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TURKU TAKING STEPS TOWARDS FUTURE

Technology supports physical activity

Master´s Thesis

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ABSTRACT

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Abstract:

Physical activity (PA) is an important field of healthcare research internationally and within Finland. As technology devices and services penetrate deeper levels within society, the need for studying the usefulness for PA turns vital. We started this research work by reviewing literature consisting of two hundred research journals, all of which have found technology to significantly improve an individual's ability to get motivation and achieve officially recommended levels of physical activity, like the 10000 steps a day, being tracked with the help of pedometers. Physical activity recommendations require sustained encouragement, consistent performance in order to achieve the long term benefits. We surveyed within the city of Turku, how the motivation levels and thirty three other criterions encompassing technology awareness, adoption and usage attitudes are impacted. Our aim was to know the factors responsible for achieving consistent growth in activity levels within the individuals and focus groups, as well as to determine the causes of failures and for collecting user experience feedback.

The survey results were quite interesting and contain impeccable information for this field. While the focus groups confirmed the theory established by past studies within our literature review, it also establishes our research propositions that ict tools and services have provided and can further add higher benefits and value to individuals in tracking and maintain their activity levels consistently for longer time durations. This thesis includes two new models which dictate technology and physical activity adoption patterns based on four easy to evaluate criterions, thereby helping the healthcare providers to recommend improvements and address issues with an easy rule based approach. This research work provides vital clues on technology based healthcare objectives and achievement of standard PA recommendations by people within Turku and nearby regions.

Key words	technology, physical activity, pedometer, step counter, turku, åbo
Further information	

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I highly appreciate the co-operation received from the Turku sports center, whose highly supporting staff exceeded all the expectations and made this research work a success.

It’s vital to mention here the impeccable support, guidance and the blessings of my parents, being showered upon me throughout this life.

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Abbreviations

aee	associated energy expenditure
cbcs	computer based counseling system
gps	global positioning system
ict	information and communication technology
ilt	instructor led training
ijbpna	international journal of behavioral nutrition and physical activity
lvsem	latent variable structural equation modeling
mvpa	moderate to vigorous physical activity
pa	physical activity
pait	physical activity information & communication technology model
patam	physical activity and technology adoption trends matrix model
pf	physical fitness
rct	randomized controlled trial
sdt	self-determination theory
tee	total energy expenditure
tra	theory of reasoned action
voc	voice of customer

1 INTRODUCTION

1.1 Healthcare and technology confluence

Advanced technologies are constantly evolving around the globe which includes healthcare information technology (hcit). Likewise social networking has increased general awareness of people about internet based healthcare services. Such scenario helps us in bringing the technology based service models like of social marketing to be used and leveraged for the development of integrated and sustainable healthcare models, benefitting fitness and physical activity for the masses.

This research studies how much information and communication technology (ict) related tools are able to inspire people to maintain a healthy lifestyle, while using the same at individual level or within some social, work or sports activity group. Also the research area does encompass within the study of ict-related tool's importance and its benefit for the healthcare industry. A brief introduction on the thesis work, surveys performed and my main inspiration towards this work is listed in next sub-chapter. The research methods employed for data collection and case study formation and the structure of this thesis report is also included, along with the key terms and their narrowed down descriptions.

1.2 Motivation

The researcher is currently pursuing the master studies in the area of global information technology management. Furthermore he has prior work experience of five years in healthcare industry's information technology based service delivery.

Although there has been quite regular study being taken up by researchers at the University of Turku (UTU, Publications), our research topic and focus area combines the aspects of advanced ict, to the healthcare services. Combination of which along specialization in physical activity measurement, fitness and healthcare sentiment across Turku city makes it a topic worth researching for benefit of healthcare in this region. The benefit of measuring the impact of ict-related tools on fitness activity and health related interventions motivated the author, due to timely guidance of the professor. Henceforth provides an interesting topic to research for the readers in Turku. Further-

more, the master thesis study is appreciated by the Turku city office, which sponsored the study partly while data collection was is progress in city of Turku.

1.3 Research questions and Turku

This research started as a pilot study in early 2010 and continued with the work along with Turku sports center and then focused on fitness and activity groups as participants for this study. City of Turku (sports center) has more than a decade of an impeccable expertise in promoting and providing high quality fitness infrastructure and healthcare activity services for the residents of Turku city and nearby towns.

We decided to keep a case study approach herein. The analysis of survey based data collection would provide a valuable insight into the technology supported healthcare and physical activity. The participants are people of different focus groups in and around city of Turku, which helped in retrieving key data about motivation levels of people residing in Turku, along with the real benefits of technology in achieving their individual or group based fitness goals.

1.4 Structure of thesis

The initial sections of this thesis describe physical activity briefly and then represent the standard requirements approved by the public healthcare organizations in various countries. These are also commonly known as fitness recommendations. Within this section, crucial factors behind successful incorporation of healthy lifestyle using physical activity awareness and interventions are also included. this information is based on a thorough literature review of around two hundred research papers, journals, publications of researches done in this area of technology based physical activity and its measurement.

Most of the publications that we reviewed are available online at research portals, namely Science Direct and PubMed and based on four search keywords: “pedometer”, “accelerometer”, “physical activity” and “pa measurement”. As this thesis is focused on technology for a city wide level of healthcare services framework, we aim to provide notes on public health infrastructure facilities here and the justifications to need for usage and adoption awareness within the masses. Even all these marketing and awareness

campaigns are generally implemented with technology usage and thus ict provides value to existing public ict infrastructure.

In the next chapter of thesis, spotlight is made on usage of ict-related tools including mobile, internet, and email based communication on implementation of the fitness programs and similar interventions. Technology has provided novel ways to measure the activity and track the activity levels and comparison of individual progress with time and with other individuals of the group, we would see how easier technology has reached the people, how much and what particular benefits they have realized from ict-related tools. Such tools evolve possibilities more than just comparison and analysis. The possibilities nowadays include sharing of one's achievements among friends, which helps motivating the peer group and such interactions are tested here to know how individuals within Turku benefit from the public facilities and technology collectively.

Third chapter details the research method and design description. This includes the survey and data collection techniques adopted by us in this research study. Also provided is description of focus groups in detail and the type of interfaces we used to reach them out for surveys and research work data collection requirement. This chapter completed the theory part based on literature review as well as the brief introduction of research work participants and area of focus, concluding the background information about description of people which may have used technology, from which we get our data and survey results in next chapters.

Fourth chapter illustrates the results we received from the focus group candidates and the people from open (no-groups). The study accepted participants via Turku city internet and social media marketing interfaces targeting general public of Turku as eligible for participation. This part of thesis reveals the effects of ict-related tools and devices on physical activity awareness, adoption motivation as well as usage benefits, within their fitness and activity programs. We also test the level of awareness made by city of Turku sports center in these participants, as well the role of technology in bringing positive mindset and effective use of such healthcare facilities for adoption of healthy lifestyle.

Conclusions are finally drawn from the results and are presented within fifth chapter. The comparison between theoretical recommendations and practical contributing facts vis-à-vis results from this study are also detailed. As the results contains both quantitative and qualitative data. After the chapters which focus on results of studies done before and provides the baseline for an evaluation of results about as to what technology holds for physical activity and city of Turku collectively. The study and its outcome

further draw conclusions which could be helpful for healthcare service providers, city administration, sports center as a feedback, as well as for future researches to be done in Finnish society.

This final part of the thesis also presents some practical suggestions within conclusions, which can be called as voice of the customer (voc) and are thus highly recommended for adoption by the people or departments concerned, to improve the present level of motivation regarding technology based healthy lifestyle and wellbeing. Thus presents physical activity within focus groups, adoption and usage of ict-related tools and public healthcare facility infrastructure in Turku.

2 PHYSICAL ACTIVITY

2.1 Definition

The world health organization states that physical activity is the bodily movement produced by skeletal muscles which results in caloric expenditure and there are benefits achieved by doing such an activity e.g. enhanced physical fitness and wellness levels, as well as preventing body from getting non-communicable and chronic diseases (Cdc, 2010 and Who, 2010). reduction in weight for overweight people, easier management of body weight are the prime factors making physical activity necessary and recommended for everyone desiring a good looking and healthy body. Figure 2-1 shows in a much better way some of the details about different physical activities one can focus upon.

