the form of some kind of a self-assessment: *"Maybe you can provide a personality check with questions such as 'What do I like in general?', 'Do I like better to be with others or am I rather alone while working out?' and use that for presenting a solution as 'This could be more fun for you!'" (obese male with no details concerning PA recommendations)*.

Furthermore, the discussion participants made clear that credibility plays a major role while seeking health- related information online. The participants described an uncertainty of online health information. One discussant even described concerns that the internet would already be overfilled with incorrect information making false promises. Matching this concern, other participants recommended that an intervention planned by a university should specifically target myths and misinformation that circulate on the web. The discussion participants proposed that all information should be study proven. Two participants recommended the use of a sign or an official seal of a trustworthy institution to express credibility.

## Discussion

In the present study, we identified the expectations and preferences of young office workers regarding a web- based intervention.

The interests of young office workers included, on the one hand, information regarding PA (e.g. training schedules) and a healthy nutrition (e.g. recipes). These findings confirm the results of Thompson and colleagues [34] who also included focus groups in the planning phase of a web-based intervention for a young target group.

On the other hand, participants expressed the wish for motivational tips to integrate healthy behavior in their everyday working life. Van Gemert-Pijnen and colleagues [15] also stated that usage and efficacy increase if the content of a web-based intervention has a direct link to occupational stress and the everyday working life of the target group. The PA content should contain necessary exercises taking into consideration work related health problems (e.g. back complaints). On account of the heterogeneous status of physical performance, they expressed the need for individual training schedules. In this context, Cook and colleagues [35] recommend that subgroup-specific differences must be taken into account to increase usage.

In general, one should consider that web-based interventions are more likely to be used by healthy or rather health-interested individuals [36] and female subjects who are, in any case, more receptive towards health information online [36-38]. Accordingly, intervention designers could focus on the preferences of potential male users [16,39] or persons having lower health awareness [40]

if the intention is to reach subgroups with lower usage. Davies and colleagues [22] even found that, in heterogeneous target groups, subjects with a higher need of health promotion should be addressed preferably and that the potential usage of persons with a lower need can be more or less neglected.

The preferences for regular updates agree with those found in previous research [38]. It is already well established that regular updates promote adherence to web-based interventions [41,42]. Furthermore, Brouwer and colleagues [43] show the relation between regular updates and usage of web-based interventions could subsequently influence the intervention's efficacy.

The participants described several platform features which are motivating and influence platform usage (e.g. self-monitoring, goal setting and automated and tailored feedback). Several other studies describing planning phases [26,34,44,45] also confirm that these features are desired by young target groups. Therefore, the authors describe such features as possibilities to reduce drop-out rates, which is still a present problem in web-based interventions. In line with this, Krukowski and colleagues [46] show that consistent self-monitoring can lead to significant weight losses during a web-based program. Furthermore, O'Donnell and colleagues successfully used goal setting to promote healthy eating and physical activity in a web-based intervention [47]. Several studies in turn state that web-based interventions with tailored messages represent a promising approach to increase PA [48,49]. In general, feedback which is provided by a personal coach (face-to-face) could be integrated into a fully automated computer-based feedback. However, the integration of algorithm to develop automated computer-tailored feedback including messages will need appropriate human and financial resources. It is questionable if health promotion researchers are able to develop these algorithms. Alternatively, researchers should build up an interdisciplinary team of different stakeholders with programmers and web designers. Ideally, such a team is led by someone who is able to bundle all talents while mediating between different disciplines.

Comments regarding interactive elements like chats, forums or networks were not uniform. Our findings show, on the one hand, that the young adults want to share and to comment information and experiences or improvements. These features have the potential for increasing usage [38] but do not necessarily relate to efficacy [50]. The comments regarding interactive elements are in line with the findings of a study by Ferney and Marshall [44] who conducted focus groups during a user-centred development process of a website intervention to promote physical activity. However, the subsequent trial showed only low usage of interactive features [51]. Additionally, Williams and colleagues [52] also show low levels of participation in social media interventions using mostly discussion boards as interactive element.

