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LOCALIZATION OF THE WALKING MEETING CONCEPT TO THE PAKISTANI CULTURE

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ABSTRACT

Yasir Rathore: Localization of the Walking Meeting Concept to the Pakistani Culture
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There is no doubt that regular office work is a sedentary endeavor and when done over a course of time can lead to a deterioration in health. While efforts are being made to introduce exercise into the office setting, there is a question mark around the feasibility of such ventures. One such concept is that of walking meetings, which allow lightweight office meetings to be done while walking, preferably outside in the nature. Since most offices do regular meetings, this concept has the promise to allow the chance of exercise without taking a break from office work.

While the concept of walking meetings has been somewhat tested, it hasn't been tested in non-Western cultures. This has become the motivation behind this research as we test the prototype of a walking meeting mobile app among employees of a middle school in Pakistan. Pakistan is a good candidate since it is a complex mix of cultural elements from regions such as South Asia and Middle East and religions like Islam and Hinduism. Moreover, the Pakistani office environment is classified with high levels of stress and can use a health intervention. We explore some of the aspects necessary for a successful implementation of the walking meeting concept to the Pakistan culture.

The aim was to answer questions such as what the user experiences of the first-time users of the concept prototype are. Through these, we looked at some user requirements for a successful design in the Pakistani culture and tried to translate them into design implications. We found out that conducting walking meetings resulted in a reduction in stress levels and an increase in creativity along with a positive effect on mood. Users were receptive to the idea and were impressed by the value of walking meetings as an alternative to an otherwise entirely sedentary workday. They also seemed keen to use walking meetings as an exercise tool since it requires much less effort as compared to formal exercise and can fit inside of the workday.

We also found out that the role of institutions in establishing the practice of walking meetings, is of the utmost importance. It is therefore necessary to gain proper institution support, along with putting in place the necessary steps to allow institutions to play a useful role. As a result of the research, design implications have been presented for both the walking meeting prototype and a new concept design has been presented for admins, which can help integrating the role of institutions in normalizing health interventions such as walking meetings.

Keywords: Human-Centered Design, Persuasive Design, Hofstede's Cultural Dimensions, Technology Acceptance Model, Walking meeting.

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1 INTRODUCTION

The modern white-collar office environment consists of many hours of sitting down. An unfortunate consequence of this development is a sedentary lifestyle, which in turn leads to unhealthy habits and various health conditions under the umbrella of metabolic syndrome such as cardiovascular disease, high blood pressure, obesity, stroke, and diabetes [1] [2]. Another, often overlooked, risk factor for metabolic syndrome is chronic stress, which oftentimes can come from work. All these health problems can be alleviated by having a healthier lifestyle with more time for exercise. Exercise helps not only in managing stress and improving physical health but also contributes positively towards mental health, better performance at work, better quality of life and eventually longevity [3]. This, however, is easier said than done since many people these days cannot find the time to exercise regularly due to fast paced lives. Between work and family, there is little time left for exercise and since most people do not prioritize it, exercise is often neglected resulting in poor mental and physical health in the long-term [4].

This is where the concept of walking meeting comes in; the ability to ‘Walk as you work’ is perhaps a step forward from the now common standing desk and the extravagant ‘treadmill desk’ ideas [5], which have shown some promise when it comes to reducing sedentary behaviors [6]. The idea is to combine simple office activities, such as short meetings and group discussions with light exercise such as slow-paced walking in order to reap the benefits of exercise while not having to explicitly take the time out for it. The concept of walking meeting is, therefore, a useful tool as it has the potential to make people move more while in their offices- a place often associated with being continually sedentary.

1.1 Motivation and Focus of Research

While it has been tested in the Western countries [7] [8] [9], the concept of walking meetings is yet to be applied to the eastern cultures. This is not to say that the concept doesn’t have its limitations, but its benefits as an alternative to an otherwise entirely sedentary lifestyle, simply cannot be overlooked. It is especially useful in an era where a clear majority of people cannot find time to go to the gym and exercise on a regular basis. This results in faster deterioration of health and people leading a more sedentary lifestyle in general. Even in

cases where people exercise and lead otherwise healthy lifestyles, there is no doubt that they can use walking meetings as means to take a break from long hours of sitting. On top of that, walking in the nature can have a host of benefits including an increase in creativity and mood through the change of surrounding [10] [11]. Therefore, it is of the utmost importance that it is tried in a new culture to see its validity in a space where it's need is much more.

Here, we try to localize a walking meeting concept prototype to the private sector educational institutes of Pakistan and through it, perhaps the larger part of South Asia as well, since the organizational structure of educational institutes should have similarities throughout the region. The educational institutes in the private sector of Pakistan will ensure that there is enough outdoor space in the form of playgrounds and sports fields for this idea to be tested. Moreover, an educational institute will allow for it to be tested in a hierarchical setting since Pakistan is a slightly power distant hierarchical society [12]. This can be a novel idea since the education system in Pakistan is still in its infancy and needs a lot of development specially in the secondary division [13].

Hofstede's cultural dimensions are commonly used to study various cultures. Different countries of the world are scored on 6 dimensions [12]. They include Power Distance Index (PDI), Individualism versus collectivism (IDV), Masculinity versus Femininity (MAS), Uncertainty avoidance index (UAI), Long term orientation versus short term orientation (LTO), and Indulgence versus restraint (IND). These dimensions are used to compare national cultures and based on the various cultural inclinations; design principles can be formulated [14]. Based on the preexisting theoretical knowledge of testing the walking meeting concepts in western cultures, and combining it with a cultural study of Pakistan, new design considerations will be formulated and later tested in the Pakistani office environment.

1.2 Goal of Thesis

The primary goal of this thesis is to explore the validity of the walking meetings concept in the Pakistani society and gather people's feedback on using the idea. This will be done through a mobile app prototype. The prototype will be tested through evaluations and feedback collected through a questionnaire and a short semi structured interview. In short, this research aims to answer the following questions:

1. What are the user requirements to localize the walking meeting concept to Pakistan?
2. How do knowledge workers in Pakistan perceive the idea of walking meetings?
3. What are the administrative factors which might help in the widespread adoption of the walking meetings?

1.3 Structure of Document

The related work chapter contains information about the current state of physical ways of working, it also contains some theoretical knowledge about the concept of human-centered design and localization. This is followed by a brief introduction to previous research work which has laid the foundation for this thesis. Chapter three introduces the reader to the Pakistani culture, it starts by throwing light on Hofstede's cultural dimensions for Pakistan, there is also discussion on some core principles of the Pakistani culture and a brief intro to work culture in Pakistan. This has then been summarized and from it, design considerations have been derived. The methodology chapter details the design process and how and why the design choices were made. It also explains the prototyping process and how it was tested with users, along with the data collection methods and types of data collected. The next chapter reveals the findings and the collected data has been analyzed either statistically or through discussions. Following this, there is some discussion on the limitations of the research and based on that, some design implications have been formulated and a new design concept has been presented. In the afterword, there is some discussion on how this research can be taken into the future and what the next round of implementation might entail.

2 RELATED WORK

The idea of walking meetings is not new, and it has been around now for a few years, and other ideas to improve physical activity at work also exist. They combine the various aspects of human-centered and persuasive design to create a more active workplace. This chapter sheds light on some of these concepts and discusses how they can be combined with the concept of localization, where already tried and tested pieces of technology can be adapted to a new culture.

2.1 Current Solution for Physically Active Ways of Work

The modern office is a mostly sedentary environment and involves many hours of sitting down. It is common knowledge that sitting down for extended periods of times can be detrimental to health in the long run [2]. Efforts have been made to combat this by introducing physical ways of doing work, which aim to combine light exercise and movement with simple office tasks which can be done in a more active manner.

Examples of such technologies include height adjustable standing desks, which allow the workers to spend their day standing instead of sitting [5], and treadmill desks [6], which replace the desk chair with a treadmill allowing the worker to walk as they work. Other examples include smart furniture to record posture and prompt movement, and the introduction of trackers to record total activity at work [15]. All these concepts have limitations of their own whether they be space and/or budget in case of height adjustable and treadmill desks or feasibility, in case of smart furniture. Some of them may even have an adverse effect on the ability to do work and thus eventually, reduce work efficiency [16]. Moreover, the social acceptability of these technologies might be another issue and so is User motivation, which is a huge factor in the success of these concepts as will be discussed in the next sections.

Under these circumstances, where it is of the utmost importance that exercising and taking breaks from the normal routine of sitting down for hours be somehow normalized, walking meeting is a new and somewhat untested concept. It has the promise of allowing the workers to exercise albeit a few minutes, without taking a break from work. The time which is reserved to have discussions and meeting in groups or with a single work colleague is

usually spent sitting down. This can be changed with walking meetings, which can add the benefits of exercise without taking anything away from the conventional meeting. Walking will not only enhance the thinking process but if done in natural environments, walking meetings can also bring a host of other benefits as well such as stress reduction and can also be considered a break from the hectic work routine. [9]

When it comes to commercial applications of walking meetings, a few have already hit the market. *Beenote* is a mobile walking meeting app which, as of May 2019 is already available on the Android play store and the Appstore for iOS [17]. It has basic functionality and allows the user to conduct walking meetings and voice record ideas while they do so. Users can also take pictures with their camera and add them to the meeting. Users can add notes, tasks and decisions to the meeting and once done the meeting data can be saved and shared with colleagues through email. Another similar application is called *Statik* which is not available yet but is in the development phase. It is similar to *Beenote* in the sense that it allows the users to conduct walking meetings and record their ideas, it differs in its target audience since it is aimed not only at the corporate sector but also at students who want to record ideas while walking and share them with friends. In addition to taking notes while walking, *Statik* can also count calories burned and steps taken [18].

2.2 Human-Centered and Persuasive Design

Human-centered design is the practice of focusing design efforts towards user needs in order to enhance the usability and the overall UX of a system. It focuses on the essential user requirements and increases efficiency by cutting out unnecessary design practices to create a lean design process. It consists of first identifying the users and then figuring out their behaviors, needs and expectations. This is then followed by an understanding of the technology available to create a novel system. Human-centered design approach not only involves creating, but also early testing, possibly through design concepts and prototype evaluations to ensure that a robust feedback loop is established with the users. [19]

In the case of walking meetings, it is important to understand the usage context. This may include time and space limitations such as short periods of 5 to 10-minute walks and the unavailability of large walking paths. User expectations are also a key consideration, which, for instance, might be light walks to burn off some calories instead of long and strenuous

exercise sessions. Understanding all of these and designing according to it are some examples of good human-centered design.

Persuasive technologies aim at changing user behavior by introducing persuasive elements into the design [20]. These may be derived from various psychological and social factors to either promote user involvement from scratch or to sustain it in the long term. A major part of this is improving the overall user experience of the system. User experience is further divided into two factors; pragmatic factors which include the usability and usefulness of the system i.e. how well it can perform a certain task, and hedonic factors which are the emotional and non-functional attributes i.e. how does the use of a system make the user feel. For a successful persuasive design, both the hedonic and pragmatic factors of UX must be accounted for during the design process. [21]

In the context of walking meetings for example, a good design must take into account, pragmatic factors such as the ability to count steps, calories, and distance covered, along with other features which are necessary for walking outside. Hedonic factors are equally important and may include the ability to socialize, gain reward points, and indulge in the gamified, playful and competitive elements etc. These will be important since the main aim of the design will be to encourage a change in behavior going from sitting down to do meetings towards conducting walking meetings.

2.3 Localization

Localization is the process of modifying a system in order to adapt it to a specific market. This starts with a study of the target user segment which may be a different societal culture or even a niche within it, and then making the necessary design changes to better suit it to that culture. Localization ties in closely with the concept of Human-centered design since the localization process is focused around and is done in proximity with the target users which in this case may be people of a new culture. [22]

While localizing a concept such as walking meetings for the Pakistani culture, it is important to get some idea of not only the Pakistani culture in general, but also of a niche segment to which the localization is aimed. In this case it could be the type of office environments. This will help in better understanding the expectations, limitations and even opportunities while designing a walking meeting concept. Various models exist which can help to grasp a basic understanding of the Pakistani culture, most prominent of which is Hofstede's 6D model

which will be discussed in detail in the next chapter. This combined with an in-depth analysis of the various components of the Pakistani culture, and a basic understanding of the work culture in Pakistan, will help formulate design considerations which will form the basis of the localization.

The technology acceptance model, TAM [23], also serves as basic groundwork for any new technology. It consists of two parameters which are the main contributing factors as to how readily a new technology may be accepted by the users. These two factors are Perceived Usefulness, which defines the extent to which the user believes the technology would be beneficial to his/her work; and Perceived Ease of Use, which is the extent to which the user believes adopting the technology would be free from effort. While the TAM is a good generalization when it comes to new technologies, it fails to consider the various cultural factors involved. Over the years, various other models have been formulated to add variables to the TAM to make it more relevant under different conditions and environments. Abbasi et al point out that in countries such as Pakistan, factors like institution support and government support are also of significance when it comes to adopting new technologies [24].

2.4 User Experience Design of Walking Meeting App

The groundwork for the design comes from the user study of the walking meeting concept which was carried out at Tampere University, formerly Tampere University of Technology, This study explored user expectations and experiences when it came to introducing light intensity cardiovascular activity such as walking to the sedentary work environment. It also aimed at presenting possible design implications for future work in the field of walking meetings and creating mediated mobile technologies to facilitate such activities. The study came up with a total of ten design implications which were classified into three main categories. These design implications can be considered as basic guidelines for any future implementation of the walking meeting concept. [7]

The study aimed at answering questions like, *what are the user needs and expectation from walking meetings? What are the user experiences of walking meetings? and what are some design implications for walking meetings?* The study started with an initial user study, which aimed at finding out initial user expectations from walking meetings, based on this study a *Walking Metro* concept was designed. On the *Walking Metro*, walking paths were predefined

much in the same way as metro lines. Users could go on different lines and GPS was used to track them. Paths had checkpoints and collectables to motivate the users. The Walking Metro design was then tested with users to evaluate user experiences of this concept. Finally, design implications were derived from the collected user experiences and have been summarized into three main categories. They are as follows:

Redesign the Concept for Acceptability

- 1. Redesign the walking meeting concept:** Walking meeting app should be designed in such a way as to allow it to properly facilitate the tasks it is best suited for i.e. light discussion and ideation etc. Moreover, it can be redesigned and renamed to let the users see its value.
- 2. Enable the walking meeting to become an accepted way of work:** Support the design to allow it to be acceptable in the workplace and design around any prejudices people might have.
- 3. Support the freedom of the user:** User must be allowed creative freedom. This means that the app should set the guidelines and provide the features but let the user use them to whatever extent they see fit.