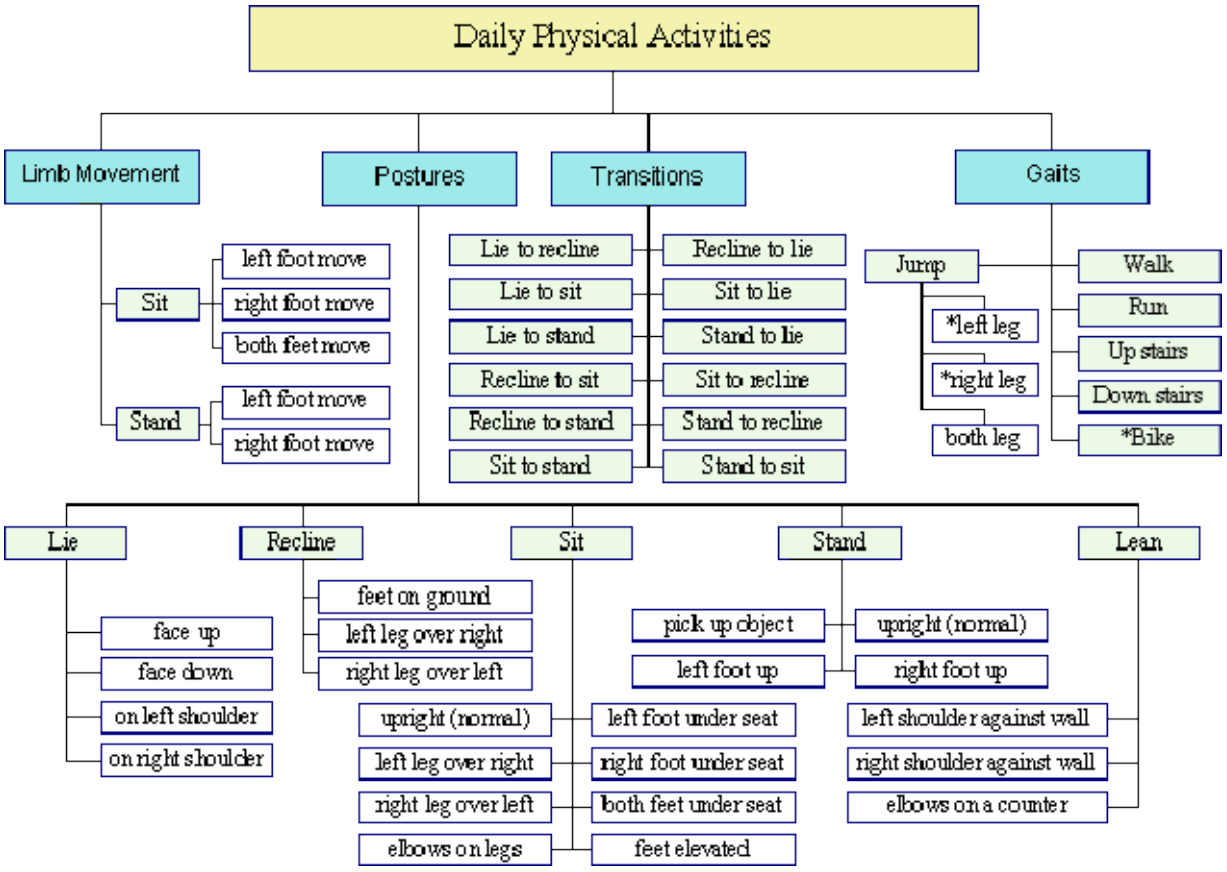

Figure 2-1: Types of Activity detectable

(cf. Obesity Research Journal, 2003 and MiniSun, activity types)

The common activities are walking, running and fitness exercises. The more such activity is performed by a person consistently, more efficient the body becomes and remains healthy. Other benefits include but are not limited to prevention of chronic dis-

eases, boosts immune system, helps in weight loss (Tudor-Locke, 2009). Regular exercises validated with follow-ups are well-established and proven as intervention for improving the health and physical functioning of people. Its importance increases dramatically and becomes imperative in case of patients with chronic diseases. However there are many barriers in achieving consistent physical activity, henceforth supervised training and counseling becomes necessary. However the exact usage and benefits of physical activity must be understood, as this is an area of high impact for society in long run and would immensely help people, particularly in the Turku region due to the winter season which impacts outside movement. International journal of behavioral nutrition and physical activity (IJBNPA, 2009), a well sought journal in this field states that lower levels of physical activity increases risk for adverse mental and physiological health, outcomes of such reduced level of activity include cardiovascular diseases, obesity, diabetes, osteoporosis, depression and anxiety (Cocker, 2009). While the American heart association of identified physical activity to be the fourth major risk factor for coronary heart disease which can be modified (Fletcher et al., 1992).

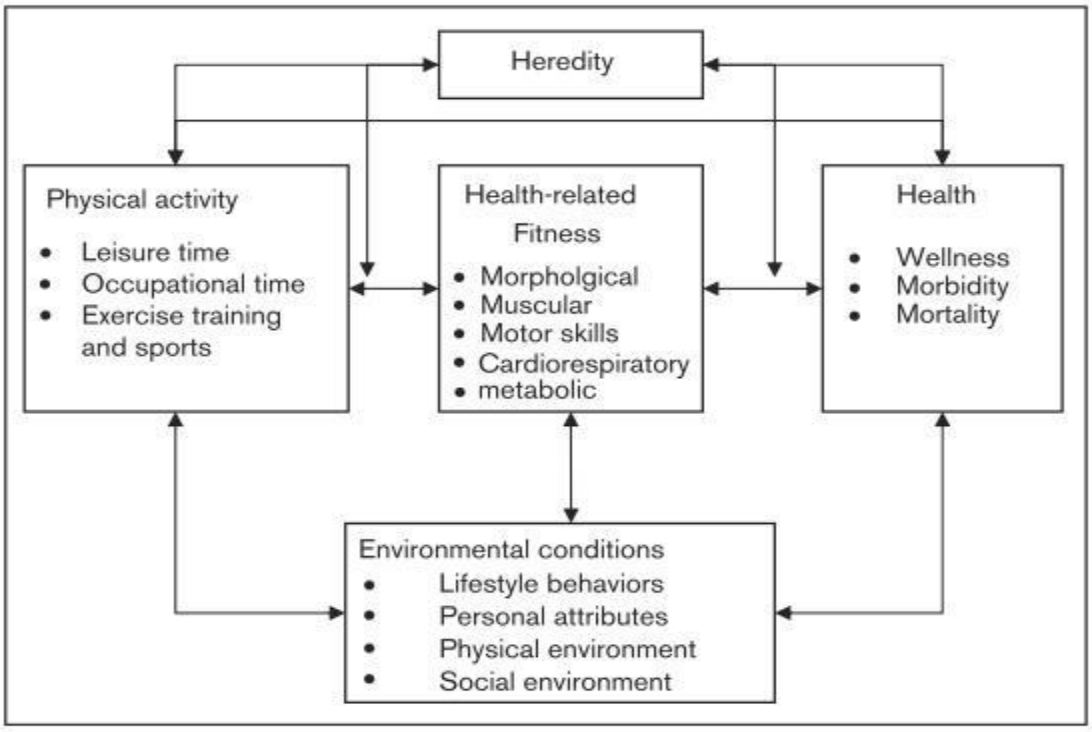

Figure 2-2: Model of relations between physical activity, fitness and health (cf. Vanhees, Luc et al. 2005)

The relationship between physical activity, physical fitness and health is illustrated in figure 2-2. The three types of physical activity include associated energy expenditure (aee), which form 30% of total energy expenditure (tee). Aee is the biggest

source of variation in activity levels between individuals, being highly based on movement efficiency. Henceforth, a little variation in activities related to aee can impact the energy expenditure levels in a big way.

2.2 Physical activity recommendations

Regular physical activity helps maintain fitness levels and keeps intact the activeness of mind, apart from various other health benefits to the individual. In order to achieve such benefits, people are required to be regular at targeted physical activity exercises.

The US department of health & human services, as well as UK department of health, both recommends that individuals should engage in 30 minutes of moderate-intensity physical activity such as brisk walking, for 5 days a week. These recommendations are standard and well accepted throughout the world. Also, for intensive physical activity, the prescribed levels are 20 minutes for 3 times a week. (Becker et al., 2010, us department of health and human services, 1996 and department of health, London 2004) As a matter of concern as much as 87% Europeans do not achieve these recommendation levels (Varo et al., 2003).

In day to day life, walking is considered as the most important form of a physical activity. The globally established and well marketed recommended level for such a physical activity through walking is 10,000 steps a day (Choi et al., 2007).

Studies have established this with programs like 10,000 steps rockhampton, that reveal that people who participated once in such goal oriented interventions never show a downward activity curve vis-à-vis other people in community. While this recommendation took its own time to get researched, established and be popularized, studies performed in various countries for testing validity of this 10,000 step recommendation, in their respective regions reveals that the activity increases by an average of 900 steps per day within a year. The studies also found that women and people with higher income are more inclined to achieve and maintain these recommendations (Craig et al., 2006).

Also revealed in above research, educated people (university graduates) were also more focused to align themselves for achieving these recommendations. If we extrapolate this result to the context of this society, since Finnish people should be highly inclined for adhering to this recommendation, due to the pre-existing high standards of academic infrastructure.

The Finnish UKK institute located at Tampere, being an active promoter of physical activity and research in this area has given out the weekly recommendations on physical activity for adults aged 18-64. The same are presented in figure 2-3.

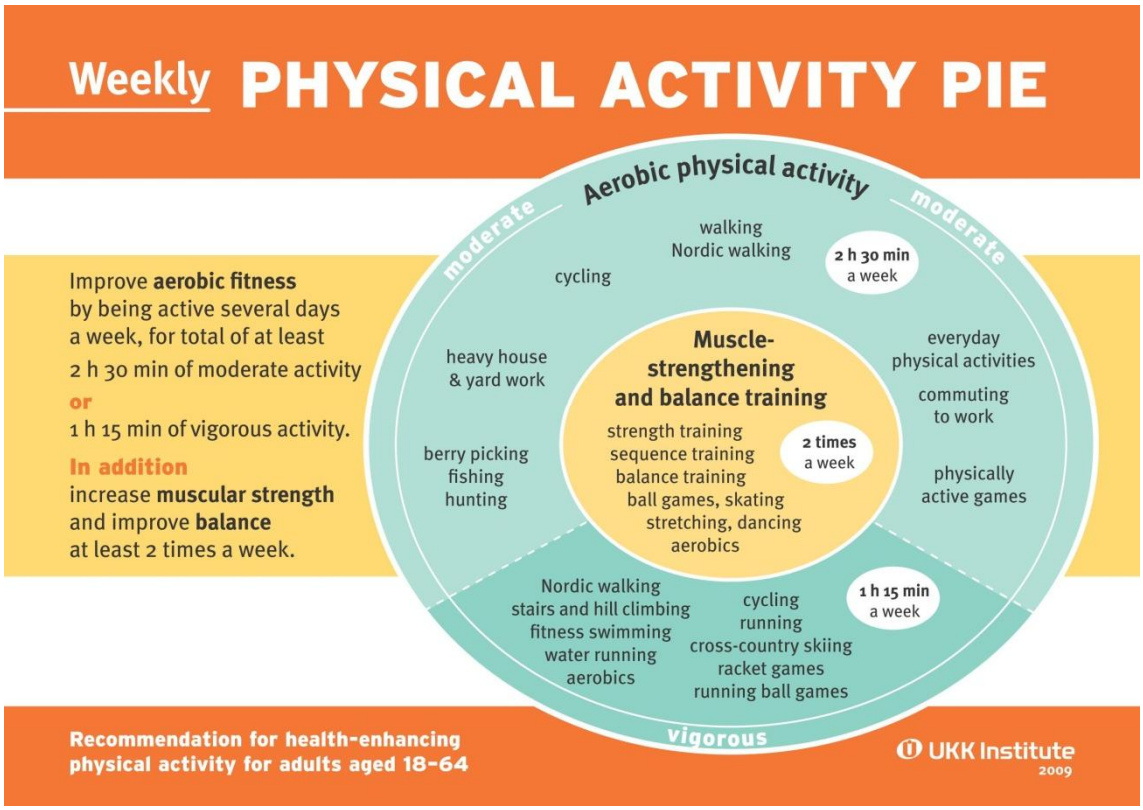

Figure 2-3: Physical activity recommendations by Finnish UKK institute (cf. Liikuntapiirakka, 2009)

These recommendations laid out by Finnish organizations (Käypä hoito and UKK) are more detailed and focused for each target area given the scope of vast number of activities are possible in Nordic region, while the recommendations by other health organizations are generally acceptable for application by people in any part of the globe, thus has a much wider scale of reach and scope (globally).