On the other hand, data protection and security are top priorities and are regarded from the point of view of the young office workers as basic prerequisites for the provision of a health service. These findings agree with the results in previous research [53]. Gowin and colleagues [53] showed that young adults aged 18-26 reject sharing health related data with others on the

internet. In another study, young adults describe social networks or interactive platforms as an inappropriate place for sharing personal health-related information [45]. Young adults attach great importance to individually configurable data handling [26]. Future studies are needed to analyse whether private communities with peers influence general platform usage and efficacy.

In addition to the previously mentioned platform features, there are some further necessities which a project manager must follow when planning a website. The measure should be clearly structured with a professional layout impression. In line with other qualitative studies which consulted young adults, the participants mentioned clarity and structure as important design aspects [26,54]. An intuitive use must be guaranteed. Nowadays, platform design and usability are expected as a matter of course from the young generation. Mobile accessibility is another noteworthy aspect concerning today's web-based interventions, especially in the context of young target groups. Already, every second smartphone-owner uses this device to search health-related information [55]. Smartphones must to be seriously considered as an access device when planning future web-based interventions [39].

## Strengths and Limitations

There are several strengths but also limitations to this study that should be considered: The major strength of this study is the opportunity to explore young office workers' opinions and thoughts and therefore provide valuable information regarding a platform to increase physical activity and to improve diet. Taking into account that the last focus group provided no new information and confirmed the results of the first groups, one can assume that data saturation and therefore representative results were reached for the group of apprentices participating in a vocational training for commercial profession or rather young office workers. The nearly equal ratio of female and male participants underlines the value of the collected data. The qualitative approach offered an expedient possibility of integrating young adults, and especially one target group that has so far been underrepresented in health promotion, into an intervention's development phase.

One limitation of the study is that all focus groups were heterogeneous regarding gender, age, weight status and physical activity. Therefore, the results could not be clearly compared with regard to subgroups which might be of further interest e.g. when taking into account the different health-related web usage of women and men. In this study the data collection took place during regular school lessons. Accordingly, we declined splitting classes by, e.g. demographic characteristics, to avoid stigmatization. Moreover, heterogeneous focus groups tend to be livelier and therefore more enriching. Another obvious limitation, due to the special sample selection, is that the results cannot be generalized or at least only for young office workers. Therefore, the results should be replicated among other groups of young adults, e.g. with additional focus groups or surveys.

In addition to this, further research has to be performed to examine if the content and functions that are created based on the results are ultimately actually used. Interventional studies with objectively measured platform use have to be conducted to assess the added value of user participation during the planning phase of a web-based intervention and to analyses user's usage patterns. However, the study confirms that the involvement of the target group in an early phase of the intervention-development offers great possibilities for increasing target group- specificity and for identifying expectations and preferences.

## Conclusions

We conclude that the everyday working life of the young office workers must be taken into account by practitioners and scientists while generating health-related content for this special target group. Furthermore, the young office workers wanted to be informed about the possibilities of being active in their living environment. It is mandatory that the content is prepared in a mix of multimedia to fit today's modes of sharing information on the internet. Moreover, a web-based intervention should be interactive (but with the possibility of individual configurability) and regularly updated. It should offer individualized information based on the user's characteristics and should additionally integrate functions for individual documentation (e.g. achievements or diaries) and tailored feedback. Of course, a potential intervention-platform must be clearly structured and designed professionally to meet today's benchmarks. Mobile availability and smartphone suitability are basic prerequisites for the usage of web-based interventions targeting young adults. With the rapidity of the technological developments and the associated costs, it is in general questionable if (sports) scientists alone are able to integrate up-to-date technologies on the one hand and the mentioned platform features on the other hand.

In sum, our study provides valuable information and makes an important contribution for the development and planning phase of future web-based interventions to increase physical activity and to promote healthy eating among young office workers.

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