Non-Interrupting Guidance and Instructions

- 4. Instruct about the practical matters:** The app should provide basic information on how to use its various features and how to set up a walking meeting. This will also increase its ease of use.
- 5. Suggest walking instead of sitting:** App should have a framework to plan walking meetings and to invite others.
- 6. Guide but do not interrupt:** The app should steer clear of obtrusive elements to allow the user to focus on the walking meeting itself rather than the app and its feature set.

Discreet Persuasion and Stimulation

- 7. Utilize Digital UI features and physical objects:** The app should use both digital UI features such as gamified and playful elements and physical objects such as nature, weather and greenery to persuade users to do walking meetings.

- 8. Provide different readymade as well as user defined routes:** The app can provide various routes to the user to chose from as well as to let them create routes as they perform walking meetings.
- 9. Promote and emphasize the positive effects:** The app can also use the positive effects from doing a walking meeting for motivation. These may include stress reduction, increase in creativity and mood lift as well as physical health benefits.
- 10. Stimulate and motivate with discreet use of playful elements:** The app should use playful elements discreetly. These may include surprising content and even the sense of competition which naturally arises from other users of the app.

3 OVERVIEW OF PAKISTANI CULTURE

In order to localize a design to any culture, it is important to have a deep understanding of how that culture works. This includes not only the visible elements of that culture but also parts of it which are deep rooted and create the foundation on which the culture and its various practices stand. This chapter tries to explore the Pakistani culture in detail. Firstly, the Hofstede's cultural dimensions for Pakistan have been discussed, followed by a study of Pakistan's value system and its work culture since it is important not only to study the culture in general, but to also dive deeper into the particular segment for which the design is aimed at. At the end, based on the study, design considerations have been presented for the localization.

Pakistan is a country in South Asia and borrows cultural elements from its shared history with India and from the Pashtun and Arabic influence over the centuries. It has a complex mix of ethnicities, behaviors and cultures and generalizing anything to the Pakistani culture, is therefore a tedious task. However, there are elements which have become a part of its culture in modern times since its inception in 1947. It shares much of these elements with many other countries in South Asia but also with the rest of the developing world.

The culture of Pakistan differs slightly from other Islamic countries like Saudi Arabia and Iran although having a Muslim majority [25]. It also slightly differs from other South Asian countries such as India which clearly shows that Pakistan has a complex mix of culture which cannot be simplified in terms of religion or geography. In addition to this Pakistan is and always has been multi-ethnic. It's largest province Punjab which consists of 60 percent of the entire population of Pakistan shares a large part of its culture with the Indian state of Punjab since they were divided during Partition in 1947. Similarly, the North Western province of Khyber Pakhtunkhwa has more similarities with Afghanistan than any other province of Pakistan. In such a case, localizing anything for the Pakistani culture, would be an exercise in futility. An alternative approach would be to look for a niche within the Pakistani society and localize to it, since it will be governed by similar laws and would have similar structure and norms throughout Pakistan. Doing so would ensure that our efforts do not go to waste and can not only be applied to the Pakistani culture but also to neighboring

regions such as South Asia for the most part and to some extent the middle East as well [26].

3.1 Hofstede's Cultural Dimensions

Hofstede's cultural dimensions are based on one of the most extensive research done with IBM employees between the years 1967 and 1973. Prior to this no comprehensive comparison between cultures existed [27]. The study was based on similar questionnaires distributed among IBM employees of 40 countries although more countries were added later. The initial model contained 4 cultural dimensions but two more have since been added and this model is now commonly known as the 6D model. While sometimes criticized, Hofstede's cultural dimensions are still one of the most academically researched and referenced work when it comes to comparing cultures [27] [28]. [14]

The 6D model contains the following cultural dimensions:

1. Power Distance Index (PDI)
2. Individualism versus Collectivism (IDV)
3. Masculinity versus Femininity (MAS)
4. Uncertainty Avoidance Index (UAI)
5. Long Term Orientation versus Short Term Normative Orientation (LTO)
6. Indulgence versus Restraint (IND)

Countries are scored from 0 to 100 on each dimension, where 0 is the lowest score and means that the country has no affinity for that attribute. A country with a score of 50 means that it is difficult to determine affinity towards either attribute, and the country can thus be considered neutral for that dimension. A score of 100 means the extreme of an attribute relative to other countries which have been scored.

Power Distance Index (PDI) is the degree to which the members of a specific society accept that fact that power is distributed unequally within a society. This does not necessarily refer to the unequal distribution of power, but more to how people react to this fact. Countries which score higher on the PDI are likely to have well defined hierarchies where each individual has a particular place and enjoys the powers associated with that position. Pakistan scores an intermediate 55 on the PDI which means it is hard to determine whether the people of Pakistan are accepting of unequal power distribution.

Individualism versus Collectivism (IDV) is the extent to which an individual is knit to the society. Countries with a high IDV score tend to define people as individuals and the identity “I” is more common, while the countries with a low IDV score are considered more collectivist societies where a person is recognized through his family, group etc. In these countries people describe themselves as “We”. Pakistan scores a meager 14, which means that Pakistan is a highly collectivist society and the individual is likely to consider him/herself as a member of a larger group. Like other collectivist societies people are responsible for family and to think only of oneself is considered selfish and is frowned upon. For technologies to be successful in such societies, they must gain common acceptance. This is slightly contradictive to the technology acceptance model TAM which states that a technology’s perceived usefulness and perceived ease of use are the main contributing factor to the intention to use the technology [23]. In Pakistan however, other factors such as institution support and government support are also of vital importance when it comes to accepting a new technology as pointed out by Abbasi et al. [24]. [29]

Masculinity versus Femininity (MAS) is the extent to which a society values masculine attributes such as assertiveness, competitiveness and achievements etc. Countries which score low on the MAS are feminine societies and have values such as cooperation, modesty and caring for the needy. On the MAS, Pakistan scores 50 which means that there is no preference and thus it cannot be determined whether Pakistan is a masculine or a feminine society.

Uncertainty Avoidance Index (UAI) is the extent to which a society deals with the fact that the future is unpredictable and can bring unforeseeable challenges and obstacles. Cultures which score high on UAI tend to be more orthodox and have practices in place to predict and deal with uncertainty. Cultures with a low UAI score tend to be more easy-going and see the future as an eventuality and live more in the moment instead of caring too much about the future. Pakistan scores 70 on the UAI which puts it as an uncertainty avoiding society. This also coincides with the fact that Pakistan is a conservative society and puts high emphasis on traditions. When designing for Pakistan, it will be better to display all the necessary information to remove uncertainty to the greatest extent possible. Similarly, it can be useful to design simple interfaces with limited functionality and the primary focus on basics necessities.

Long Term Orientation versus Short Term Normative Orientation (LTO) is the measure of how a society deals with the future and the challenges of changing societal norms and values. Countries which score low on the LTO are called normative societies and they stick to time tested norms, uphold traditions and are suspicious of change. Societies which score high on the LTO maintain a more pragmatic approach in the face of changing societal values. With a neutral score of 50 Pakistan is believed not to have a preference for long term orientation.

Indulgence versus Restraint (IND) is the measure of how much a society believes in indulging in the pleasures of life. Societies which score higher on the IND are considered indulgent societies and they believe that it is important to enjoy life and have fun. They see human urges as natural and believe that happiness cannot be achieved by restricting oneself. On the other hand, societies with a low IND score are called restraint societies. These cultures believe in the control of natural urges and pay special importance to discipline. Indulgence in these societies is considered unimportant and a waste of an individual's time and effort. Pakistan scores 0 on the IND which means that Pakistan is one of the most restraint societies in the world [12] [14]. This might not entirely be a bad thing. Being a restraint society means that Pakistani people prefer to delay gratification and believe in hard work. One might think that people from such societies have a superior work ethic or perhaps are workaholics, but that might not be the case. It might simply mean that Pakistani people do indulge but since the society thinks bad of indulgence, they might consider it as a negative aspect of their lives or perhaps even a sin. Introducing a technology in such an environment might only be useful if the people consider it as adding value to their life and serving a larger purpose rather than just being a leisure activity.

3.2 Underlying Values

Famous American anthropologist Edward T. Hall, in his work *Beyond Culture* has equated a culture to an iceberg. According to him, if a culture is an iceberg, only a small part of it is above sea level. This is the visible culture and can be seen upon first meeting the people of that culture. These can be traditions, practices and behaviors that the people exhibit daily. A much greater part of that culture lies underneath the sea level and takes a deeper understanding to uncover. This oftentimes, can be done by spending long periods of time within that culture and studying it in detail. This consists of its belief systems, norms and

values. It is these norms and values which through time enforce the various cultural practices that are visible upon first contact. [30]

When applying the iceberg model of culture to Pakistan, it can be useful to identify some of the underlying values of Pakistani culture. Pakistan is situated in South Asia and shares similar culture with India, which were both British colonies until 1947. The Arab conquests of the Indian subcontinent and subsequent rule gave rise to Muslim population before the British invasion. Towards the end of the British rule, the western provinces of British India had a Muslim majority. Fearing that a single Hindu majority state would mean no representation for the minority Muslims, the British separated India based on religion and thus, Pakistan was created. [31]

Being the Muslim majority state, Pakistan derives some of its customs from the Islamic culture and Arab influences throughout the centuries. Some other customs are based on centuries old Indian traditions and values. Together it means that Pakistan is a highly conservative society and sees change with suspicion. Values associated with conservative societies are common in Pakistan. These include strong family ties, defined gender roles, and religious beliefs etc. Sticking to traditional values and practices is generally considered a virtue and change is considered foreign. Individuals are expected to uphold the longstanding traditions and practices and are usually discouraged to stand out and go against the norm. [32]

Pakistan is developing at a fast pace and it is safe to assume that in the years to come conventional beliefs will be challenged. Most of Pakistan's population lives in large cities and this is where the trends are slowly changing. Young people are more open to change and are more influenced by western values. This combined with the fact that a large majority of Pakistan's population is between the age of 0 and 14 years old (41.3 percent), means that Pakistan may see change in conventional beliefs and values. [33]

3.3 Work Culture in Pakistan

During the census of Pakistan held in 2017, the population was estimated between 210 to 220 million. This puts Pakistan to be the 5th largest country in the world based on population, behind Indonesia, US, India and China. A large majority of this population lives in cities, Karachi being the largest city with a population of almost 15 million, followed by Lahore with 11 million and Faisalabad at just over 3 million. More than 20 percent of the population of

Pakistan lives in the 10 largest cities. The rest lives in small towns, countryside and villages and work simple jobs like farming, and small-scale cottage industries. [34]

City life is fast-paced, and work includes skilled jobs such as administration, education, industry and factories and construction. IT sector is relatively new in Pakistan and has seen significant growth since the last decade. More job opportunities in cities has caused an influx of people into large cities. Depending on the sector, jobs can be stressful, with long working hours and strict deadlines. This combined with a growing economy, means that more individuals of a household are now working to support the family as compared to a few decades ago where only one person, usually male, was expected to work, while women were homemakers. More women are entering the workforce as compared to before. Women in Pakistan usually prefer the more feminine jobs related to teaching and healthcare, although this trend is expected to change as the government encourages women into technical fields such as engineering and computer science etc.

Depending on the job sector, working hours can differ significantly. White collar office jobs usually consist of 8-hour shifts while blue collar labor work can range anywhere between 3 to up to 12 hours. Work settings are strictly hierarchical with strictly defined job descriptions and bureaucratic practices are always followed.

Unfortunately, people working in Pakistan's private sector often report stress at work [35]. Often called the 'Silent killer', stress can come from work, home, studies or even anticipation. It is chronic stress which becomes the problem since it cannot be avoided and results in the deterioration of both mental and physical health over time if not controlled. In addition to being a serious health risk in the long run, stress can also negatively impact the everyday work performance [36]. Moreover, it was found that stress is now a major concern within educational institutes as well, where employees of educational institutes in the private sector are experiencing higher levels of stress as compared to their counterparts in the public sector [37]. Being an uncertainty avoiding society [12], Pakistani people are more prone to stress. It was reported [35], that there is a strong need for stress management and support systems in the private sector in Pakistan.

Education sector is one of the largest in Pakistan. A growing young generation means there is an increasing need for educational institutes. Moreover, the need for skilled labor means more technical institutes to feed the needs of the various growing economic sectors [38]. Educational institutes in Pakistan have strict hierarchical systems [39], and those who teach

young individuals usually almost always have space reserved for playgrounds and sports activities. Both of these attributes make them viable for the scope of this research.

3.4 Design Considerations

Based on the cultural study of Pakistan, the following three design considerations can be hypothesized, when localizing a system designed for walking meetings:

D1. Social aspects would be welcomed and will facilitate system use. Being a collectivist society, Pakistani people are likely to adopt a technology faster if it supports social features. The knowledge that others around are also using the same system as one is, is likely to make people feel like a part of a group instead of being the only adopters of a technology. Social features such as the ability to add friends, meet people and the ability to find out what others are doing will accentuate this behavior of the system.

D2. Institution support will facilitate system use. Since Pakistan is also a slightly hierarchical society, it can be assumed that people would be more likely to adopt a technology if its use has been promoted by the institution. The institution support can likely be incentives to use the technology. This has also been pointed out by Abbasi et al. [24] that in the Pakistani society, government support and/or institution support is vital for the easy adoption of any new technology.

D3. Conducting Walking meeting will result in reduction of stress levels. The importance of stress management cannot be understated in societies such as Pakistan. A fast-paced life brings with it, stress as a byproduct, which people carry home from their workplace. While there are many ways to manage stress, regular exercise is perhaps, the most organic method [40]. We therefore hypothesize, that combining a robust stress management system such as regular exercising in stressful work environments can occur through performing walking meetings. Doing so, should result in a significant decrease in stress levels, which can then be self-assessed by individuals participating.

4 METHODOLOGY

The data collected from the user study at Tampere University [7], combined with a cultural study of Pakistan have become the basis of the theoretical background for this research. Design principles have been formulated from the theoretical work and these design principles have been used to create the prototype of a mobile app, the purpose of which is to mediate walking meetings in a Pakistani office setting. This prototype has then been tested with users for evaluation and data gathered through questionnaires and interviews. This data will add to the theoretical knowledge on walking meetings, specially in the context of the Pakistani culture and can give rise to new design principles for future iterations. This process is shown in Figure 1.

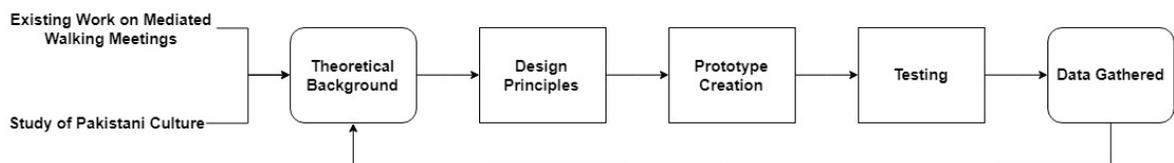


Figure 1. Flowchart of the Research Process

This chapter details the design process and how and why the design choices were made. It also talks about the prototype creation and how it will be evaluated by discussing the rationale behind the questionnaire and interviews.