2.3 Motivational factors

Research has found that individuals are most probable to remain active while participating in fitness within group while otherwise remains less encouraged with self-managed and tracked physical activity. Also in older population, reduced exercise capacity or an increased fear of falling might lead to a less active lifestyle (Bertera et al., 2008) and with the help of activity groups, immense improvements were found in vigorous activity

levels. Study also show the significant reduction in cholesterol levels after a short time period of activity within groups and such benefits remain intact even after a year (Norton et al., 2010).

A systematic review of 48 research studies focusing on finding motivating factors for physical activity found collective results, which state that promoting walking brings improvement to physical activity levels within sedentary people. Walking can be further enhanced with programs tailored according to individual needs (Ogilvie et al., 2007). Physical activity (pa) is also found useful in addressing the physiological we well as the psychological causes of relapse to smoking (Bock et al., 1999; Ussher et al., 2001). Further as many as 12 distinct studies reported a positive effect for reducing cigarette cravings, negative affect, withdrawal symptoms, and smoking behavior (Taylor et al., 2007). To sum up, combination of different intensity of activities, variety of fitness techniques and group participations makes the long term process much easier to sustain.

2.4 Environmental factors

Vital is the public infrastructure for motivation of public to indulge in more walking and activity. The presence of pedestrian pathways, racing tracks, fitness centers within short distance is imperative to sustain long term physical activity lifestyle improvements.

Turku city library and sports center provides technology aids to public on loan for tracking their physical activity (for example, pedometers and heart rate monitors are available). Such a novel way to get people familiar with technology devices would play out efficiently in achieving sustainable awareness and marketing the importance of physical activity and healthy lifestyle for everyone.

3 TECHNOLOGY SUPPORTS PHYSICAL ACTIVITY

3.1 Physical activity measurement

Technology has penetrated well within the society to the level where it has started to show impact on physical and mental state of people worldwide collectively. This ever changing, growing field of technology now requires healthcare organization's focus for better society by keeping a long-run sustainable perspective healthcare service based on technology. Effective decision supported by technology combines motivational and the environmental factors, for tracking and improving the health levels. One of the major contributing parts of physical activity is technology tools like pedometer, thus we focus on physical activity supported by ict-related tools here (Nguyen, 2009).

PA* Assessment method	Advantages	Disadvantages
Criterion methods		
Doubly labelled water (DLW)	Accurate and valid measurement of EE*. Applicable for children and adults Induces no change in PA behaviour in daily free-living conditions	Expensive Analysis requires expertise No indication of specific activities, only total (daily) EE Not appropriate for large-scale studies At least recordings over 3 days
Indirect calorimetry	Accurate and valid measurement of short term EE	Expensive Limited to laboratory setting until better portable devices become available. Indirect measurement of PA
Direct observation	Best recording of type of PA and interpretation of the activities Contextual information Applicable to children	Time consuming Potential reactivity of study participant Limited in monitoring time Subjectivity of the observer.
Objective methods		
Pedometers	Lightweight, portable around waist Simple and inexpensive Non-reactive. Free living conditions	Only walking or running steps, no recording of horizontal or upper-body movements Limited validity for EE estimation No information of specific activity, only total (daily) PA
Accelerometers	See pedometer Recording of accelerations in more than one plane and for extended period Indication of intensity of the movement. Possibility of measuring a specific activity Free living conditions	Limited validity for EE estimation. No recording of horizontal or upper-body movements, carrying a load
Heart rate monitoring	Lightweight and portable Directly related to physiological response to a physical activity Detailed data recording over extended period. Possibility of measuring a specific activity	Measurement of EE, not of PA Not suited for very low-intensity PA as heart rate is affected by non-activity related environmental factors. Individual calibration of heart rate – PA relationship required
Subjective methods		
Questionnaires	Applicable in epidemiological studies Valid for gross classification of PA level for a population (e.g., low, moderate, highly active)	Limited validity. No detailed information of PA. Depends on subject's memory, interpretation Not suited for PA assessment at the individual level

Figure 3-1: Overview of physical activity assessment methods

(cf. Vanhees, Luc et al. 2005)

Physical activity is measured by technology devices that calculate the units of energy released during workout (e.g. personal trainers calculate calories burnt by monitoring heartbeat rate). Measuring physical activity helps motivating a person, apart from keep-

ing a track record while the person makes effort to achieve the fitness targets, henceforth helps maintaining healthy body as bottom-line for whole of this process. Ict based devices are helpful in comparisons and finding interesting patterns from within the data with statistical analysis, apart from accurate measurement and devices being integrated well within daily lifestyle.

On a longer time frame of measurement tracking, when a person is trying to maintain his\her levels of routine physical activity, using bio-mechanical methods becomes a challenge, due to many factors like occupational reasons and change in their attitude towards the device used for measurements (Bauman, 2006). Thus a constant motivation (via self-discipline) or methods discussed within this thesis would help in longer term wellness sustainability.

We've three categories of measurement of physical activity, based on bio-mechanical methods. A brief understanding would help us understand the usefulness of physical activity in maintaining healthcare levels recommended in various research studies. For the sake of keeping this thesis in focus, we'd explain three methods only. Figure 3-1 explains the pros and cons of the three types of methods to record physical activity, namely energy expenditure, heartbeat measurement and body acceleration.

Energy expenditure is measured based on oxygen uptake, such as activity energy expenditure, activity-related time equivalent, physical activity level, physical activity ratio, metabolic equivalent and a new index of potential interest, known as the daytime physical activity level. While heartbeat measurement is based on monitoring of heart rate, such as net heart rate, physical activity ratio heart rate, physical activity level heart rate, activity-related time equivalent, and daytime physical activity level heart rate.

Another method is body acceleration, in which measurement based on whole-body acceleration is recorded, based on quantification of the velocity and duration of displacement in outdoor conditions using by satellites using the differential global positioning system may constitute a surrogate for physical activity, because walking is the primary activity of man in free-living conditions.

3.2 PA measurement devices

3.2.1 Pedometer

There are two major devices being used to measure the physical activity. While pedometer is the first one and the most popular one, there are also other devices like accelerometer and others which have many specialized uses in measurement based on the very nature of activity. For example, an athlete measure his physical activity by the distance covered, which requires acceleration, velocity and data about elevation while performing activity. Since the intensity of such workout cannot be determined due to many reasons like the weight carried during the exercise and effect of external factors like weather, footwear, etc., so measurement is valid only to some extent. Devices available in the market are able to measure with accuracy of ± 5 % of actual activity (Rye, 2007).
A pedometer is a micro electromechanical step counting device and is generally used as a motivational device for overweight and obese people to increase the counts of steps they take daily and try to achieve higher number in future to lose weight and stay fit. While there are many commercial devices available, research done by Ghent University, Belgium and a study by the British journal of sports medicine reveal that inexpensive pedometers can be less accurate and show less step counts or show more steps than taken by a person in reality. Although the pedometers nowadays are more accurate than before and user friendly, for example they have inbuilt radio, light and talk facility to know the step count without having to see the pedometer (Cocker, 2009 and Rye, 2007).

3.2.2 Accelerometer

This device is more accurate as compared to pedometer. Hence are used in computer games pointers. many applications of accelerometer are seen in real life games like golf, where a gyro sensor (gyroscope) is used with mems to measure the orientation or swing of golf player’s arm, which can be rendered to a microcomputer to interpret incoming data in a three dimensional way to guide and train the golfer based on his personal history and track records. A commercial golf device is also sold by fujitsu, where the previous history of golf player and advice from professional golfer is used to judge the level of proficiency of the golfer (Murphy, 2009).

3.2.3 Heart Rate Monitor & Gyroscopes

Heart rate monitor (hrm) measures the heart beats per minute on a real time basis or for later use by recording the readings. Since motion sensors like pedometer and accelerometer have certain limitations, including failing to detect or underestimate the cost of activities like household tasks, cycling, etc. Henceforth, combination of accelerometer and heart rate monitor is seen as a potential solution to improve estimation of energy expenditure. Use of accelerometer is found to be more accurate than pedometer, in such cases of combined use (Thompson et al., 2006). Pedometer is more accurate than heart rate monitor and accelerometer, for estimating light and moderate physical activity (Macfarlane, 2006).

3.2.4 Sports gaming and devices

Sports are generally a field of collective exercises. in present times, when people have different schedules to keep up with in their professional and business oriented life, the place of open-field games is overtaken by computer gaming and devices like Wii. The present level of simulation and embedded technology has provided enough power to the humans to have ample free movement while playing the games and help leverage the fun to improve their activity levels. We study on this lesser researched topic more on the results section, which interpret the opinion as well as usage patterns of such devices on people of Turku region.

3.3 Online Motivation

3.3.1 Social Networking

Apart from the devices and tools which help people to track, maintain the activity, apart from measurement feature. There is an ever growing field of internet and high-end technology based participation which helps in awareness and encouragement. As people are unable to move all the time or exercise absolutely in a given group, during such gap time the social networking services can help the individual to share their activity progress and fitness routine through internet with their colleagues, friends, family, activity

group or online social circle. Such a virtual social environment helps built positive effect and encouragement towards progressing with the recommended physical activity levels. Above that, the personal trainers, professional sport's mentors as well as doctors and healthcare staff are able to track the progress in a mentally constructive environment.

Social medium technology tools like micro blogging websites (twitter) and engagement to friends and groups within Facebook pages, enables sharing of controlled information automatically using technological means. Major healthcare organizations have found that to keep people engaged in physical activity and encouraging them to stick to targets, internet can provide dramatic improvements to the required motivation and encouragement. In this age of social media and websites like twitter and Facebook, people can use internet based or mobile phone based applications for sharing their achievements in physical activity to their friends. This ultimately helps in making a very positive environment for others to adopt physical activity and healthy practices as an integral part of their lifestyle. Websites like wellthen.org is one of the examples of this emerging and fast growing trend in pa and healthcare (Svensson, 2010 and Hurling, 2007). Previous developments and implementations, as well as researches have quite well revealed the improvements in healthcare levels with computer based counseling.

A fully automated internet and mobile phone–based motivation and action support system can significantly increase and maintain the level of physical activity in healthy adults (Fukuoka, 2010). Researches on this have been done previously and have found significant statistical results in increasing mvpa and increasing fat lost during such interventions (Nguyen, 2009 and Hurling, 2007).

3.3.2 Computer based counseling

A computer based counseling system (cbcs) is best suited for a public healthcare service system. This is because cbcs allows addressing high patient numbers and with individual tailoring, plus feedback despite minimal manpower requirements and low intervention costs. Information may be presented in a user-friendly way by including videos, pictures and audios which are adapted to the user needs. Cbcs may be part of shared decision aids enabling the exchange of user or patient experiences and encouraging self-management (Bieber, 2008, Murray, 2005 and Thomson et al. 2007).

Historically, achievement motivation was used in sports, although attention has shifted to participation motivation (Patrick, 2010). Interventions with computer based counseling system (cbcs) are most likely to promote participation with motivation and also result in statistically significant improvements in leisure-time physical activity. The need would be to apply the cbcs of physical activity, along with the SDT, the self-determination theory (Hurling, 2007 and Häkkilä, 2007).

Some sdt based studies have found that users are motivated when they enter details on their physical activity target achievements on a regular basis and are also able to track it regularly, pushing the limits higher. This creates the much needed motivation and positive environment for adopting physical activity in their daily lifestyle. Some of the key issues getting physical activity into one's lifestyle are awareness, usage, motivation, adoption of support technologies within lifestyle.

In order to make improve acceptance of physical activity in everyone's lifestyle, technology provides immense help with its customization and promising results. The technologies include both software application and hardware devices, used along with pedometers. A ready example is gps based measurement devices, which helps save time in accurately measuring, recording and tracking pa levels (Derrick, 2002).

3.3.3 Advanced Technologies for movement tracking

Here we'd discuss about the global positioning system being used in many physical activity measurement tracking devices. The global positioning technology is the only available fully functional global navigation satellite systems (gnss), which is able to judge the accuracy of the location of gps device to highest accuracy of 1 meter, 95 % of the times.

While accelerometers are the primary tools for objectively measuring children's physical activity, they can provide precise intensity and temporal movement data (Rowlands and Eston, 2007) and capture physical activity in free living conditions (Vanhees, Luc et al. 2005) without the need for participant or proxy recall, or manual record. A notable limitation of accelerometers is that they do not provide the location where physical activity occurs.

There are two types of gps technologies available, one is assisted gps and another is differential gps assisted gps (agps), which are deployed where weaker satellite signals make calculation of actual position difficult and inaccurate. Agps uses local cell towers

to gain the position accurately, which also increases the battery life. on the other hand, differential gps (dgps) is the parent technology of waas (wide area augmentation system) and is used to measure the position accurately up to 1 meter both vertically and laterally, by using both cell tower signals and satellite signals. Henceforth, we now know that the accuracy of such measurement would be suitable for all, including professional athletes.

Some of the uses of gps in physical activity measurement are found in measuring the distance traveled by an athlete, at various inclinations or elevations, without depending upon pendulum based step counters (Maddison, 2009, IJBNPA, 2009 and GPS maps).

In a pilot study with 137 children, where accelerometer was deployed to know factors affecting overall mvpa (moderate to vigorous physical activity) of school going children of around 11 years of age, the study results details that walking to school resulted in much statistically significant results to increase mvpa, as much as by 43%. This means that those who do not walk to school were doing 43% less in terms of physical activity. The study also found that playgrounds were not able to contribute that much significant physical activity. This single research clearly shows the importance of walking to school, however adoption of such lifestyle was found to be an issue. (Cooper et al, 2010). This research further keep open the room for improvements the ict-based tools can bring in motivating and monitoring targets for this age group. These beings focus and aim of this master's thesis study.

3.4 Walkaholic with technology

A review of past studies was made and we found ten studies that employed use of vastly separated ict tools in studying the physical activity in different groups of people (children, at-risk adults, patients with chronic illness, etc.). These studies were found with the existing list of two hundred journals collected during literature review phase and had special mentions with their titles that made it easy for us to know that these are exceptional papers and should be dealt with separately which making theory portion for this report. These studies served the theoretical framework for this multiple case-study research briefly described below along with results of some of the research studies done in past related to technology and healthcare.

A recent study on US adults has shown that the average percentage of daily physical activity comes from food and drink preparation (12-38%, while running contributed as

the moderate-to-vigorous activity accounted for only 1% of the total daily percentage (Tudor-Locke, 2010). This clearly shows that while running contributes most effectively in maintaining the well researched 10,000 steps a daily recommended level, this remains as a challenge for healthcare services to achieve motivation within society for achieving this health level.

Also the focus on this very aspect of physical activity, i.e. by running and tracking of the improvements made by measurement using pedometer and counseling using ict-related tools, in order to get results on user acceptance and usefulness of these devices. Research studies done on patients with non-chronic diseases have showed lasting positive effects on steps per day, after pedometer-based behavioral modification program with telephone support (Greef et al. 2010). In every physical activity intervention or healthcare activity, the feedback system is the vital link for regular follow-ups and up keeping the motivation with constant guidance. Such a channel is made possible with help of technology. The computer based counseling systems have emerged as the only low cost and sustainable solution to the ever increasing population of healthcare and social security benefits. This process of feedback by service providers is known as cbcs. It helps us form the hypothesis that ict-related tools could provide motivation in reaching the recommended levels of physical activity without requirement of frequent follow-ups or interventions.

3.5 Trends in tools

There are various tools that are available in market like movement calculation devices like pedometers, accelerometers, energy expenditure estimation devices like heart rate monitors, odometers and gps recorders, entertainment combining devices like music players (ipod, mp3), aerobic equipment and gaming devices like Wii.

The interest of general public is seen to act more likely in a collective way than in a distributed fashion. For example, one single model of apple iphone is able to compete with whole range of nokia mobile phones and even new entrants like google android based smartphones. Thus, we can safely assume that a single product with enough innovation and collection of features is poised of mark a big revolutionary difference in the public interest towards physical activity.

We’re seeing couple of internet based services which help in tracking of the activity as well as they make sure that the people are able to do self-analysis of their activity and set the goals based on the knowledge base available online in the data warehouse.

Services like web based physical activity tracking diaries help the users to share their activity graphs within their social groups, peers, family and friends. Such an advanced ability to share the personal health and fitness records, via other compatible communication technology interfaces (including mobile and internet) helps create a positive mindset and improve the attitude of the whole group of people (those who share and those who receive the shared information).

The big brands in commercial lifestyle segment are also now bringing products that help users do more with their purchases than just using the product. For example, combo devices are available from stores like Nike which helps the buyer manage their steps taken via an internet diary manager and sharing via Facebook and twitter (social networking capabilities). The footwear comes with inbuilt gps, mp3 player, pedometer and iphone apps supported such online services. This is the initial stage of what we see as a step towards physical activity being made officially viral with usage of such technology in every society. The trends in technology based on maturity level and adoption is discussed in note 3.7 and detailed with the help of a model patam in figure 3.3 within this report.

3.6 Awareness is the keyword

User awareness is a concern for every technology using organization. Same situation is applied to the society in whole as the healthcare services are trying to maintain the balance in social infrastructure available to support unhealthily people while trying to keep the rest motivated to remain fit and maintain the fitness levels with healthy lifestyle.
In such scenarios, awareness of benefits of the facilities being provided as well the recommendations set by the researchers in healthcare services field must be communicated thoroughly and understood by the individuals and families. The starting point of such an interaction towards awareness should being at school, as established by the literature review.

In such scenarios, the mentors, physical activity trainers are expected to have ample hands-on knowledge of the technology devices so that they are able to successfully do

the knowledge transfer to the participants in the various exercise groups as well as their counseling beneficiaries in the society.

Further stages of the awareness include usage of computers to a larger extent and an increased monitoring or tracking of the progress of physical activity using such tools under supervision of doctors and other healthcare services staff. In order to reduce frustration among the people at such level, motivation is infused with change in environment and encouragements with help of various activities (e.g. outdoor). Integration of the social medium with technology would help overcome the motivation issues.

Finally with the consistent usage of technology based counseling and activity tracking, the routines would be absorbed by the participants of the healthcare services focus groups within their lifestyles. Support of social groups, mentors, technology, as well as healthcare staff would help overcome issues like self-discipline and people are found to benefit from this approach.

3.7 Adoption

The perceived usefulness (attitude) as well as perceived ease of use (subjective norms) forms the behavioral intention of the users of any technology. Adoption of technology tools and services supports the individual with a collective goal of improving physical activity adoption. For the same, we follow the below listed approach, which includes self-motivation and interaction of the individuals with the healthcare staff as well as social circle (focus groups like '*ladies on the move*' or '*55+*').

Figure 3-2 explains the PAIT model. This model is adopted from well-established hypothesis testing model and path analysis which fits the context of physical activity, being the most popular one and used throughout in the research papers reviewed.

Attitude being the perceived usefulness, gains help in our assumption with the awareness campaigns. Turku city and sports center makes sure that people know about the very facilities available for general public (including the swimming pool, stadiums, jogging tracks, technology devices available on loan, etc.).