4.1 Design

The user study held at Tampere University, formerly Tampere University of Technology, came up with multiple design implications [7]. These design implications have become the rationale for the design of a mobile app prototype named Walkshawk. These design principles have been categorized into three main themes each containing several design implications which have been taken into consideration while designing the various aspects of Walkshawk. They are listed as follows:

Redesign for Acceptability

In this section the following design decisions were made

a. Renaming for acceptability: The system based on the concept of walking meeting was renamed to '*Walkshawk*', which is a clever play on words. In the Urdu language, there is a concept of *Muhmil* which is the practice to append a word with a meaningless made up word which is similar sounding. This indicates that the conversation is being held in a casual manner. In this case 'Shawk' is a non-word but it rhymes with talk which is not an Urdu word but adding a Muhmil to it not only makes it an Urdu word, but also gives the impression that a Walkshawk is to be done in a relaxed and casual manner.

b. Accepted Way of Work: Since the idea of walking meeting is new, it is fair to assume that it could be misconstrued as taking breaks from work. Although walking meetings can give the benefits of break from conventional work practices, it is essentially a part of work since necessary meetings and discussions are carried out during walking meetings. This problem can be solved by making sure that it becomes common practice, and everyone practices it to some extent. It is also important that the users themselves feel that other people are also doing walking meeting around them.

One way to tackle the acceptability issue is by adding social aspects into the system designed for walking meetings. Being a collectivist society, social aspects should be welcomed in Pakistan [12]. These may include the ability to search for and add friends, to be able to post to a wall and the ability to see what others near you are posting when they use the system. This can give the user the sense that he/she is not the only one using the system and that since others are using it, they will be less likely to consider it as a non-work activity.

Another way to combat this problem is by adding some sort of institutional support. Since in Pakistan the acceptance of new technologies specially in the context of small organizations requires support from the organizations [24]. Institutional support can be achieved by adding incentives for the use of the system. They could be done by awarding the users with a special points system. Other ways of doing this is by featuring users of the system in the institution's publications which could be magazines or newsletters or even information boards. A more extreme approach could be making it compulsory for all workers to hit weekly goals based on minutes or time spent on the system.

c. Support Freedom of User: Freedom of user is an essential part of any user centered design. The user must be given enough creative freedom to use the system to the best of his/her ability while making full use of the system's feature set. This way the tasks

can be accomplished such that the system acts as a mediator rather than an influence or a hurdle in the actual work [41].

In this system, freedom of user has been ensured by allowing the user to conduct walking meeting without any interruptions from the system at any point. Moreover, the system allows the user to take notes of important subjects during the walking meeting. In addition to this, the user can also take photos of useful things and objects during the walking meeting. The system becomes active once the user indicates the start of the walking meeting, the system will then start collecting data. Similarly, when the walking meeting is completed, the user can indicate this to the system and it will show the data collected during the walking meeting such as photos taken, notes written and other health data that was collected including steps taken, time spent during exercise and calories burned. This data can easily be collected through the device's sensors and the information can be made visible at the end and the user has the option to save it or share it with others.

The system also does not push any preset walking paths, nor does it save the path that a user has followed. This is done to ensure simplicity and ease of use. This will make it easier for anyone to conduct a walking meeting from anywhere. In an earlier implementation of the walking meeting idea known as '*Brainwalk*', which was tested at Tampere University of Technology, users were supposed to follow pre-defined paths which would contain checkpoints, where each checkpoint further contained various content including motivational messages and tasks etc. [8]. This has been left out during this implementation since it over complicates the system and takes away from the focus of the walking meeting which was to discuss meeting points. Moreover, since Pakistan is an uncertainty avoiding society, it makes sense to limit the variables included in the practice of a walking meeting to reduce uncertainty [12]. Another advantage of this is the ease of conducting walking meetings indoors. This can come in handy when weather conditions are unfavorable to go out for walking. The advantages of outdoor exercise cannot be overlooked but in cases where this is not possible either because the lack of space or due to weather, walking indoors can be the second-best option as long as short walks can be conducted to still get the benefits from exercise.

Guidance and Instructions:

The following design decisions were made to ensure that the system facilitates proper guidance and instructions not only for first time users but also for regular users.

a. **Practical Matters:** A *Howto* screen is built into the system and is shown before the start of the Walkshawk. It explains the features of the Walkshawk design and how to conduct a Walkshawk. This in addition with a demo video make up the practical matters relating to guidance and instructions for using the system. For prototype testing with the users, this was substituted with an instructor explaining the concept of a walking meetings and showing a demo Walkshawk.

b. **Suggestions:** Various suggestive features have been added, most important of which is the ability to search and add other users of the system as friends. Friends can invite each other for Walkshawks. In addition to this some form of Institution support is also necessary. This can be achieved either through the system or externally or even both. Within the system, the *Blog* feature gives a sense of belonging to a community which bodes well with the tendency towards collectivism in the Pakistani culture. User can see others who are also doing Walkshawks around. Moreover, the blog also includes sections such as *Leaderboard*, *Top Picks* and *Get Inspired*. *Leaderboard* lists, in ascending order, the users with the most Walkshawks in terms of minutes, *Top Picks* contains the most trending blog content based on likes while the *Get Inspired* section contains motivational quotes and photos posted by other users on the blog. For external suggestive elements, features in the institute's publications can be a good way of ensuring institution support but that is beyond the scope of this implementation, however, it is important during a complete implementation of the idea.

c. **No Obtrusiveness:** It has been made sure that the system is as less obtrusive as possible. This means that the user can use it freely without much interruptions. The system runs smoothly in the background without drawing attention towards it while making sure the user can easily access the main features whenever required. This goes both for the design of the system and for its features.

This can be clearly seen while conducting a Walkshawk. At which point, the user is shown the *During Walkshawk* screen. This screen is show in Figure 4. It can be seen that the user is not shown any paths or given any instructions during the Walkshawk. The user is only shown a greeting message, followed by the weather forecast. Underneath which, there is an option to take notes and/or photos for that Walkshawk. Once done, the user can tap on *End Walkshawk* and the system will save the data and show the end screen. While the

system will continue to gather data during Walkshawk, at no point will the user be disturbed and can put the phone inside his/her pocket.

Discreet Persuasion and Stimulation

The system can also facilitate its use through discreet elements to persuade users and to motivate them to use it. This has been achieved through the following:

a. Physical World Persuasion: The system supports the ability to take photos while doing a walking meeting. These photos can later be viewed by the same individual or even by others if the user chooses to make them public and post them on the blog. This feature offers physical world stimulation through bringing back good memories from old walking meetings and to motivate through other user photos.

b. Emphasis on Positive Effects: Positive effects can include increase in creativity, energy and mood. Studies have shown that walking for only a few minutes outside in nature can have a significant reduction in stress [40], can boost creativity and have a positive effect on an individual's mood. It can also make a person more energetic for the rest of the day. [42] [43]

While the design prototype created for this implementation does not have any direct built in mechanism to record energy, stress, mood and creativity levels, these positive effects will nonetheless be achieved through Walkshawk. In order to measure them, a self-assessment questionnaire will be distributed where users will assess these metrics pre and post Walkshawk which will then be analyzed. Moreover, in the finished design of Walkshawk, some mechanism to assess these positive effects should be present. Since it is very difficult to measure them objectively, a subjective self-assessment should be enough. By saving these assessments for future reference, they can also function as elements for persuasion and motivation.

c. Playful and Gamified Elements: Through playful elements and gamification, a system can be made to resemble a game environment. This makes any system more competitive and enjoyable and can make the users more likely to use it since they now consider it as a playful practice. [44]

This system also uses gamified elements to persuade users. The most prominent perhaps is the *Leaderboard* feature in the *Blog*. The *Leaderboard* sorts all uses of the system and

ranks them based on the minutes they have spent walking. It is visible to all other users and should create a competitive sense in the users to beat their friends who are close to them on the leaderboard by doing more Walkshawks.

The system also allows users to invite their friends for Walkshawks. This can also be viewed as a playful and social element and makes using the system an enjoyable experience. The ability to meet a friend and do a Walkhawk, while also getting the health benefits can be a way to stimulate people to use the system more.

4.2 Prototype

The mobile app prototype for Walkhawk was created using Figma Starter pack for Windows [45]. Figma is a design tool which is free to use for individual users. In addition to designing, it also offers prototyping features and the prototypes can be accessed through the web.

All the design elements discussed previously, were incorporated to the prototype. The prototype was of a mobile app for Android phones but could be tested on any device with an internet connection through the Chrome browser. The prototype consisted of a total of 24 screens.

The user can perform four main tasks:

1. Conduct a Walkhawk
2. View old Walkshawks and their data
3. Add/Remove friends and invite them for a Walkhawk
4. Access the Blog to view and publish social content

These four tasks correspond to the four main screens within the prototype; *New Walkhawk*, *My Walkshawks*, *Friends*, and *Blog*. The user can switch between the four from any place within the prototype using the horizontal menu at the bottom (see Figure 3), which is always displayed. The prototype can be navigated just like a real app. Tapping on a specific button either contains popup text indicating the completion of an action or some information about that feature. Figure 2 shows the top-level navigation model of the Walkhawk prototype.

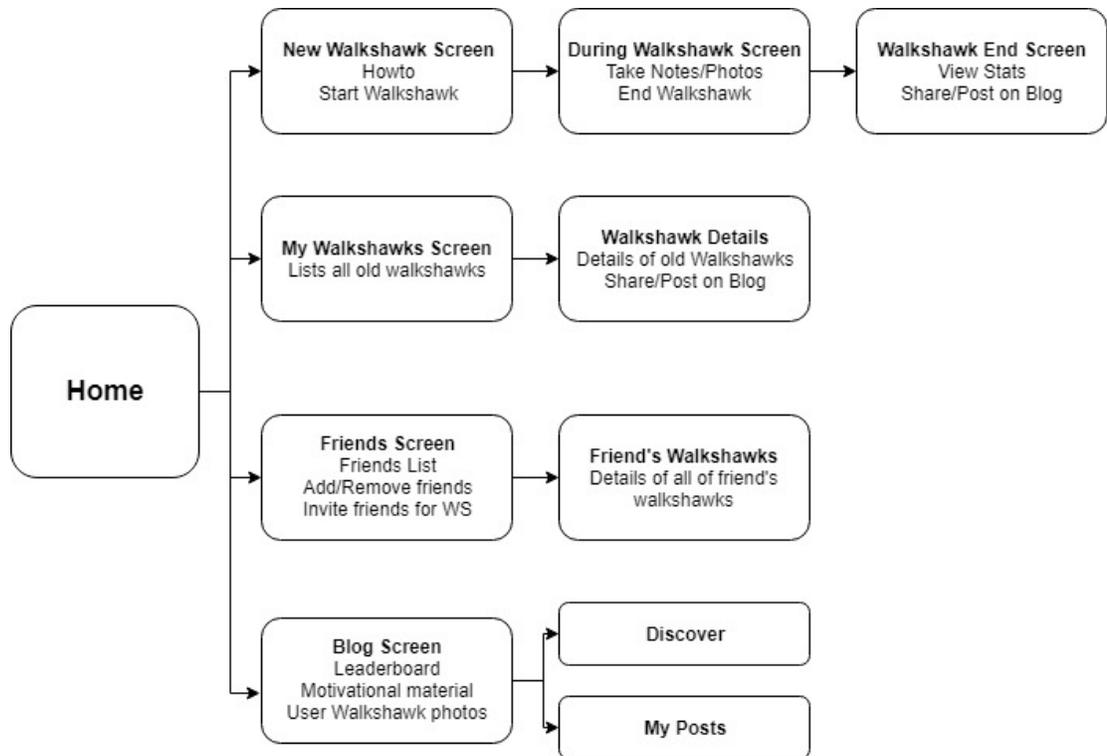


Figure 2. Top Level Navigation Model of Walkshawk

The *New Walkshawk*, screen, Figure 3, lets the user start a new walking meeting and also consists of instructions of how to conduct one. It also presents weather information to plan for the walking meeting accordingly. Once started the user is taken to the next screen where they have the option to take notes and photos for that Walkshawk, this can be seen in Figure 4. From here they can also end the Walkshawk which will take them to the next screen showing the stats for that Walkshawk such as time spent, calories burned, and steps taken. This screen also lets them view the notes and photos taken during that Walkshawk. They can also share the Walkshawk and its data with a friend or post it to the blog as seen in Figure 5.



Figure 3. New WS Screen



Figure 4. During WS Screen



Figure 5. When WS Ends

My Walkshawks section shown in Figure 6, lets the users see the history of their walking meetings. From there they can tap on a Walkshawk to expand it to get further details about that Walkshawk such as stats, notes and photos. On this screen, they also get the option to share it with a friend or post it to the Blog as shown in Figure 7.

Friends section in Figure 8, lets the user see the list of his/her friends. From here they can also search for other users of the Walkshawk app. From among their friends list they can tap on any name to view their Walkshawks in the *Friends WS screen* (Figure 9). From the main *Friends* screen they can also tap on menu to get further actions for each friend which includes removing them from their list of friends and inviting them for a Walkshawk, see Figure 10.

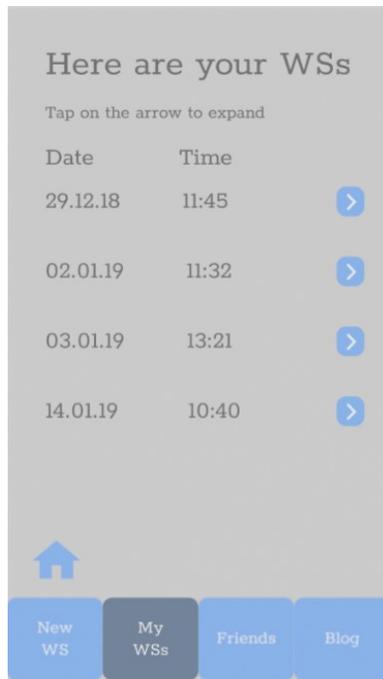


Figure 6. My Walkshawks Screen

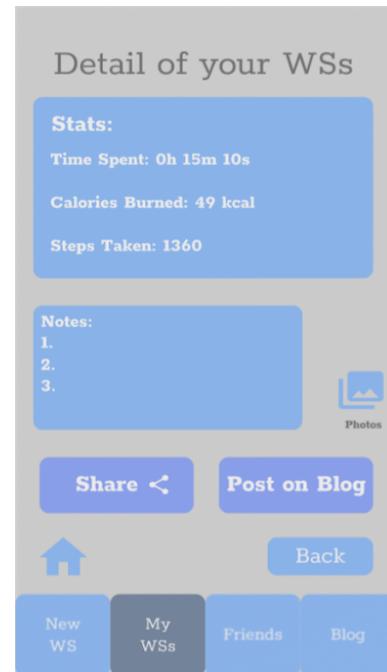


Figure 7. Walkshawk Details

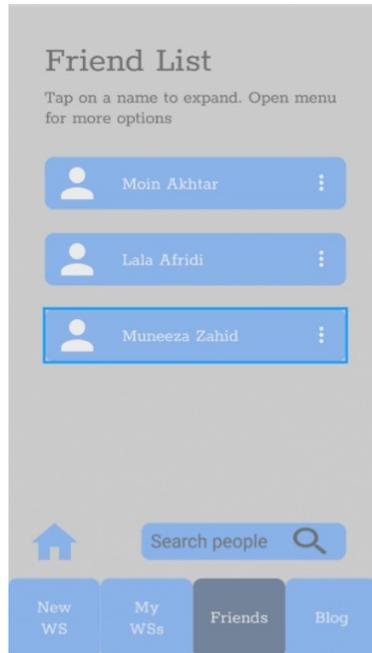


Figure 8. Friends Screen

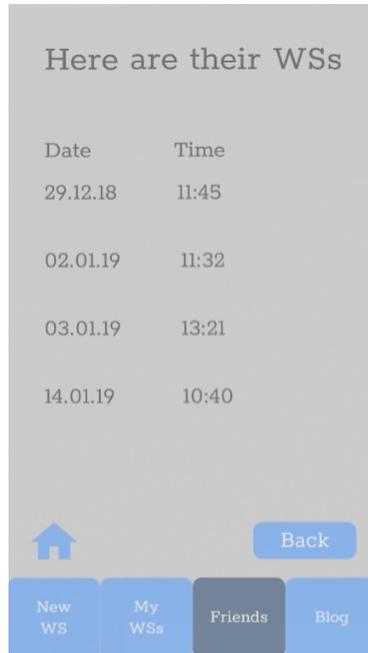


Figure 9. Friends WSs

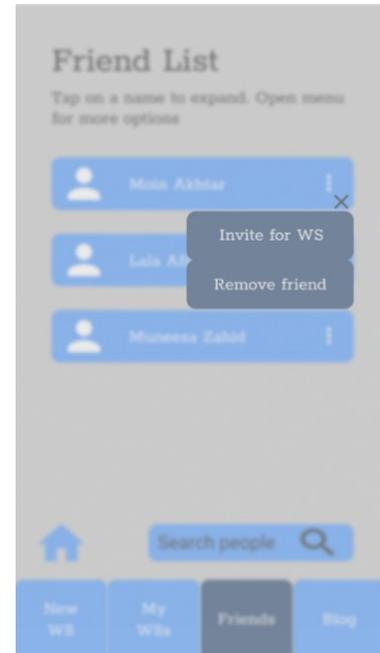


Figure 10. Friends Menu

Blog screen shown in Figure 11, contains blog posts and has two main sections. *Discover* section contains content such as *Leaderboard* which ranks all the users based on

Walkshawks. There is also the *Top Picks* section which shows all the top blog posts based on likes and trends and finally the *Get Inspired* section shows motivational quotes and photos posted by other bloggers, see Figure 12. The *My Posts* section on the blog shows the post history of the user as seen in Figure 13.



Figure 11. Blog Screen



Figure 12. Discover Screen

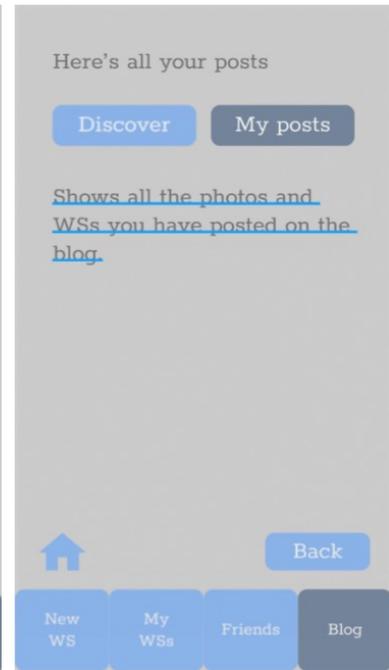


Figure 13. My Posts Screen

4.3 Evaluation

Prototype testing was carried out with a total of 15 participants. It was done in a private sector middle school from grade 6 to 10. All the participants were school teachers which meant that they were all knowledge workers and spent most of their workday in a sedentary office environment. Participants signed consent forms to allow the use of data gathered during the evaluation phase of the prototype including the usage of any images taken; refer to Appendix D. The choice of a school was made to ensure that there are open fields available for the walking meetings to occur. Testing was carried out over a period of two weeks during March 2019. March is springtime in Pakistan and the temperatures range between 10 to 25 degrees Celsius in the city of Lahore. Testing took approximately 35 to 40 minutes for each participant including 8 to 10 minutes for the actual walking meeting, followed by a questionnaire and an interview. The walking meeting was mediated using the Walkshawk app prototype while the participants were free to discuss any topic of their

choosing during the meeting, given that it was related to their work. Walking meetings were either carried in groups of two where one person was the mediator, or larger groups of up to 4 people where at least one was the mediator. Figure 14 shows four participants conducting a walking meeting.

The participants were first briefed about the concept of walking meetings, this was followed by an introduction to the Walkshawk app prototype. The participants were able to use the features of the app relating to conducting the walking meeting and any questions they had were answered. After this the walking meeting was conducted. This was done in the student playground where enough space was available to walk around. A mediator explained the use of the Walkshawk prototype during the walking meeting itself. Once the walking meeting was over the participants were taken back inside where they were given a few more minutes to explore the prototype further. Any questions they had were answered by the mediator. After this, they were given a few tasks to perform (Appendix B), to make sure that they familiarize themselves completely with all the features. The tasks were as follows:

- T1.** Share an old Walkshawk on the blog.
- T2.** Invite a friend to do a Walkshawk with you.
- T3.** Find out who has done the most Walkshawks in terms of minutes.
- T4.** Search for someone to add as a new friend.
- T5.** View the Walkshawks of a friend.
- T6.** Remove someone from your friend list.

Since the purpose of the testing was less about the actual usability of the prototype and more about exploring the design concept and gathering feedback about the features included, the tasks were not timed and in the case where a participant failed to perform a specific task, they were guided by the mediator in order for them to perform the task successfully and get to know all the features of the design. Once complete, testing was followed by questionnaire and interviews, which were used to gather data.



Figure 14. Participants during walking meeting

4.4 Data Gathering

The walking meeting and the Walkshawk prototype demo was followed by a questionnaire and an interview. The questionnaire consisted of two parts; one to be filled in before the walking meeting. The other was filled in after the walking meeting and the Walkshawk demo (see Appendix A). Data gathered from the questionnaire became the basis for quantitative data.

The first part consisted of background info about the participant such as age, activity level, exercise goals, self-assessment of their stress levels on a daily basis and on the time of filling the questionnaire. The second part of the questionnaire had three separate sections each corresponding to the three design considerations **D1**, **D2** and **D3**. They were A: Stress and wellbeing assessment, B: Assessment of the impact of social aspects, and C: Assessment of the impact of institutional support. All sections contained statements regarding the subject and the participants could choose one from 5 options varying on levels of agreeableness with the statement. These were Strongly Agree, Somewhat Agree, Neither Agree nor Disagree, Somewhat Disagree, and Strongly disagree. Data gathered through the

questionnaire was later analyzed and the findings were used to substantiate or discredit the earlier formulated hypotheses. Figure 15 shows one of the participants filling out the questionnaire.



Figure 15. *One of the participants filling out the post walk questionnaire*

Once the questionnaire was filled out the interviews were conducted (see Appendix C). The interviews were recorded by a recording device. The language of the interviews was English in some cases and Urdu in others where the participants felt uncomfortable communicating in English. In either case, the interviews were transcribed and translated where necessary. The main purpose of the interviews was to allow the participants to add free form comments, in that sense the interviews were semi structured, however interview questions were provided for uniformity and comparing comments. The interviews consisted of the following seven questions:

IQ1. What do you think about combining exercise and the office environment?

IQ2. What do you think about introducing social aspects (friends, blog) to exercising? Do you think it will positively or negatively affect behaviors towards exercise? Elaborate.

IQ3. What other things can institutions do other than GPA awards and magazine features to encourage walking meetings?

IQ4. If others around you are not using this system do you think that you will still use it? If so why and if not, why? Elaborate.

IQ5. What did you think about the design of the app? What did you like about it and what didn't you like? Is there anything you would like to add to it?

IQ6. Do you think in Pakistan attitudes towards exercise are changing? Do you think people are giving it more importance?

IQ7. Do you think concepts such as walking meetings where exercise and work are combined have any future in Pakistan? If yes, why and if no why not? Elaborate.

The data gathered has been presented and analyzed in the following chapter. For the quantitative data, statistical analysis was used to calculate the mean agreement or disagreement value for each statement question. Based on this, general trends have been identified to predict possible user behaviors. Similarly, the qualitative data gathered through interviews, was studied and inferences were made. The content of the interviews was analyzed to look for patterns and recurring keywords. First, similar comments were grouped together, and thematic analysis was done to pick out key themes from the comments. Keywords were then used to identify various themes, and these keywords were sorted in descending order of occurrence. Finally, the most common themes have been discussed and have become the basis for future design implication presented in Chapter 6.

5 FINDINGS

Data collection was done through questionnaire and interviews. This chapter details the results of the data gathered through the questionnaire and analyzes the quantitative data while there is detailed discussion on the qualitative data gathered through the interviews.

The questionnaire was divided into two main parts, one to be filled out before and the other after the walking meeting (see Appendix A). The portion of the questionnaire that was filled out before the walking meeting contained some background info about the participants including their age group, daily activity level and a self-assessment, on a scale of 1: lowest to 5: highest, of their average daily stress level, and their level of stress before the walking meeting. They were then asked to evaluate their stress level after the walking meeting.

14 participants lied in the age group 35 to 45 while one other was between 25 to 34. All the participants were females. On their daily exercise routines, only one said that they exercise regularly while 14 said they did not. 9 of these 14 attributed their lack of daily exercise due to the shortage of time, while 5 associated it to lack of motivation.

5.1 Stress and Wellness Indicators

Participants were asked to rate on average, how stressed they feel daily. The scale ranged from 1 to 5 where 1 was not stressed at all and 5 was very stressed. 14 participants rated their level of stress to be more than or equal to 3, one rated it as 2, while 4 participants rated their everyday lives to be highly stressed at 5.

Similarly, they were also asked to rate their level of stress at the time of filling out the questionnaire before the walking meeting and then once again after the walking meeting was over. 6 of the participants reported no change in stress levels before and after the walking meeting while 9 reported a reduction in stress level after the walking meeting was done. No one reported an increase in their level of stress. This is detailed in the Chart 1 below which clearly shows that for most participants stress levels reduced after the walking meeting was conducted. The mean stress level in all participants before the walking meeting was 3.33 with a standard deviation of 1.676, which fell to 1.86, with a standard deviation of 1.125 after the walking meeting.

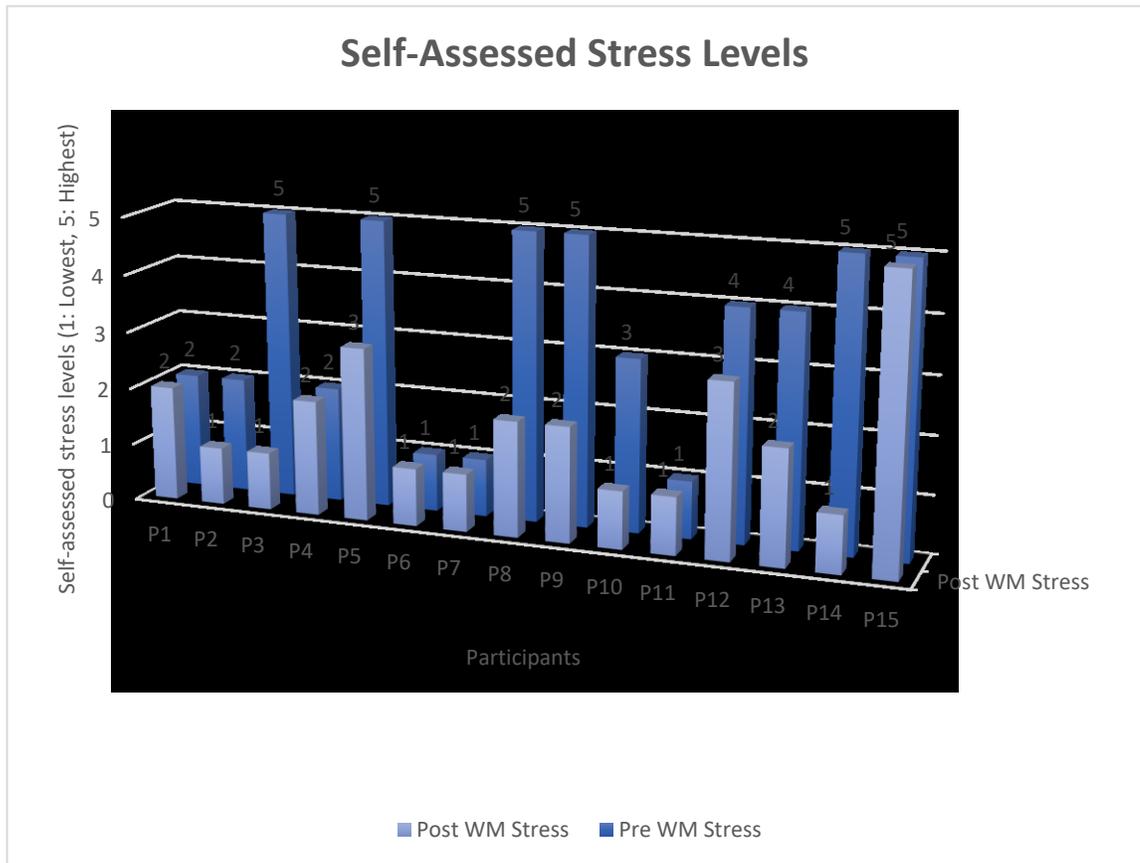


Chart 1. *Self-Assessed Stress Levels*

Soon after the walking meeting, participants were asked to fill in the section of the questionnaire which was related to stress levels and other markers of wellness. Other than stress levels it also contained statement questions which the participants could rate on 5 levels of agreement; strongly agree (SA), somewhat agree (SwA), neither agree nor disagree (NAND), somewhat disagree (SwD) and finally, strongly disagree (SD). Included questions were about the perceived effects of the walking meeting on the mood, energy levels and creativity. There were also a couple of questions about how the participants perceived the usefulness and feasibility of the walking meetings (see Appendix A). The statements were as follows:

S1. The Walkshawk has lifted my mood.

S2. The Walkshawk has made me more energetic.

S3. The Walkshawk has made me more creative for the rest of the day.