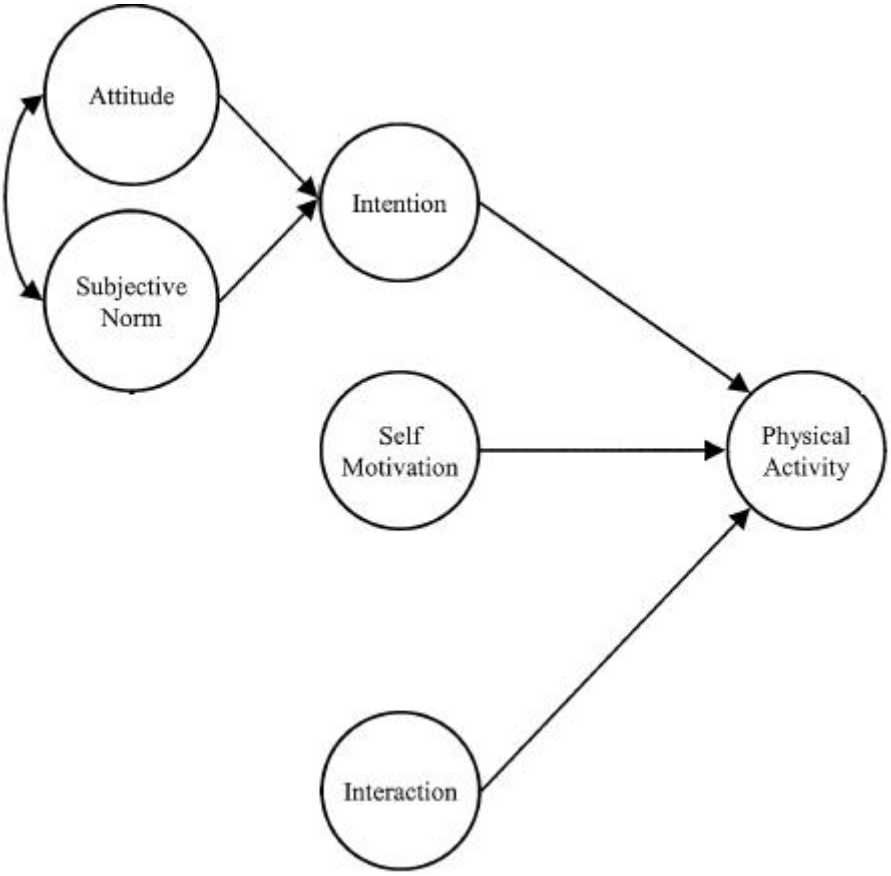

Figure 3-2: PAIT: Technology based Physical Activity at Turku Sports Center

(cf. adopted from Marshall, 2007)

The perceived ease of use based subjective norm gains motivations for the physical activity with the actual trainings imparted to focused groups, as well as the articles that come in Turku sports magazine. People who read such material are assumed to be more active in the facilities and events being made available and marketed in such places, as compared to non-readers and non-participants of such awareness tools, campaigns and events.

Plus, those who take part in focus groups help keep their interaction with the professional sport trainers as well as interaction with their peers in sports groups. This social teaming helps them stay motivated. Self-motivation is greatly helped by the technology devices, as there is no major availability of social groups, except if a part of focus groups. Henceforth, people tend to do physical activity based on their awareness and self-discipline to follow a healthy schedule. Technology devices help in this sense a great deal and we assume that such lonely times of exercise and activity can be reduced by introducing fun activities that can be done frequently. In the pait model, we can easi-

ly visualize the combination of physical activity and significance of technology in Turku sports center's perspective.

The whole program is to increase the usage of physical activity with technology as an enabler of this public healthcare function. The level of interaction and technology penetration increases the usage of physical activity, which is described with the help of patam, the customized version of technology adoption model for physical activity.

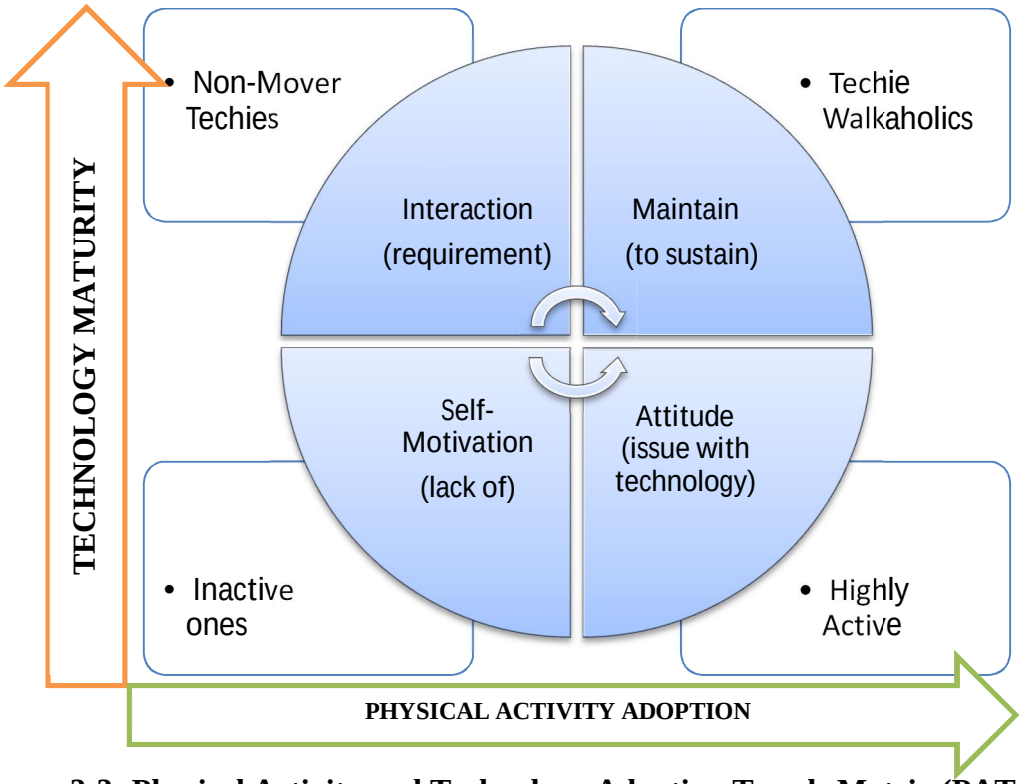

Figure 3-3: Physical Activity and Technology Adoption Trends Matrix (PATAM)

The adoption pattern of the physical activity vis-à-vis technology usage is at different level for any individual and can be divided into four categories, for careful analysis of each of the user availing the services at the Turku sports center for analysis and resolution of issues with adoption or technology or both.

Turku sports center can apply this model to identify the kind of focus needed for a given individual or for a group of people within same segment based on the patam. As the terms mentioned in the circle reveal to us the issue pertaining for that very given segment of individual(s), based on the graphical placement of this term. Thus we can easily see what kind of attention is required and whether the case is of technology based training or requires interaction if issue is of physical activity adoption.

In the figure 3.2, we saw the technology as an enabler of physical activity as the goal, while in figure 3.3 we see technology as a distinct and separate entity which may or may not be clubbed with physical activity.

When the activity is clubbed with technology, we do get the benefit of this enabling function based on level of each individual and thus we're able to provide better healthcare services tailored to the requirement which suits the needs of that very individual or group of people in the given segment.

3.8 Stages of use

The normal technology use curve is given in figure 3-4 and also applies to the sports and physical activity enabling technology devices and services.

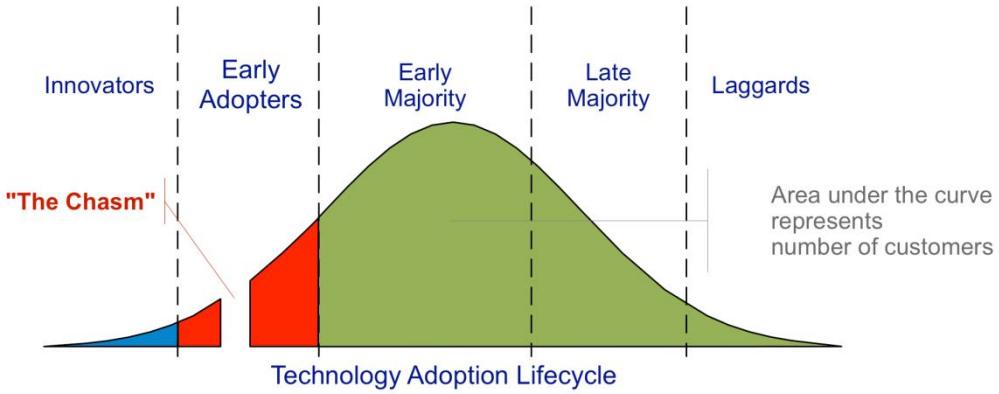

Figure 3-4: Stages of Use of Technology

(cf. Moore, 1991)

It all starts with development and introduction periods (chasm occurs here) and goes to growth with peak of inflated expectations before getting matured and decline with removal of illusion (also known as the slow and steady slope of enlightenment).

3.9 Feedback

With all the technology based tracking and tailored interactions with healthcare and professional sportspeople staff, the individuals would like to get feedback based on their activity measurement via many channels, which could include the friends, sports coach, healthcare staff, even self-measurement and self-feedback is included in this approach.

Apart from that, such a feedback can be facilitated via technology based communication channels like email, telephone, sms or internet based online services or via conventional means like face-to-face discussions and postal snail mails.

4 RESEARCH DESIGN

4.1 Focus groups

Turku sports center has focus groups, which became our research work's participants and thus we'd describe more about the center, its facilities and about the groups we included in the study. The center has a wide range of facilities for exercises and sports enthusiasts. The department is immensely resourceful and specializes in providing ultra-modern facilities to the society at reasonable and inexpensive prices.

The multipurpose facilities include swimming pools, gymnasiums, running circuits, ski trails, dance and recreational classes, water aerobics groups and list goes on. Our interaction and work with the center's staff gave a good impression. the staffs was found to be highly committed in bringing a change towards being better at its services and were open for giving us the resources to evaluate the people and analyze the data. This fact was well established during the co-operation we got during survey data collection as well from the feedbacks we were able to receive from over hundred respondents.

The sports center provided quite focused groups, for quality services delivery, e.g. special groups for ladies for improvement to their body with movement, activities, exercises, dance classes, etc., and on the same note separate group for overweight people.

There are also special groups for senior citizens, which get to do lot of focused exercises like zumba fitness, circuit training, inducing the required fun as well as motivation for staying on track of the recommended levels by their mentors at the sports center.

The focus groups were:

Poweraction (13-19v),

Power20+,

Leidit liikkeellä,

Ihanaiset naiset,

Hikinen tusina,

Raskar sarja and

55+

Apart from the above listed groups, the survey was also made open to residents of city of Turku and its satellite towns with the help of official marketing interfaces, online and offline.