S4. Doing the Walkshawk is a good form of easy exercise I can incorporate in my daily routine.

S5. Conducting Walkshawks can help me hit my daily exercise goals without exclusively taking the time out for exercise.

Most participants gave generally favorable responses to these statements. Chart 2 shows the mean agreement values for each statement question where the numerical value corresponds to level of agreement such that SD=1, SwD=2, NAND=3, SwA=4 and SA=5. This high level of agreement can likely be attributed to factors such as good weather at the time of the walking meeting, such as spring time, sunny weather and a lot of natural elements such as green outdoors with a lot of plants and colorful flowers in the area the walking meeting was conducted. All of these are naturally related to walking and can be attributed to the walking meeting itself. Appendix E: Table 1 shows the number of responses for each question based on levels of agreement.

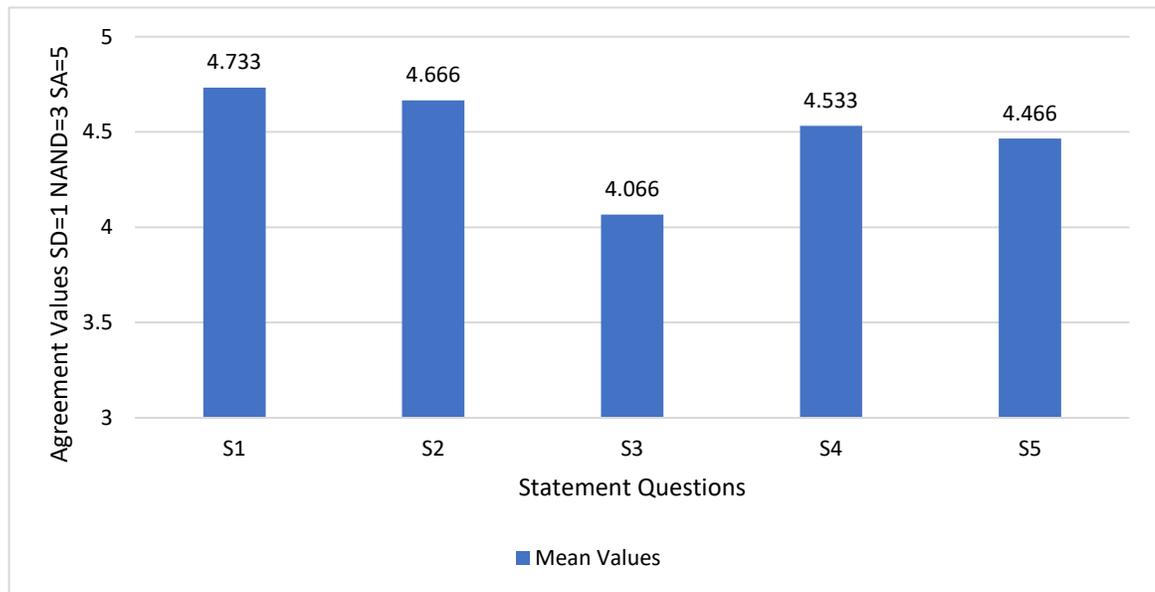


Chart 2. Mean Agreement Values for Statements on Wellbeing

5.2 Perceived Role of Social Media Features

The second section of the questionnaire contained statements about the social aspects built into the Walkshawk prototype (Appendix A). These were related to the features such as

Blog, Invite Friends, and Photos. Questions were about the perceived usefulness and acceptability of these features and the impact they could have on the adoptability of walking meetings. The question statements were as follows:

S6. I am more likely to use WS if I find out that a friend is using it.

S7. I am more likely to use WS if I see photos of WSs from a friend.

S8. I will be encouraged to do more WSs if my photos are featured on a blog.

S9. I am more likely to do WSs if I am invited by someone.

S10. I am more likely to do a WS if a group of friends are doing a group WS.

S11. WS can be a good way to meet fellow teachers.

S12. Blog can be a good way to know which of my friends are doing WSs.

Responses were generally favorable to all seven statements with an exception to **S8**, in response to which three participants answered strongly disagree **SD**, this could be attributed to privacy concerns as not everyone likes to share their life publicly, for the same statement, only 4 participants answered **SA**, which is the least of any statement in this section. The responses are detailed in Appendix E: Table 2, while mean values for agreement on each statement are presented in Chart 3.

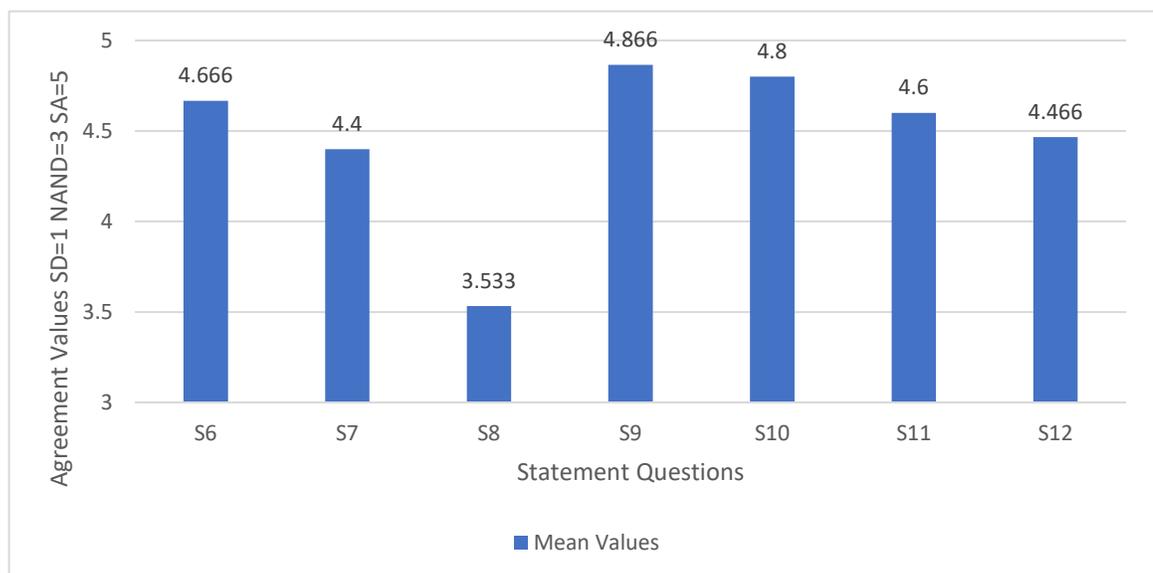


Chart 3. Mean Agreement Values for Statements on Role of Social Media Features

5.3 Perceived Role of Institution Support

The third and final section of the questionnaire contained questions about institutional support and how the participants perceived it to affect the adoption of the concept (Appendix A). A lot of these features were not built directly into the Walkshawk prototype but will have to be considered for the successful adoption of the walking meeting concept in the Pakistani culture since institutional support and government support are both necessary for the adoption of any new technology in the Pakistani culture as pointed out by Abbassi et al. [24]

The question statements were as follows:

S13. I am more likely to do WSs if they will in some way affect positively towards my teacher GPA.

S14. It will encourage me to do more WSs if they are an accepted way of work in the institution.

S15. I will be encouraged to see my WS photos featured in the school magazine.

S16. I am likely to do WSs more frequently if the school sets a minimum WS score for all teachers to achieve.

S17. Without any institutional support I fear that conducting WS may be perceived by some as taking breaks from work.

S18. If I am the only one doing WS, I fear that people may perceive it as if I am not working.

Statement **S13** makes a reference to the term teacher GPA, which is a teacher evaluation system used in some schools across Pakistan. It considers student performance in both school and public examinations and grades the teachers on a scale of 0 to 6. Teachers with a high GPA are given incentives and awards while those with a low GPA are expected to improve their performance. While this system is not practiced universally across Pakistan, it is safe to assume that all schools have at least some alternative to evaluate teacher performance.

The responses to the above statements are detailed in Appendix E: Table 3, while Chart 4 shows the mean agreement value for each statement.

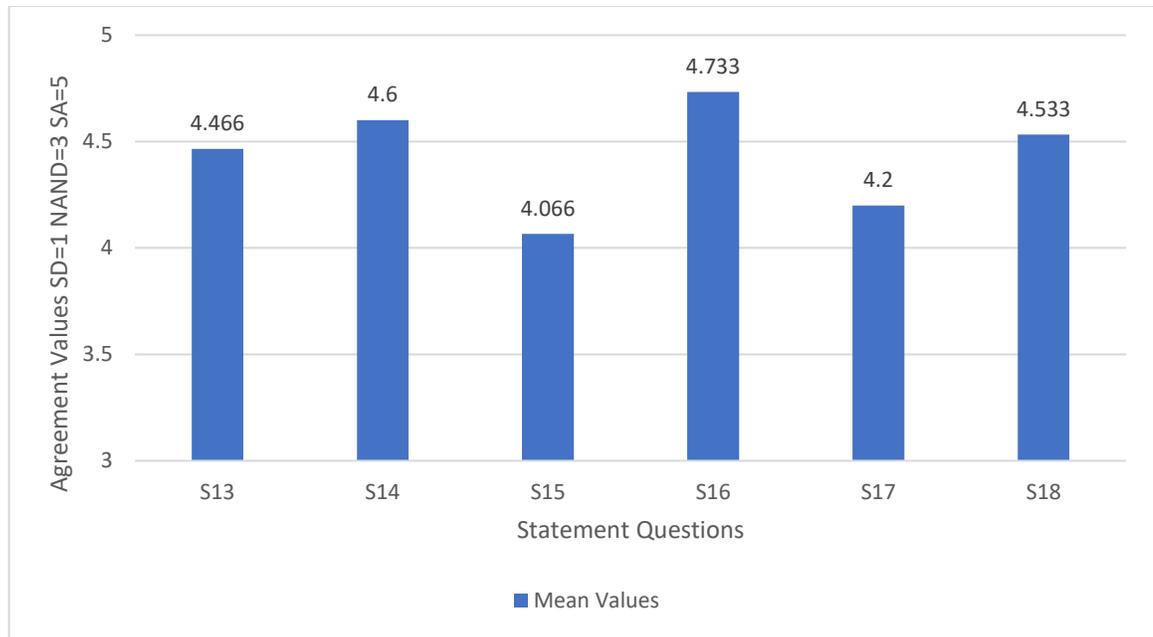


Chart 4. Mean Agreement Values for Statements on Role of Institution Support

Responses were generally positive in this section as well, with only a slight exception in **S15**, which received mixed levels of agreement. This can once again be explained by the fact that this statement was about the magazine features and could possibly raise privacy concerns.

5.4 Interview Results

The questionnaire was followed by interviews of each participant which took about 5 minutes per participant. The main idea behind the interviews, was to explore further aspects about the walking meeting concept and allow the participants to speak freely since the questionnaire was very structured and did not have any section to allow free form comments (Appendix C).

IQ1 explored how people perceived combining exercise with the office environment. They were asked to explain if they thought it was a good idea and if it was feasible. In response to the question most participants noted that they realize that exercise has positive health benefits such as increase in energy, productivity, and creativity and combining it with office work can result in increase in these factors and also increase health and fitness in the long run. It was also pointed out that exercise may also be able to impact the hectic office work positively through reduction in stress levels. Several participants also pointed out that it can

be a challenge to do so because of the office environment itself. *"I see the biggest obstacles to be time and space, and of course the fact that office work must take first priority"*, (female, 35-45). Other factors were pointed out such as the nature of work, working hours and strict schedules. One participant noted that working in an educational institute allows them some extra time between lectures which can be used effectively to conduct some walking meetings but that also meant that sometimes, there would be periods throughout the year where there would be strict deadlines and it would be very hard to work while walking. Another pointed out that it could be used as a gateway to introduce otherwise sedentary people to exercising and once they see the positive aspects, they might introduce regular exercise into their everyday lives and perhaps want to combine it with other activities as well. One participant added that it would highly depend on the office authorities and whether they allow it and facilitate this kind of work. *"I believe that office authorities have a role to play not only in facilitating but also to make sure ideas like these are integrated properly"*, (female, 35-45). In general, most people liked the idea and appreciated the ability to be able to exercise, albeit a small amount without exclusively taking time out of their day.

IQ2 explored the role of social aspects such as the ability to add friends, and post on blog, within the Walkshawk prototype and whether the participants thought these would positively or negatively impact user behaviors towards exercising. Most participants noted that the addition of social media elements to the prototype would have a positive effect in behaviors towards exercise. They agreed that it can help to inspire, encourage and motivate people to exercise more since the ability to see others do something makes people naturally want to follow them. Participants noted that it can have a similar effect as social media has had on lives in general where people share photos and enhance the positive aspects of their lives and it encourages others to follow them, it can similarly be used to emphasize the positive effects of exercising. A few interviewees mentioned that it can be encouraging for the person posting if he/she gets positive feedback from people who see their shared content. One participant pointed out that the presence of these features will make walking meetings a fun and enjoyable activity. *"I would appreciate the social features since like most people, I don't like doing things alone and it is more fun to do stuff with other people"*, (female, 35-45). Another interviewee mentioned that it can give rise to healthy competition. One participant also mentioned that social media can be a double-edged sword since it is the presence of social media in the first place which has somewhat made people exercise less. *"It appears that everyone is looking at screens now and no one goes out anymore"*, (female, 35-45).

While a decade ago people used to put in the effort to go out and meet people, now they can do it on their mobile devices and not need to move at all, so it is possible that the introduction of social media in an exercise app can be counterproductive.

IQ3. Was about Institutional support and what institutes can do other than GPA awards and magazine features which could encourage teachers to do more walking meetings. Most participants agreed that GPA awards were a very good incentive to them, but perhaps other kind of incentives could also be included such as certificates, gifts, movie tickets based on the number of walking meetings. Other incentives can also include recognition and having a board of honors. Most interviewees also pointed out that the easiest way institutes can ensure that their staff are doing walking meetings is to make it a part of standard operating procedure and have a minimum threshold of walking meeting everyone must achieve. The importance of making it an acceptable way of work was also pointed out. *“By using catchy terms like ‘walking coordination’ the administration can make it more acceptable and that way I would feel like it is a part of everyday routine”*, (female, 35-45). One participant noted that institutes might not be interested altogether, and more work must be done to make them realize the importance of exercise for their staff before expecting anything of them. Among other suggestions were, allocation of specific time slots to facilitate the practice of walking meetings and to conduct demos of walking meetings and workshops which discuss the importance of daily exercise. These can also emphasize on the positive effects of exercising such as weight loss, a healthy and fit body etc.

While there can be many things institutions can do, most participants focused on the reward part of motivation. No one mentioned improving available facilities such as grounds and walking paths to enable walking meetings. Some other measures could be to add notice board reminders about daily exercise and its importance in living a healthy life, but these were not pointed out by any of the interviewees.

IQ4 was asked to explore whether people would use the app if no one else around them was using it. This question not only related to the personal motivation of each participant but also to the social behavior towards standing out and doing something no one else is doing and how people think such an action would be perceived by their peers. In response to **IQ4**, all the participants said they would continue to use it but two pointed out that it might be hard to stay motivated if no one else is using it and they might lose motivation also. *“I think I will at first, but honestly, I will probably stop after a while”*, (female, 35-45). Among the

interviewees who said they would continue to use it, the most common reason was that they see the positive benefits that can be gained through it such as health, effect on mood, and stress management. One participant mentioned that they like to stand out more and don't mind doing new and different things and would continue to use it, another said that they will not only continue to use it but also convince others to join them as well. *"Of course, I will", said one participant confidently "I'll convince others too"*, (female, 25-34). Some said that they will keep using it due to various personal reasons such as hitting daily exercise goals, stress management, likeability of the concept and being out in nature.

While all the interviewees said that others not using the system will not bother them much, it is safe to assume that using walking meetings as a way of work will not be easy if it is not recognized by the institution. *"If it is an accepted way of work, I would not mind using it even if no one else does"*, (female, 35-45). Motivation is another aspect and was correctly pointed out that loss of motivation might occur if activities such as these are done alone over a course of time. It is therefore hard to say how successful walking meetings can be if they are done as a solo activity.

IQ5. Was about the design of the app and whether users found it likeable and if they thought something could be added to it. Most interviewees said that the design was good and complete for the most part, some common suggestions included making different color choices to account for usage outside in direct sunlight which can make it hard to use. People also mentioned that the design could use more privacy. *"I don't see the point of knowing so much about my friends and I don't think they need to know all my Walkshawks, maybe just the photos I share"*, (female, 35-45). One participant also pointed out that the app should include more feedback both in the form of commenting ability from friends and the app giving suggestive and appreciative comments to the user. Another pointed out that the design could use some more graphical elements to make it appealing to new users. Among the likeable features, the photo taking ability was the most popular. Participants mentioned that it allows them to take photos of sceneries which can be shared with others and be kept for future use and can bring back good memories. They also liked the note taking ability and said that it would be very useful. The ability to invite a friend for a Walkshawk was also appreciated. *"It is nice to be able to invite my colleagues to do a Walkshawk with me, this feature is great since it mimics real life"*, (female, 35-45).

This question was also included to see if some people who exercise regularly would like some feature added to the design which they use while exercising, but as it turned out only 1 out of the sample group of 15 exercised regularly, so the feedback gathered was mostly about the different features of the prototype.

IQ6. Was about the attitudes towards exercise in Pakistan and whether the interviewees thought that they are changing for the better or worse. It can be safe to assume that people in Pakistan do not prioritize exercise. Daily life usually consists of work, followed by family time and some leisure time. While some of these activities can be combined with exercise most people do not do so. This can also be clearly seen from the pre interview questionnaire, where 14 out of the 15 participants said that while they would like to exercise regularly, they do not do so either due to a lack of time or motivation.

In response to **IQ6**, interviewees were divided, while some thought that the attitudes have changed for the better others thought that they have gotten worse. They pointed out that life has gotten busier and people have less time to exercise and since most people do not prioritize exercise, it usually gets neglected for other things like work, studies etc. One interviewee pointed out that compared to other countries, the number of people who exercise in Pakistan is negligible. Another added that the younger generations are more health conscious but there is no change in attitudes in the middle-aged people and the old people who need to exercise more often. From the people who believed that behaviors have improved, the most common reason stated was becoming more health conscious and realizing that a lot of poor health conditions can be prevented from regular exercise. One interviewee said that some people still find the time to exercise very early in the morning or late at night due to their hectic routines and continue to do so even in harsh climates. *“In summer I see people walking in the streets as early as 4 to get the exercise in before the sun comes up and the day gets hot”*, (female, 35-45). Another pointed out that there has been a significant change in mindset where people try to exercise more as they realize it must be a part of their everyday lives. Another reason stated was doctor’s recommendation and stress management. One interviewee also pointed out that there are much more people in parks and more gyms have opened in the last decade which could hint that an increasing number of people are exercising in Pakistan than ever.

IQ7 was asked to see what participants think of the concept in general and if they think it has a future in Pakistan. Responses were mixed and while some felt it could work others

thought that there are a lot of issues which might stop it from catching on in Pakistan. Interviewees pointed out that perhaps the biggest hurdle could be the lack of space, as many office workers in Pakistan do not have available space to walk inside their offices let alone outside in the nature. Another reason pointed out was the nature of meetings where some can involve presentations and even extensive note taking, both impossible while walking. Participants also thought that attitudes towards exercise could be an issue in integration since people are non-serious towards exercise. Lack of time was also pointed out as a possible hindrance in successful implementation of any walking meeting concept. Interviewees pointed out that it is very important to introduce such concepts since more people are entering the workforce, especially women who can find it very hard to exercise since they also manage children and are expected to invest more time on their family. They thought that it can be a welcome change from sitting down all day and will also be enjoyable since it comes as a break from the hectic office life. A few participants recalled their Walkshawk experience and pointed out that they felt much better afterwards. *“It felt great when we did the Walkshawk the other day. We were still working but it felt like a break”*, (female, 25-34). Interviewees pointed out that if integrated properly, it could have some future in Pakistan and that it must be done through slowly changing mindsets towards exercising and focusing on motivation not only for the employees but also for institutes, which have to understand that exercise is good for their employees in the long run.

6 DISCUSSION

The research questions which formed the basis of this work were aimed at finding the user requirements for localizing walking meeting to Pakistan, finding out how knowledge workers in Pakistan perceive the idea of walking meetings, and to explore some administrative factors which can help in the smooth adoption of walking meetings in Pakistan. User requirements were mostly gathered through theoretical research prior to user testing, although user testing has also revealed more user requirements such as designing for first time users of health and exercise applications etc. In response to the second question, users were found to be very receptive to the idea of combining exercise and work whenever possible. This was revealed through the questionnaires and the interviews. In addition to this, the interviews have also shed light on deeper aspects such as user expectations, fears and concerns. For the third research question, it was found that the role of institutions was the most important administrative factor. Since no institution support was built into the prototype, user interviews were used to gather insight to suggest an effective role for institutions. Based on this, design implications have been presented in this chapter which summarize and integrate the role of institutes into the Walkshawk design prototype.

While it was made sure that the data collected be of sound quality, the research is not without its limitations. This chapter discusses some of these limitations, followed by design implications which have been formulated through the analysis of the results. Finally, there is a section detailing how these design decisions can be used to take this work into the future.

6.1 Limitations of the Research

Different measures were used to collect data, most common was a 5-point scale, based on agreement level which went from strongly agree to strongly disagree on which the users were asked to rate statements. They were also asked to rate their stress levels both pre and post Walkshawk. This was done on a 5-point scale corresponding to the stress levels. Similarly, there were also questions about mood, energy and creativity. Self-assessment was chosen for measurement since it was the easiest and the quickest method available. One problem with self-assessment of stress and other markers of wellbeing is that people can often tend to exaggerate or console their levels at the time of evaluation. There is also

a high chance of bias since people can associate such markers with things such as exposure to exercise and nature, so the simple act of walking outside can make people feel that it has improved their mood or reduced the stress. There is also a high chance of the results being skewed due to personal reasons where a participant could have a stressful day on the day of the test. This was somehow eliminated by asking the participants about their general stress levels on any given day. Doing this ensures that any anomaly in the result could be accounted for using information the participants provided. That being said, the chance of error can still not be neglected. In general, all the participants reported either reduction in stress levels or no change in them, along with agreeing favorably that their mood, creativity and energy levels have improved from conducting a Walkshawk. These results were somewhat expected, so it can be concluded that no anomaly was found in this section of data collection.

15 participants can be considered a small sample size, especially when talking of a culture as vast as that of Pakistan. It is important to note that all these participants were female due to the prototype test done in a girl's school. In girls' high/middle schools across Pakistan, the teachers are usually female. It is uncommon to find male teachers in girls only schools and in mixed gender schools for younger children. Teaching roles in Pakistan are mostly occupied by women as it is considered a feminine role. Working as teachers allows women to contribute financially to the household while also taking care and spending time with family, since a school day is only about 6 hours and goes from 8 in the morning to 2 in the afternoon. It is therefore safe to assume that whenever a sample will be taken within an educational institution, it will mostly be dominated by female employees. On a positive note it can be a good thing to test with more women, since a lot of women are entering the workforce in Pakistan now and a great number of them adhere to the more sedentary jobs and have a greater need to exercise, while men adhere to the more labor intensive work, although this trend is slowly changing.

All the participants were also of the same age range i.e. between the age of 35 and 45, except for one who was under 35. This could be attributed mainly to the choice of educational institution and choosing a university or college or perhaps even a technical institution could have resulted in a much older age group. This knowledge could be of significance considering that people in their late to middle ages may be more exercise conscious due to some health conditions and might have different attitudes towards exercise and may perceive this idea with more enthusiasm.

Since the prototype testing was done in one institution, the people in the sample were somewhat similar to each other in the sense that their nature of work was the same. This was done to reduce the variables such as office timings, job description, and age group, among others; so meaningful data can be collected. It is important to note that this will differ vastly when tests are done in other office settings, even in other educational institutions. While job definitions may remain the same, the way of doing work can differ. Peoples' expectations from walking meetings may also vary and so will their responses. The role of institutions can also vary greatly, while an educational institution might be very interested in the long-term wellbeing of its employees, an engineering company might not be as enthusiastic of the idea. Many limiting factors can also be a hindrance in the implementation of such an idea. One great problem can be the lack of space, making it necessary for the employees to leave the office premises in order to do a walking meeting. This might be unacceptable for the management of some institutions. This was also one of the reasons for choosing an educational institution for testing. While not all, most of the educational institutions in Pakistan have playgrounds for students within the premises. Moreover, some administrations might be unable to support such concepts even if they wanted to, mainly because of the nature of work where walking and working cannot be combined.

During the interviews, one suggestion that frequently came up was to somehow make it compulsory for the teachers to do walking meetings, either through setting a minimum threshold for everyone to achieve or by making it a part of the standard operating procedure. While it is true that exercising is a good thing and everyone can achieve some good health benefits from exercising regularly, making it mandatory, may not be entirely ethical. Employees might see it as a burden or perhaps as something unnecessary which hinders their ability to do work. Some employees might be unable to do walking meetings due to various health conditions or disabilities. It will also require a greater effort on the part of the institution to ensure that everyone is complying with the new guidelines and to make sure that adequate conditions are provided so that employees might do so. It would without doubt be the fastest way to make employees walk more but will have problems of its own. A better way would be where teachers conduct walking meetings organically, through finding intrinsic motivation. This does not mean that institutions will have no role in helping promote the concept, but it only means that their role would be that of a facilitator and a motivator, rather than that of an enforcer.

From the 15 participants who were tested, 14 mentioned in the pre-Walkshawk questionnaire that they do not exercise regularly. It was expected that most of the participants would not have daily exercise routines, but it turns out that almost all who were tested didn't exercise. It must be said that people who do not exercise regularly, might have a different experience while testing with a walking meeting for the first time. It is safe to assume that people who exercise daily, understand the importance of exercise and will therefore find the activity more likeable and enjoyable. Exercising is linked to a release of endorphins in the brain [4], which trigger a positive feeling in the individual. People who exercise regularly find it enjoyable, since it activates a reward in the brain, while those who do not exercise find it hard to do so and often tend to lack motivation to start. During our tests, regular exercisers might show very positive and favorable attitudes towards the Walkshawk concept, while the negative or neutral results may come from people who do not exercise regularly. As it turns out almost all the participants were non exercisers, this variable was also somewhat eliminated. Moreover, the answers from all the participants on the questionnaire were generally above neutral and gravitated towards positive. However, this should be taken into consideration while testing the Walkshawk concept in the future.

It must also be considered that some office environments are generally associated with very high levels of stress in general and light to moderate walking might not be able to help with those levels of stress. These are the fast-paced office work environments and it is quite possible that a walking meeting is not the most efficient way of doing work in these environments, since they have hard deadlines and delivery schedules. For this reason, the Walkshawk concept should be limited to less stressful office environments which involve work with soft deadlines and flexible schedules. Not only will it be more feasible, it will also make more sense in the context of combining work and physical activity where it is most needed. Other than educational institutions, this can also involve offices with light clerical work.

The climate of Pakistan cannot be ignored either while planning any outdoor activity. While the testing with users was conducted in March, which is usually springtime with temperatures ranging between 10 to 25 degrees centigrade, in the Lahore city of Pakistan, climate can be harsher. Temperatures in summer can soar to 45 degrees centigrade during May and June and can fall below zero in January. People tend to stay indoors and avoid outdoor physical activities. While harsh climate only constitutes about 3 months in the whole year, it can make

outdoor walking meetings impossible. This might require indoor alternatives, which might not be a problem in an educational institute but may be problematic in other office settings.

During the interviews, one participant pointed out how social media has made people more sedentary in this day and age. People tend to get their daily dose of social interactions by looking into a screen rather than going outside and meeting people. This results in reduced physical activity. Therefore, any concept which is designed to make people exercise should be wary of including social media features lest they may take the focus away from the real task at hand i.e. to make people get up and be more active.

In this context, social media applications can be divided into two main categories. First are the ones which focus on people and the community in general. An example can be Facebook, which allows the users to comment, like, share and even post reactions to the posted content. While this is good for user engagement, it takes the focus away from the content itself. On the other hand, are application which focus primarily on the content. While users have the option to like and comment on posts, the focus is usually always the content posted. Examples of these are YouTube and Tumblr.

In the design of the Walkshawk prototype, users can look at posts from other users of the system, but it was undefined whether they have the ability to like and comment on the posts. This was also pointed out by some users during testing, that some sort of feedback such as comments could be added to the design. While it is true that positive feedback can be a motivator, negative comments are also a possibility. More social media features will also mean that the focus will be shifted from the content to user involvement. Therefore, these features should be kept to a minimum allowing users to only like a post from someone else, while the person who posts should only be allowed to see the views on their post in order to prevent users from competing for likes instead of actually going outside and doing more walking meetings.

6.2 Future Design Implications

Design of the Walkshawk prototype was tested with users who used it to conduct a walking meeting. These participants were introduced to the other features of the app afterwards. These included the social media such as friend and blog. Later there were questions about the design both in the questionnaire and the interviews. This allowed for solid data to be collected regarding the design of the app. However, as hypothesized earlier, **D2** assumed

that institution support will be another factor in facilitating system use. Unfortunately, the app did not have any features regarding Institution support since it was unclear what they could be and how they can be implemented into the design. However, through the data collected in the questionnaire and mostly during the interviews, the role of institutes has been made clearer. As discussed earlier, the role of institutions can be classified into 5 main parts:

I. Promote Intrinsic Motivators

Rewards can contribute greatly to increasing motivation. In this regard, motivation can be of two types. Extrinsic motivation is driven by external and physical rewards such as prize money or incentives, while intrinsic motivation is driven by internal rewards, such as the good feeling or the pleasure achieved by doing something, or the feeling of accomplishment. While both can be powerful motivations, intrinsic motivation can be considered to build long-term sustainable habits, since material rewards are not always present and may even run out.