4.2 Data collection

4.2.1 Web based questionnaires

A web based questionnaire survey was sent to the participants, which included a set of thirty three questions. The questions in the web based survey tried to extract good amount of information in this major pilot study, from the respective participants being users of technology based devices. The questions dealt with user's perceived ease of use, benefits and usefulness, as well as acceptance of the devices like pedometer in their daily lifestyle. Focus being kept to review lifestyle interventions with ict-based PA counseling and review chances of making it better or gaining feedback. While 155 participants were sent emails with webropol based survey links, another set was opened on the social marketing interfaces and official website of Turku city (www.turku.fi).

All the webropol links were customized for each focus group, for easy analysis and differentiation, done based on the assumption of receiving enough data within the time of survey, which was kept as one month (February of 2011). The set of questions asked within the survey are the same asked in the postal mail based survey, which are provided in the appendix for reference purposes.

4.2.2 Postal Mail based survey

For the population which was not possible for covering under email or internet based groups, the postal survey was implemented. Sixty nine participants of focus groups were sent survey form via post, with a business reply envelope included for sending responses with no stamp or postal charges being required. This should encourage greater participation to the survey and we highly appreciate the participants and sports center for such a novel way of communication which they facilitated.

4.2.3 Limitations and resolution

In all historical research studies done using pedometer based step-counting, the extreme values in empirical data (single person doing higher than expected activity or lower than expected activity and reporting the same might distort the data), were not removed in all

except three of those studies we reviewed (Tudor-Locke, 2009). In our survey we've tried to mitigate this limitation to some extent by not including too many quantitative questions, so that general attitude and perception is more recorded as compared to pure empirical data of physical activity.

As our focus is on technology and physical activity adoption, we have tried to prevent any such question inclusion which might make differences from the focus of this very research. Other limitation includes that it is not possible to review and validate dramatic effects of technology usefulness in terms of motivation towards physical activity as well as real benefit in health and wellness, within a short timeframe (Baker, 2008).

Since the focus groups are already enrolled within the activity groups, this limitation is removed for those participants who are loyal to the sports center from longer time periods and as such the results were expected to match the research hypothesis in terms of benefits to health level with regular activity supported with technology tools.

4.3 Research question

The aim of this master thesis would be to relate the previous studies and clinical trials performed to review the impact of technology for improving the motivation and other key factors related to physical activity adoption. The focus after the results of analyzing all the previous studies would be on statically significant results with innovation in use of technologies like internet, mobile phones or gps in providing a lifestyle counseling which is customized as well as acceptable for adoption.

How use of single and multiple technology tools can vary the motivation levels or accomplishments towards the PA recommendations for an individual. Does awareness of the tools prior hand play out some role in the same (motivation and accomplishment levels)? How identification and resolution of a given individual’s technology adoption related issues.

Apart from these research questions, recommendations based on results would be generated on what could be the future for the technologies in form of evolution, from the present stage. Also, this work would help in giving an insight into technology acceptance and scenarios for mass acceptance of physical activity for healthy lifestyle with ict.

5 RESULTS

5.1 Response rate

In total we received one hundred and twenty one (121) responses within three week limit of the survey period (February'2011) while the postal mails that were sent to sixty nine participants got thirty three replies returned via post. Through email we sent one hundred and fifty five participants the webropol survey link and seventy one responded to it electronically.

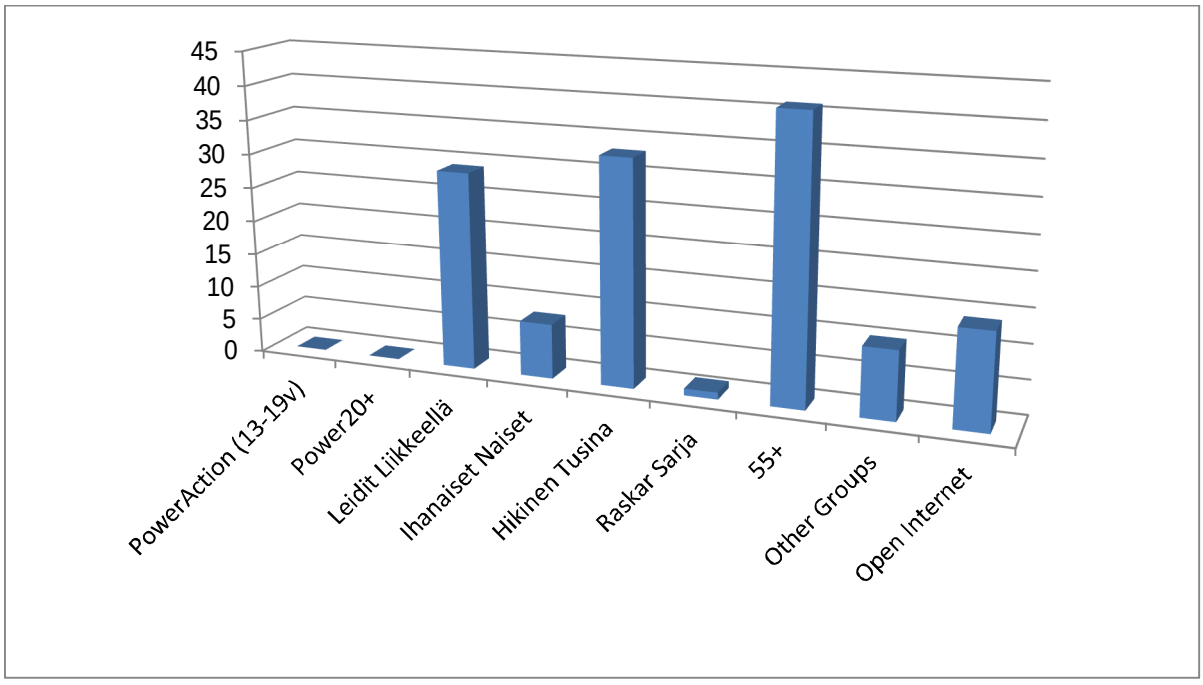

Figure 5-1: Response Rate

Thus response rate for focus groups was 47%. We also received seventeen responses, through the marketing of survey at Turku city portal and Facebook groups.

5.2 Description of respondent groups

With the total of 121 participants, 29 were from ladies on the move (leidit liikkeellä) group, 8 from lovely women (ihanaiset naiset) group, 33 from hikinen tusina and 1 from raskas sarja and 41 from 55+ group, while 10 others participated which belonged to none of these groups.

A little analysis of the gender of participants reveal that most of them were females (being more than sixty percent), while watching the age of the participants, more than 2/3rd of the responses were from people of age of 50 and above.

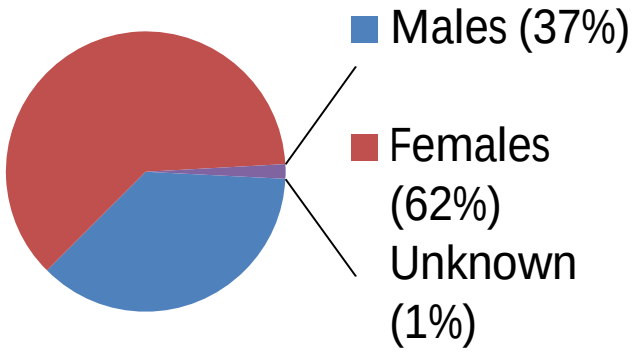

Figure 5-2: Participation based on Gender

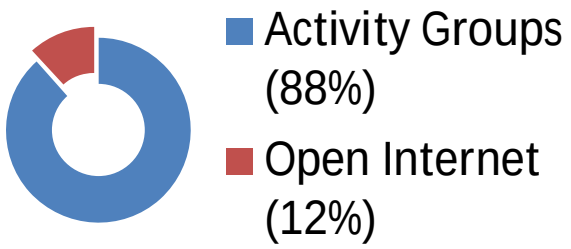

Figure 5-3: Responses from Turku Sports Center Vs. Open Internet

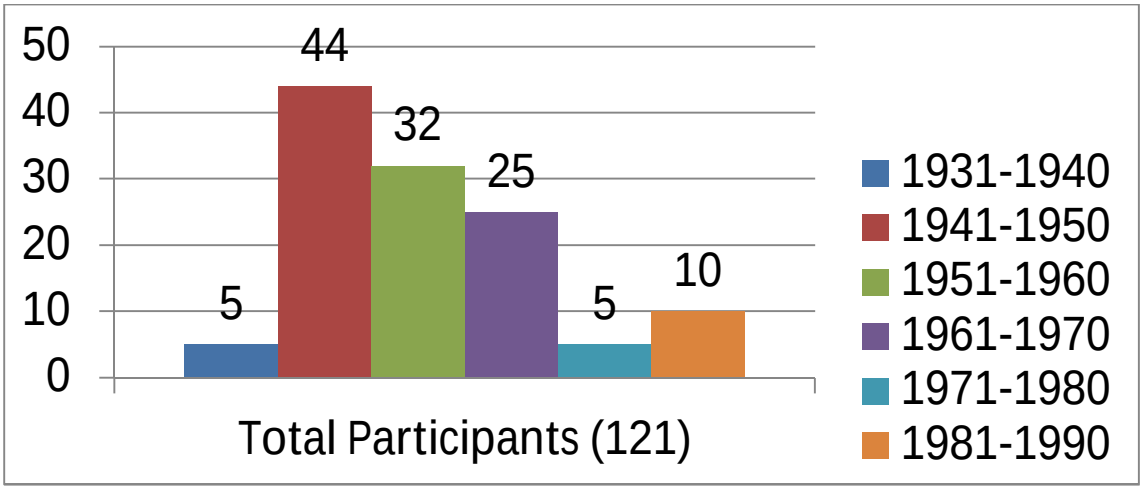

Figure 5-4: Age based participation distribution

We found that most of the participants of age sixty and over preferred postal mail instead of emails. This is evident from their responses to questions on technology, apart from the fact that they did not disclose any active email address for communication purposes. 90% of the people were from Turku city itself, while others were from neighboring cities of raisio, naantali, kaarina, pernio and lieto. In Turku, most participation was seen across residents of zip (area) codes 20740, 20320 and 20810.

5.3 Motivation

5.3.1 The role of technology

From the analysis, we found that sixty three percent of population gets motivated from pa recommendations, while twenty percent were motivated for using technology to support their physical activity. A remarkable feature within resident of Turku was found, sixty two percent people are ready to change their whole lifestyle for getting better body and fitness level.