Among the many things that institutions can do to encourage employees to do more walking meetings, the possibility of GPA awards is a great example of an extrinsic motivator, but at the same time it is much better to motivate intrinsically to create habits. Examples could be motivational quotes, pictures and videos. While extrinsic motivation elements can be used to get employees to start, in the long run, they must be kept motivated and this is where institutes can play a part by motivating intrinsically.

II. Facilitate Smooth Operation

Ease of use is necessary for any new technology to be successful. In the original Technology Acceptance Model (TAM), perceived ease of use (PEoU) is defined as the degree to which a user believes the use of a new system will be free of effort. PEoU is directly correlated to technology acceptance. Similarly, the more hurdles there are to use a system, its acceptance will go down [23] [29].

Institutes can play a big role in ensuring that walking meetings can be conducted smoothly. As discussed before, when focusing on educational institutes, there should be sufficient outdoor space available. In addition to this, institutes can create better regions for walking meetings. Examples could be specially made paths which can be decorated with flowers and other beautiful elements from nature. This can also tie in with the early point of intrinsic

motivators by adding motivation quotes around the paths. Paths can also have checkpoints marking distance and/or steps.

Smooth functioning of this concept also means staying up to date with what is happening so feedback from employees is also important. This can be in the form of positive or negative comments but also fault reports.

III. Emphasize Positive Behaviors

Exercise can be very useful in bringing about positive changes in one's life. These changes can be both physical and mental and can contribute greatly towards wellbeing in the long run.

When taking the role of a mediator and a facilitator, one way that institutes can not only motivate but ensure more walking meetings is by emphasizing the potential positive benefits from exercising. One way of doing this can be through magazine features, which can be good for recognition, but can also be useful in reiterating the positive life changes through exercise such as weight loss, improvement in physical and mental health etc. These will also correspond to the first point of motivating intrinsically. The possibility of magazine features was also discussed with the interviewees and received positive feedback except for one participant due to privacy concerns.

It is also important to mention that the Walkshawk prototype itself has a *Blog* section, which aims to motivate through elements such as focus on positive effects and motivation and if the role of institutions can somehow be combined with the blog, it can be useful for creating one decisive and integrated platform for walking meetings.

IV. Increase Investment

It can be said that together with the employees, institutions are the second most important stakeholders in walking meetings since they can benefit from healthier employees and can have more productive workers if regular walking meetings are conducted. That being said, it might be a challenge to get institutes to invest more resources into facilitating walking meetings since the positive benefits will manifest in the long term. Institutes can therefore have short- and long-term goals and invest in them to ensure that walking meetings become a part of their employees' daily routine.

An example of a short-term goal could be to set daily exercise goals based on steps taken or distance covered. Institutes can ensure that this goal is met every day by taking steps to motivate or encourage. This goal can also be published to inculcate a sense of competitiveness and goal orientation within the employees as well. An example of long-term investment can be fields for walking and creating walking paths. Another example can be indoor facilities with treadmills and other exercise equipment for days when it is not possible to walk outside due to the weather.

The Walkshawk prototype design itself has the option to calculate calories burned, steps taken, and distance covered, and this idea was also appreciated by many participants in the interview section of testing. However, it is an individual calculation and does not integrate the data of all walkers. But it can be done and sent to the institute to allow for daily or even weekly goals to be set and tracked.

V. Normalize for Acceptability

Institutes also have an important role to play in ensuring that walking meetings become standard operating procedure. Instead of enforcing and making them mandatory, a better approach is to normalize them using all the above stated principles such that they can become a part of the work culture. Once they become a norm, employees will not feel different while doing walking meetings. [46]

During the interview part of the testing, the social acceptability of the concept was tested mainly because there is a huge question mark on the status of an activity which can only be performed on an individual level, especially in a collectivist culture such as Pakistan where it is not always encouraged to stand out and do something new. Due to this, it becomes very important that institutes play a significant role in normalizing new concepts such as walking meetings. Some of the measures that they can take is to use various kinds of media to promote walking meetings but also use the built-in features of the design solution which is implemented to increase involvement and interest regarding such new activities.

Similarly, design implications can be formulated for the Walkshawk prototype, based on the feedback gathered. These will allow the design to be more robust and it will accommodate certain features to enable an increased involvement from institutions as discussed in the earlier section. Here are some design suggestions:

VI. Integrate Institution Support

The importance of institution support has been discussed earlier and there is no doubt that it will enable for a seamless design. Various features built in to the design of the Walkshawk prototype can be used in tandem with one another. An example is the walking meeting data and statistics collection which instead of being shown only to individuals can be sent to the institute's administration for records and be later used as a measure of the total amount of walking done, based on which they can set daily and/or weekly walking goals. The design can also allow admin accounts to be set up which have all the same features as a main user but also have some admin rights in features such as *Blog*, where they can post and highlight user posts. Admin can also use the *Top Picks* section to highlight engaging content and *Get Inspired* section to push motivational posts.

VII. Enhance User Involvement

It was pointed out during the testing phase, that the Walkshawk design can benefit from more user involvement, whether it be from feedback, more comments, or discussion around topics. In the discussion and Criticism chapter the possibility of this was explored and the pros and cons of increased user involvement were discussed. In short, while it is true that more user engagement is good for social media functionality, it is quite possible that it may take the focus away from the content and the main essence of promoting more walking meetings.

Minimal social media capabilities can however be used and will play a useful role in enhancing the likeability of the design. They can include the ability to send feedback to the admin section so the institutes can act accordingly, liking posts shared by other users, saving posts to be able to view them later, and perhaps also some limited ability to comment on certain blog posts.

VIII. Reduce Distractive Elements

One of the features of the Walkshawk design is its lack of obtrusiveness specially when conducting walking meetings. The user can put their phone in their pockets and focus solely on the walking meeting and may only take it out when they need to take down a note or wish to take a picture of something. This design was chosen over others which had more functionality such as checkpoints, rewards and even games because although they had more features and possibly more appeal, they take the focus away from the main subjects which are walking and the actual meeting.

These allow for the design to be the least distracting while doing walking meetings. However, while using the app in general, it is possible that some users might be distracted by the various social features and never do an actual walking meeting while they still continue to use the design for some of its other features such as looking at photos and commenting etc. This can be counter-productive, since the aim is not to promote the use of the app itself, but to prompt the users to do more walking meetings. One way of doing this is by going over all the features of the design and exploring the possibility of reducing distractions within each aspect. An example of this can be the 'Friends' section which allows users to search for people who are using the app and add them as friends, once added, friends can be sent requests to do Walkshawks together and a history of their shared walkshawks is also visible. While this sounds very simple and without much possibility of distracting elements, addition of other associated features such as the ability to chat with friends, make voice and video calls with friends can make the focus shift entirely from walking meetings. It is therefore important that in each iteration, the design is actively examined for distracting elements so that they can be eliminated.

6.3 Design Suggestions for Walkhawk Admin

From the design implications presented in the earlier part of this chapter, a basic design for an admin panel of the Walkhawk is presented. This design can work in conjunction with the earlier presented Walkhawk feature set but will also incorporate the admin elements which were found to be useful, including, promoting intrinsic motivators, facilitating smooth operation, emphasizing positive behaviors and increasing investment. It allows for admin accounts to be set up so that they can log in using the same app. From there, they are presented with a new design with added feature set. The idea is to integrate the employees and the institute administrators on the same system.

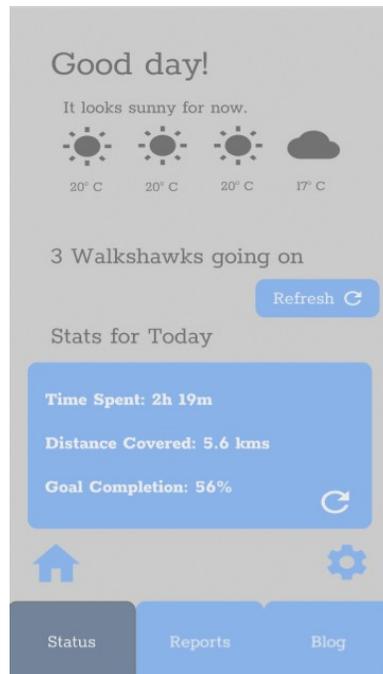


Figure 16. Admin Panel: Status Screen

Figure 16 shows the design of the Admin panel. It consists of three main sections. The *Status* screen, *Reports* screen and the *Blog* screen. Figure 16 shows the *Status* screen which is an overview of the Walkshawk status for the day. It collects data from all the users of the system and displays it in a meaningful way to the admin. It consists of weather data, information about the number of Walkshawks being currently performed. This data is fed in live through the Walkshawk design and can be refreshed to get updates. This is followed by the stats for the day, which show the total time spent on Walkshawks and the total distance covered during all the Walkshawks for that day. This can help the institutes to set daily goals and monitor their completion, which is also shown in the stats section.

Secondly, there is a *Reports* screen, which has been designed so that admins can ensure the smooth operation of walkshawks. The *Reports* screen shows feedback from users of the system for the day. There is also a fault report section which lets the admin see all the fault reports submitted by the users. Since the system is integrated, users can submit live fault reports as they conduct walkshawks. These can be simple things like 'path not clear' or 'broken tree' etc. The admins can view them and take the necessary steps to solve them. Old reports which have already been solved are placed in the *Archived Reports* section. The *Reports* screen has been shown in Figure 17.



Figure 17. Admin Panel: Reports Screen

Finally, there is the *Admin Blog* screen, which is similar to the *Blog* screen for users, but has been redesigned slightly. Instead of posting their own content, admins can view the content of users and highlight it so that it can be shown in the *Top Picks* section. This will let them focus on the positive side of walkshawks. Moreover, admins can also post motivational content in the *Get Inspired* section. This can help them to intrinsically motivate users to conduct more walkshawks. Figure 18 and 19 show the redesign of the *Blog* section with focus on admins.



Figure 18. Admin Panel: Blog Screen

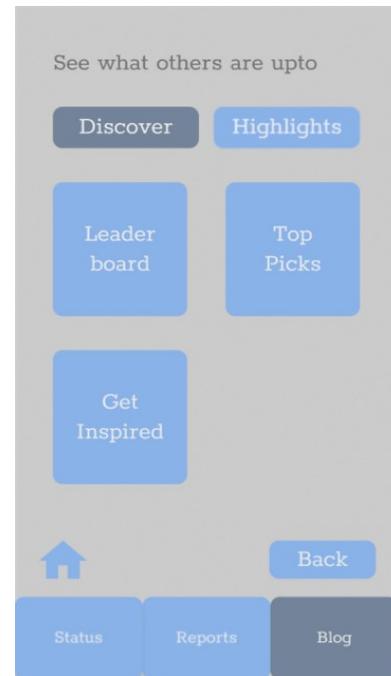


Figure 19. Admin Panel: Discover Screen

6.4 Future Work

The testing of the Walkshawk prototype and the subsequent questionnaires and interviews answered a lot of questions, but it also led to many new ones and a lot of room for improvement. It also creates room for further work both in development and in testing. Following are some suggestions on how the prototype can be developed and tested further:

While the design of the prototype managed to convey the concept, it was still essentially a prototype and did not have any functionality. In order to test it fully, it must be developed to perform the minimum functionality at least. This beta version can then be tested with the users to see what they think of the concept. Moreover, a design concept of Walkshawk admin has been presented which should be developed and used in conjunction with the original design. Once they are both integrated together, questions regarding the role of institutes can be properly answered. For both designs to be tested, a partnership is required with the institutes.

As of now, 15 users have tested the Walkshawk prototype by first being introduced to the walking meeting concept and then conducting the Walkshawk mediated by the prototype. This was a one-time practice and user experience can vary while using it for the second time

or when using it on a regular basis. Any further iteration of testing with users should require them to keep the prototype and use it multiple times and record their experiences, by either keeping a diary or answering a survey at different points of their usage cycle. It might be a challenge to find 15 participants who agree to doing this for a period of time, but this can be managed by adequately incentivizing, something which was not done during this round of testing.

It is also recommended that in the next iteration, this concept must still be limited to educational institutions due to all the limiting factors listed above. Once the concept is fully tested with educational institutes, the next round can include testing it with other office settings and perhaps new ideas can be explored in order to make the design more feasible in those environments.

From the three design considerations, **D1** related to the social aspects of the system and their role in accentuating its use. It can be said that this hypothesis was substantiated, however some further questions were raised which have been discussed in previous chapters. **D2** was about the role of institutions in the use of walking meetings. From the feedback gathered during testing, this has raised many further questions about what kind of role should an institution play. Based on the feedback, design suggestions have been formulated and a design concept of 'Walkshawk Admin' has been presented. During any future testing of the 'Walkshawk Admin' concept new hypotheses can be formulated and tested, this might include slight tweaks both to the designs of the admin panel and the main design. One possibility is to explore the social acceptability of the concept, since the proposed design of the Walkshawk admin includes increased institution support which can contribute to making the concept more socially acceptable. Other questions such as 'how to make the idea more appealing to the institutions' and 'what other kinds of office work can be combined with light exercise such as walking' are also worth exploring. **D3** was related to the stress levels and the possible relation of walking meetings at work and the reduction in stress caused by the office work. This hypothesis has also been validated as 9 of the 6 participants reported a reduction in stress levels while others reported no change. Future iterations can include stress assessment on an extensive questionnaire or for longer periods of time, multiple times throughout the day in order to obtain a more robust measurement of stress levels.

7 CONCLUSION

From the design suggestions presented and a brief cultural study of the Pakistani culture, the Walkshawk walking meeting mobile app prototype was created. This was then tested with 15 participants who were employees of an educational institute in Pakistan. Testing involved using the prototype for mediation purposes for a walking meeting. This was followed by a questionnaire and later, an interview. This mostly included questions regarding three hypothesized design considerations, which were related to social aspects built in the prototype, role of institution support in facilitating walking meetings, and the role of walking meetings in work related stress reduction.

Walking meetings were found to reduce stress levels in most of the individuals, while social aspects were also welcomed. It was also pointed out that the role of institutions cannot be undervalued, but more work needs to be done to determine what a suitable role for an institution should be.

In conclusion, the work which started off as a simple localization of the walking meeting concept for the Pakistani culture, has opened new doors in applying health conscious practices to cultures which do not put emphasis on exercising and have higher levels of stress. This work can also be used as a foundation for future work related to research into aspects such as exercise and wellbeing, and also in the social aspects of walking and working. It also lays some groundwork on the role of administration in the successful adoption of walking meetings.

REFERENCES

- [1] J. Y. Chaua, H. P. v. d. Ploeg, J. G. v. Uffelen, J. Wong, I. Riphagen, G. N. Healy, N. D. Gilson, D. W. Dunstan, A. E. Bauman, N. Owen and W. J. Brown, "Are workplace interventions to reduce sitting effective? A systematic review.," *Preventive medicine*, vol. 51, no. 5, pp. 352-356, November 2010.
- [2] American College of Cardiology, "Effect of Sedentary Lifestyle on Cardiovascular Disease Risk Among Healthy Adults With Body Mass Indexes 18.5 to 29.9 kg/m²," *The American Journal of Cardiology*, vol. 123, no. 5, pp. 764-768, 2019.
- [3] U. Bashir and M. I. Ramay, "Impact of Stress on Employees Job Performance," *International Journal of Marketing Studies*, pp. 122-126, 2010.
- [4] K. Mikkil, L. Stojanovska, M. Polenakovic, M. Bosevski and V. Apostolopoulos, "Exercise and mental health," *Maturitas*, pp. 48-56, 2017.
- [5] G. Tew, M. Posso, C. Arundel and C. McDaid, "Systematic review: Height-adjustable workstations to reduce sedentary behaviour in office-based workers," *Occupational Medicine*, vol. 65, no. 5, pp. 357 - 366, 2015.
- [6] G. A. Koeppe, C. U. Manohar, S. McCrady-Spitzer, A. Ben-Ner, D. J. Hamann, C. F. Runge and J. A. Levine, "Treadmill desks: A 1-year prospective trial.," *Obesity*, vol. 21, no. 4, pp. 705-711, 2013.
- [7] A. Ahtinen, E. Andrejeff, M. Vuolle and K. Väänänen, "Walk as You Work – User Study and Design Implications for Mobile Walking Meetings," in *Nordic Conference on Human-Computer Interaction*, Gothenburg, 2016.
- [8] A. Ahtinen, E. Andrejeff, C. Harris and K. Väänänen, "Let's Walk at Work – Persuasion through the Brainwolk Walking," in *AcademicMindtrek'17*, Tampere, 2017.

- [9] H. E. King, X. Yang, S. E. Messiah, K. L. Arheart, D. Brannan and A. J. Caban-Martinez, "Opportunities for Increased Physical Activity in the Workplace: the Walking Meeting (WaM) Pilot Study," *Preventing Chronic Disease*, vol. 13, pp. 1-8, 2016.
- [10] M. Oppezzo and D. L. Schwartz, "Give your ideas some legs: The positive effect of walking on creative thinking," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, vol. 4, no. 40, pp. 1142-1152, 2014.
- [11] M. G. Berman, J. Jonides and S. Kaplan, "The Cognitive Benefits of Interacting With Nature," *Psychological Science*, pp. 1207-1202, 2008.
- [12] G. Hofstede, "Country Comparison," 2018. [Online]. Available: <https://www.hofstede-insights.com/country-comparison/pakistan/>.
- [13] N. Ali, S. Sharma and A. Zaman, "School Culture and School Effectiveness: Secondary Schools in Pakistan," *Malaysian Online Journal of Educational Management*, vol. 4, no. 4, pp. 50-65, 2016.
- [14] G. Hofstede, *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Aations*, Thousand Oaks: Sage cop, 2001.
- [15] L. a. W. M. Thomas, "Promoting physical activity in the workplace: using pedometers to increase daily activity levels," *Health Promotion Journal of Australia*, vol. 17, no. 2, pp. 97-102, 2006.
- [16] D. Commissaris, R. Könemann, S. Hiemstra-van Mastrikt, E. Burford, J. Botter, M. Douwes and E. R.P., "Effects of a standing and three dynamic workstations on computer task performance and cognitive function tests," *Applied Ergonomics*, vol. 45, no. 6, pp. 1570-1578, 2014.
- [17] Beenote, "Beenote," Comnet-Technologie, 2019. [Online]. Available: <https://app.beenote.io/>. [Accessed 27 May 2019].
- [18] Sherpa, LLC, "Statik," 2018. [Online]. Available: <https://gostatik.com/>. [Accessed 27 May 2019].

- [19] LUMA Institute, *Innovating for people: Handbook of human-centered design methods*, Pittsburg: LUMA Institute, 2012.
- [20] B. Fogg, *Persuasive Technology: Using Computers to Change what We Think and Do*, Amsterdam: Morgan Kaufman Publishers, 2003, pp. 89-120.
- [21] M. Hassenzahl, "Hedonic, Emotional, and Experiential Perspectives on Product Quality," *Encyclopedia of Human Computer Interaction*, pp. 266-272, 2006.
- [22] B. Esselink, *A Practical Guide to Localization*, Amsterdam: John Benjamins Publishing Company, 2000.
- [23] F. D. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319-340, September 1989.
- [24] M. S. Abbasi, A. Tarhini, T. Elyas and F. Shah, "Impact of individualism and collectivism over the individual's technology acceptance behaviour: A multi-group analysis between Pakistan and Turkey," *Journal of Enterprise Information Management*, vol. 28, no. 6, pp. 747-768, 2015.
- [25] U. P. Oxford, "Pakistan, Islam in," 2018. [Online]. Available: <http://www.oxfordislamicstudies.com/article/opr/t125/e1809>. [Accessed 15 September 2018].
- [26] S. A. M. Shah and S. Amjad, "Cultural Diversity In Pakistan: National Vs Provincial," *Mediterranean Journal of Social Sciences*, 2011.
- [27] M. L. Jones, "Hofstede - Culturally questionable?," in *Oxford Business & Economics Conference*, 2007.
- [28] M. Sondergaard, "Hofstede's Consequences: A Study of Reviews, Citations and Replications," *Organization Studies*, vol. 15, no. 3, pp. 447-456, 1994.
- [29] R. J. Holden and B.-T. Karsh, "The Technology Acceptance Model: Its past and its future in health care," *Journal of Biomedical Informatics*, vol. 43, no. 1, pp. 159-172, 2010.

- [30] E. T. Hall, *Beyond Culture*, New York: Anchor Books, 1976.
- [31] A. Peshkin, "Education, the Muslim Elite, and the Creation of Pakistan," *Comparative Education Review*, pp. 152-159, 1962.
- [32] S. P. Cohen, *The Future of Pakistan*, Washington D.C.: Brookings Institution Press, 2011.
- [33] UN, "Demographic Yearbook," United Nations, New York, 2018.
- [34] Pakistan Bureau of Statistics, "Population Census," 28 April 2019. [Online]. Available: <http://www.pbs.gov.pk/content/population-census>.
- [35] U. Asgher, T. Ali, R. Ahmad, R. Taïar and R. I. Moraru, "A Comparative Study on Organizational Stress in South Asian Cultures," *Procedia Manufacturing*, vol. 3, pp. 3963-3970, 2015.
- [36] D. C. Ganster and C. C. Rosen, "Work Stress and Employee Health: A Multidisciplinary Review," *Journal of management*, pp. 1085-1122, 2013.
- [37] A. Akbar and W. Akhter, "Faculty Stress at Higher Education: A Study on," *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, pp. 93-97, 2011.
- [38] UNESCO. Director-General, "Youth and skills: putting education to work, EFA global monitoring report," United Nations Educational, Scientific and Cultural Organization, Paris, 2012.
- [39] N. Islam, "Sifarish, Sycophants, Power and Collectivism: Administrative Culture in Pakistan," *International Review of Administrative Sciences*, pp. 311-330, 2004.
- [40] R. S. Ulrich, R. F. Simons, B. D. Losito, E. Fiorito, M. A. Miles and M. Zelson, "Stress recovery during exposure to natural and urban environments," *Journal of Environmental Psychology*, vol. 11, no. 3, pp. 201-230, 1991.
- [41] T. Lowdermilk, *User-Centered Design: A Developer's Guide to Building User-Friendly Applications*, O'Reilly Media, Inc., 2013.

- [42] M. An, S. M. Colarelli, K. O'Brien and M. E. Boyajian, "Why We Need More Nature at Work: Effects of Natural Elements and Sunlight on Employee Mental Health and Work Attitudes," *PLoS One*, pp. 1-17, 2016.
- [43] F. Mayer, C. Frantz, E. Bruehlman-Senecal and K. Dolliver, "Why is nature beneficial?: the role of connectedness to nature," *Environment and Behavior*, pp. 607-643, 2009.
- [44] D. Foster, C. Linehan, B. Kirman, S. Lawson and G. James, "Motivating physical activity at work: Using persuasive," in *MindTrek*, Tampere, 2010.
- [45] Figma, "Figma: the collaborative interface design tool," 25 May 2019. [Online]. Available: <https://www.figma.com/>. [Accessed 25 May 2019].
- [46] J. Goldgruber and D. Ahrens, "Effectiveness of workplace health promotion and primary prevention interventions: a review," *Journal of Public Health*, vol. 18, no. 1, pp. 75-88, 2010.
- [47] M. A. Schafer, K. Jason Crandall, T. F. Scott Lyons, K. Edens, L. Blankenship and Shaker, "Impact Of Sit-stand Workstation Progressions On Stress, Focus, And Productivity In University Staff Members," *Medicine & Science in Sports & Exercise*, vol. 50, no. 5S, p. 716, 2018.

APPENDICES

Appendix A: Questionnaire

Pre Walkshawk questions:

Please select your age group:

- 35-45
- 46-55
- 56 and older

How are you performing the Walkshawk?

- Two people
- In a group

Do you exercise regularly?

- Yes
- No

If No, what keeps you from exercising?

- Lack of time
- Lack of motivation
- Lack of energy

On average how stressed are you each day on a scale of 1 to 5? (1: least stressed and 5: very stressed)

On a scale of 1 to 5 how stressed do you feel today? (1: not at all and 5: very stressed)

Post Walkshawk Questions:

Section A: Stress and Wellbeing Assessment

On a scale of 1 to 5 what is your level of stress after the WS? (1: not at all and 5: very stressed)

How would you rate the following statements?

1. The WS has lifted my mood.
 - a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
2. The WS has made me more energetic.
 - a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
3. The WS has made me more creative for the rest of the day.
 - a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
4. Doing the WS is a good form of easy exercise I can incorporate in my daily routine.
 - a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree

5. Conducting WSs can help me hit my daily exercise goals without exclusively taking the time out for exercise.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree

Section B: Assessment of Social Aspects:

How would you rate the following statements?

1. I am more likely to use WS if I find out a friend is using it.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
2. I am more likely to use WS if I see photos of WSs from a friend.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
3. I will be encouraged to do more WSs if my photos are featured on a blog.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
4. I am more likely to do WSs if I am invited by someone.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree

- e. Strongly disagree
5. I am more likely to do a WS if a group of friends are doing a group WS.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
6. WS can be a good way to meet fellow teachers.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
7. Blog can be a good way to know which of my friends are doing WSs.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree

Sections C: Assessment of Institutional Support:

How would you rate the following statements?

1. I am more likely to do WSs if they will in some way affect positively towards my teacher GPA.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
2. It will encourage me to do more WSs if they are an accepted way of work in the institution.
- a. Strongly Agree
 - b. Somewhat Agree

- c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
3. I will be encouraged to see my WS photos featured in the school magazine.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
4. I am likely to do WSs more frequently WSs if the school sets a minimum WS score for all teachers to achieve.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
5. Without any institutional support I fear that conducting WS may be perceived by some as taking breaks from work.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
6. If I am the only one doing WS, I fear that people may perceive it as if I am not working.
- a. Strongly Agree
 - b. Somewhat Agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree

Appendix B: User Tasks

1. Share an old Walkshawk on the blog.
2. Invite a friend to do a Walkshawk with you.
3. Find out who has done the most walkshawks in terms of minutes.
4. Search for someone to add as a new friend.
5. View the walkshawks of a friend.
6. Remove someone from your friend list.

Appendix C: Interview Questions

IQ1. What do you think about combining exercise and the office environment?

IQ2. What do you think about introducing social aspects (friends, blog) to exercising? Do you think it will positively or negatively affect behaviors towards exercise? Elaborate.

IQ3. What other things can institutions do other than GPA awards and magazine features to encourage walking meetings?

IQ4. If others around you are not using this system do you think that you will still use it? If so why and If not, why? Elaborate.

IQ5. What did you think about the design of the app? What did you like about it and what didn't you like? Is there anything you would like to add to it?

IQ6. Do you think in Pakistan attitudes towards exercise are changing? Do you think people are giving it more importance?

IQ7. Do you think concepts such as walking meetings where exercise and work are combined have any future in Pakistan? If yes, why and If no why not? Elaborate.

Appendix D: Consent Form

Study on Walking Meetings Mobile App Prototype (Walkshawk): Information regarding participation

Invitation to participate in research project

You are invited to participate in a study to collect information for the evaluation and possible further development of a mobile app prototype called 'Walkshawk'. This study is a part of research related to master's thesis at Tampere University.

We would like to collect the following material from you as part of a research into physically active ways of work:

1. Audio-recorded interview
2. Photographs (including face)

Participation is completely voluntary.

About the research

The purpose of the Walkshawk prototype evaluation is to explore the concept of walking meetings in the context of the Pakistani work culture and using the data gathered, improve the concept so that it can be better localized to Pakistan.

Confidentiality and data security

All data will be treated as confidential. Recordings and written notes will not contain any identifying information about you. All collected data will be anonymized. Your face may be seen in photographs, but no names will be used.

Results of the research

The results of this research may be written up for conference papers or peer-reviewed journal articles. We may show parts of the results in scientific papers, conferences and events.

Consent

Based on the information expressed above, I provide consent for using my data in the study.

Your name Date

Contact information

If you have any further questions regarding this study, please do not hesitate to contact the responsible person:

Yasir Rathore

Tampere University

Email: xxxxxxxxxxxx

Phone: xxxxxxxxxxxx

Appendix E: User Responses to Questionnaire

Statement	SA	SwA	NAND	SwD	SD
S1	12	2	1	0	0
S2	11	3	1	0	0
S3	2	12	1	0	0
S4	11	3	0	0	1
S5	8	6	1	0	0

Table 1. Responses to Statements on Markers of Wellbeing

Statement	SA	SwA	NAND	SwD	SD
S6	11	3	1	0	0
S7	8	5	2	0	0
S8	4	6	2	0	3
S9	13	2	0	0	0
S10	14	0	0	1	0
S11	10	4	1	0	0
S12	9	4	2	0	0

Table 2. Responses to Statements on Social Media Features

Statement	SA	SwA	NAND	SwD	SD
S13	7	8	0	0	0
S14	10	4	1	0	0
S15	7	5	1	1	1
S16	11	4	0	0	0
S17	8	4	1	2	0
S18	10	4	0	1	0

Table 3. Responses to Statements on Institution Support