5.3.1.1 Group based results

Working in social groups was highly motivating for Turku people, as ninety two percent are getting motivated for performing exercises and physical activity in some team, group along with friends and peer group. While thirty percent of them found their office and work culture suitable to adopt better physical activity. Employers of these participants encouraged their employees to adopt better fitness habits.

While sixty two percent were ready to change their lifestyle, as much as fifty three percent are motivated to start moving in order to change their lifestyle. The major motivation was seen in goal towards the reason for doing physical activity and sixty percent of people move due to their weight related goals, while a remarkable ninety percent get along in these focus groups in order to maintain a better body shape and condition. More than sixty percent (64%) agree that positive living atmosphere/locality motivates them to move around more.

And as a matter of fact, sunny weather attracts more than 83% people to start moving more than average and stay motivated with such sunny weather. Same percentages of people (83%) are motivated to move in pure natural conditions, for example a nearby forest area or landscape.

While seventy seven percent of the participants say they walk more when they find that walking roads and pavements are provided by city. Sixty nine percent revealed that well maintained jogging tracks help them do much better in keeping physically active.

59% of people got motivated due to some other factors like proximity to sports center, having a pet which is walkaholic, as well as the individual's own understanding about the benefits reaped by doing physical activity, collectively motivated fifty nine of the participants, to do more at physical activity instead of spending time in leisure.

5.4 Effects of physical activity

5.4.1 General effects observed

Seventy percent of the survey participants believe that their physical activity levels increased due to easier weight management while ninety four percent said that the desire to be in better condition is the prime motivating factor for helping them move around more. As evident before, people get motivated by doing activities within groups and in teams, from them sixty five percent people improved their physical activity.

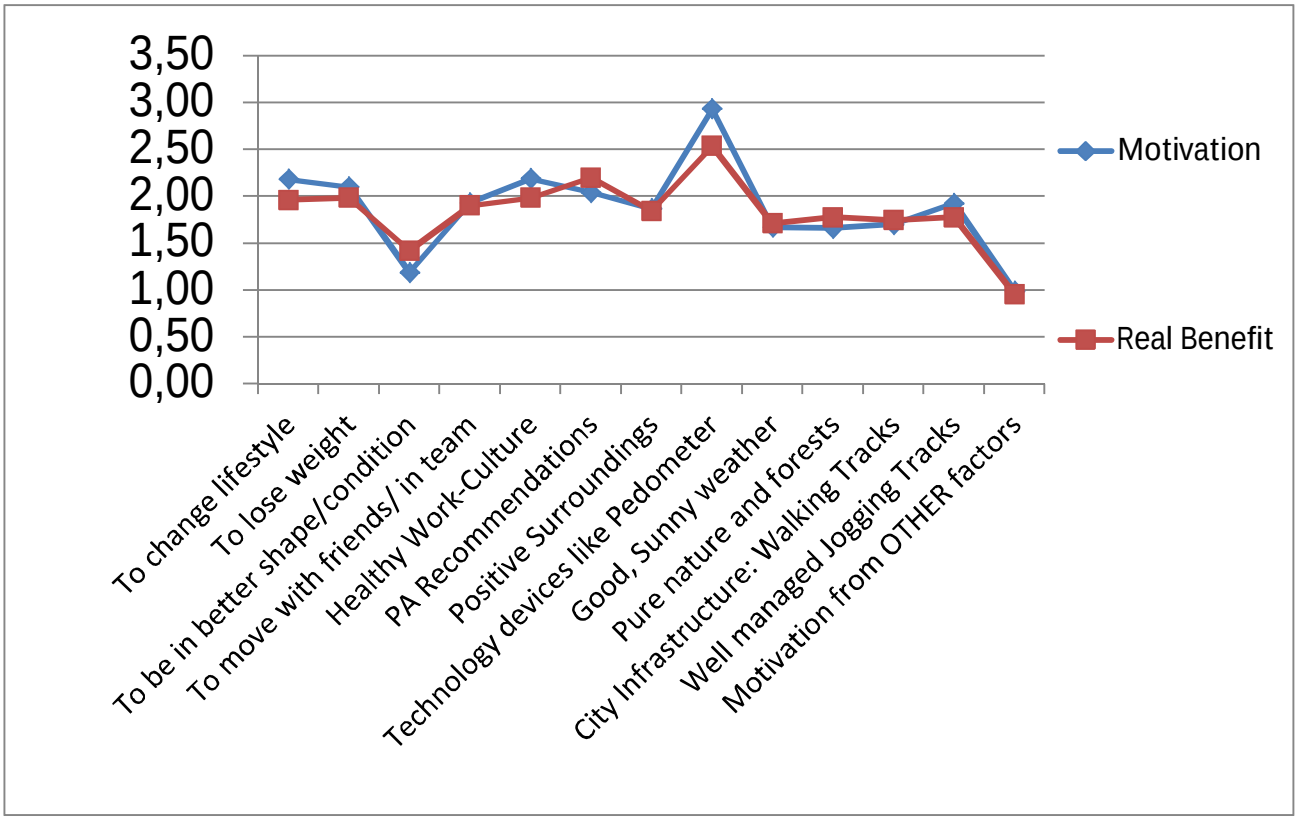

Figure 5-5: Analysis of Mean - Motivation Vs Real Benefits

The figure 5-5 shows how pedometer were clearly effective in motivation and real benefits, while the will power or zeal or enthusiasm to be in a good shape and other fac-

tors performed poorly throughout. From these numbers, twenty nine percent say that their workplace and job really helps them to move more and employers give encouragement, vouchers as well as provide sport facilities to do physical activity.

This is further enforced by more than sixty one percent people who take positive environment at work as well as in and around their residence to be a factor for good physical activity motivator. Self-discipline and understanding of physical activity recommendations helps a lot and this was evident from more than forty eight percent of the people who said that the very aim for achieving the 30-minute and 10.000 steps recommendation have helped them increase their overall movement and health levels.

Out of the eighty three percent people who are motivated to do more activity in a sunny weather, more than seventy nice found to have actually improved and increased their averages during the spring and summer seasons. Seventy eight percent got real improvement with motivation from forest areas and pure nature landscapes. As much as seventy nine percent of the participants actually improved their moving due to the wonderful walking pavements infrastructure provided by the Turku city and more than seventy five percent of the participants increased their jogging due to the well managed tracks at the sports center.

Other factors like having a good mentor, flexible timings for the ladies on the move card, desire to move and a routine set since childhood became the motivators to more than average, for 63% of the people. In summary, out of all the participants more than eighty three percent are regularly doing their exercises and are quite willing to do more to stay fit and healthy.

5.4.2 Usage of PAIT to identify patterns within results

Fifty eight percent of the participants own one more technology devices or service subscriptions, out of which, more than fifty eight percent are using these devices regularly and putting them to use frequently to motivate and track their fitness track record levels across time.

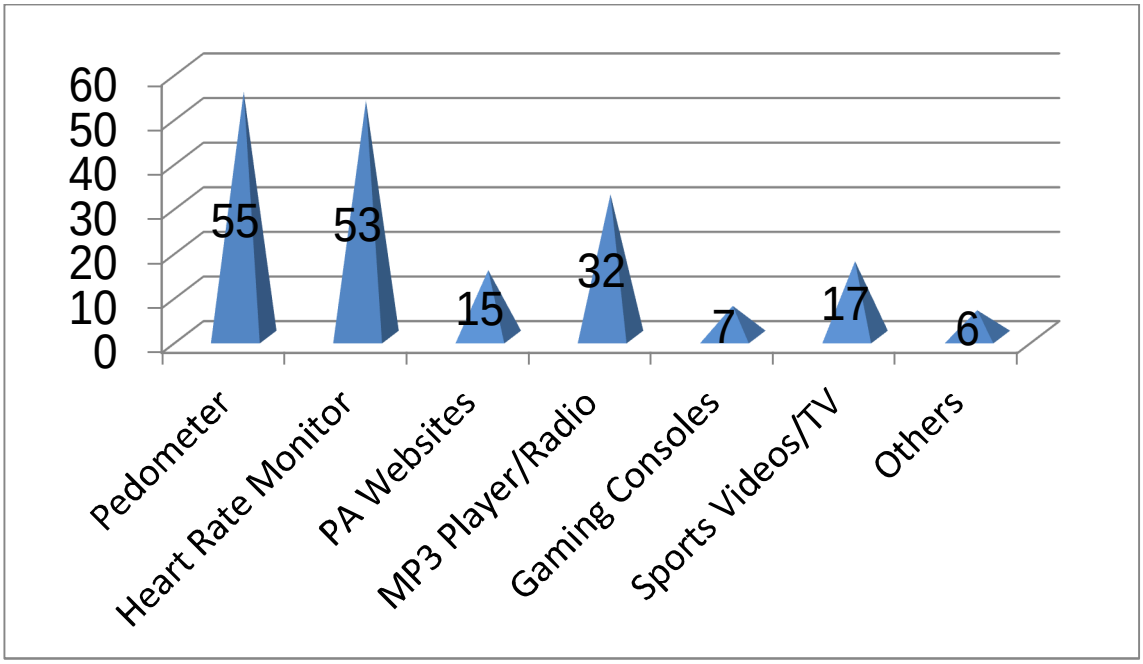

Figure 5-6: Technology choices

While out of the technology devices, the most adopted one and used ones include pedometers, heart rate monitor and mp3 players. These were found to be the most commonly used devices with a count of 55, 53 and 34 respectively from the total population of 121 which responded to our technology supports physical activity survey. Also the usage was seen across varied products and services in commercial healthcare supporting technology, for example websites like fitness.fi, trainer's dairy at treenit.net, heiaheia.com and endomondo.com were found to be quite popular.

Few people are also using Wii gaming consoles and even devices like gps recorders for tracking of their movement. The gps device helps in preventing the roués which do not fit their health goals (for example, too high inclination seen with gps while recommendation is for brisk walking only). Some participants use home based learning video DVDs for keeping up with activity, which also involves fun and movement and is possible to perform while alone.

Ease of using pedometers was established throughout the survey results, while heart rate monitor was seen as highly informative once the participants overcome the tiny learning curve of using this device easily.

5.4.3 Awareness levels and its evaluation with PAIT

The knowledge of established standards is necessary to keep physical activity he goals realistic and sustainable. Henceforth, awareness levels of the physical activity recommendations of 10.000 steps and the 30-minute brisk walking or exercise is necessary for the society to develop a holistic and physically fit environment. We found that the awareness levels were satisfactory and forty one percent of the participants knew about the pa recommendations.

Most popular pa recommendations were the 30 minutes of daily exercise as well as the 10.000 steps per day walking recommendation, both of them are famous and established also world over. More than seventy five percent of the population surveyed knew about pedometers being made available to all for free usage at the Turku library on loan, which makes a significant awareness benchmark in it about the facility provided and adopters. Plus, similar numbers of more than seventy seven percent people were recorded which knew that the heart rate monitors are available at the sports center for loan and free usage.

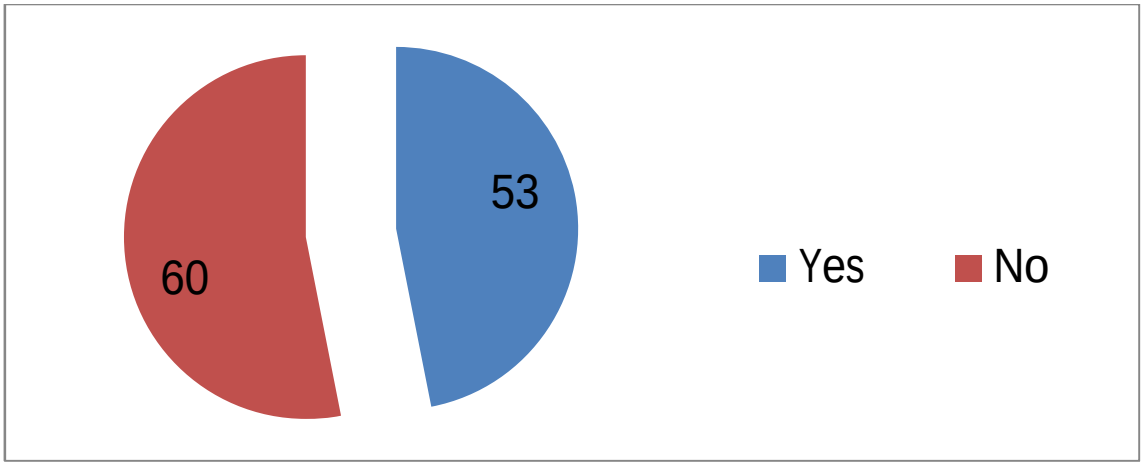

Figure 5-7: Awareness of Online Sports Magazine

People like to read and technology helps keeping the environment safe and green by electronic delivery of the newsletters and magazines. This is evident in Turku, as more than seventy two percent people from the participants knew and read the sports magazine on the Turku city portal.

5.4.4 Technology effects measured and PAIT

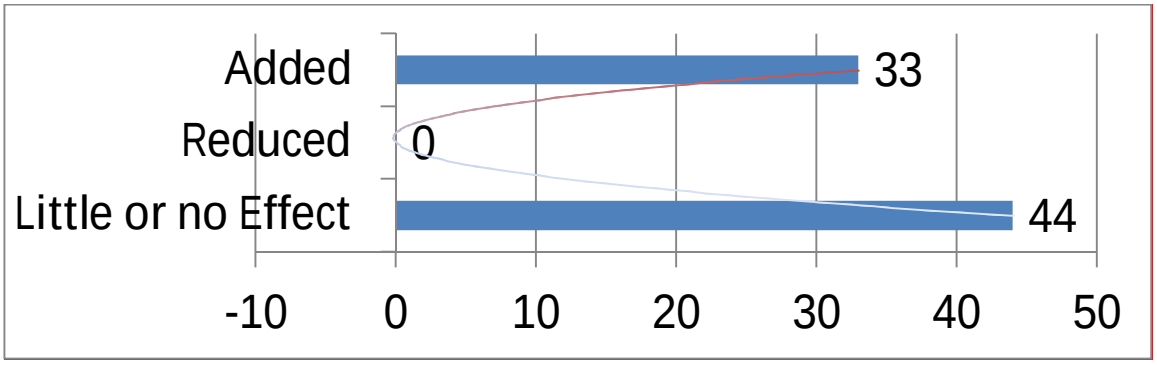

Figure 5-8: Effect of technology alone on activity levels

Forty five percent of the population got real improvements in their physical activity levels with help of technology devices.

Table 5-1: Gender based analysis of motivation towards technology

	Increase
Male	30,3%
Female	66,7%
Not Mentioned	3%

5.4.5 PAIT Feedback Willingness, Readiness and others

Usage of music players, ipod or radio was seen as a positively affecting instrument while doing exercises alone, including jogging, skiing, cycling or at gym.

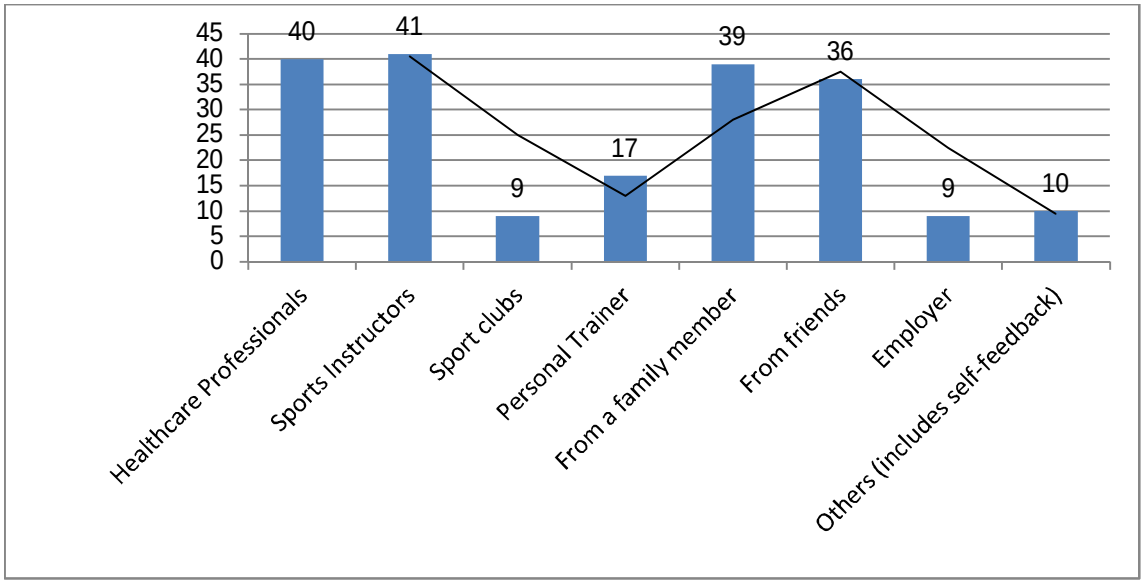

Figure 5-9: Feedback on PA expected from whom

Most of the people were interested to get feedback from sports professional or healthcare professional like doctors and most importantly from their own family members and friends.

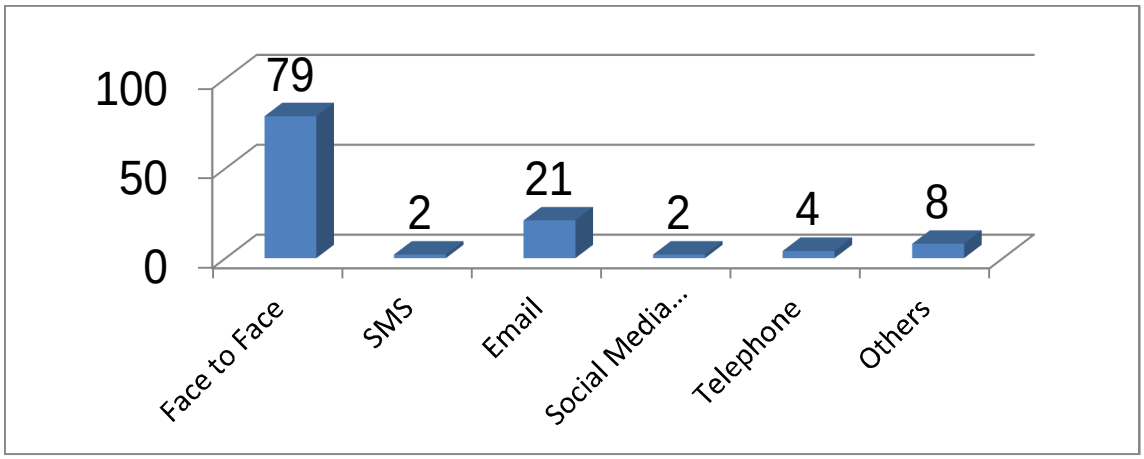

Figure 5-10: Medium of feedback

Apart from that, face-to-face communication is still preferred as compared to feedbacks through email or either face to face.

5.4.6 Ownership based results

Figure 5-11: Technology device for PA, Ownership

It was found that most of the technology devices owned, like pedometers and heart rate monitors, were received as a *gift* from either well-wisher friends or family members or even from the employers, generally on occasion of festival like Christmas.

6 DISCUSSION

6.1 Analysis

We have found many things that would be best regarded as the feedback from the specific focus group people here at the Turku sports center. As participants were well versed with all the three things a good analysis would require, i.e. the knowledge of technology, a sustained and regularly maintained experience in healthcare fitness programs or events and third is the awareness of the city wide sports infrastructure and facilities. While our participants were found to be generally good at all these three expectations and particularly because of the level of experience within sports center and residence time they have spent in Turku, the feedback here is the most lucid and a must for review by all Turku centric health and fitness institutions.

While the data contains huge amount of scope in further analysis based on the number and variety of questions we asked in survey, the focus of this analysis and thesis would remain on the research aim and questions put forward earlier. Since technology is the prime focus of this whole data collection, the analysis would show the same as well as general feedback as well.

6.2 Propositions

6.2.1 Technology ownership provides benefits

Technology ownership and benefits in Physical Activity with support from technology are linked.

Technology ownership means if a person owns a physical activity related tool e.g. a pedometer. Out of all individuals who own one or two technology devices as much as 43.8% of them reported improve in their activity levels. This is revealed by the cross-tabulation analysis of 73 respondents which matched with both the questions asked for technology device being owned or borrowed vis-à-vis the addition in activity levels due to such technology tools or services.

Similarly those who have participated in the Turku focus group activities, plus are also regular in the attending the same (once a week or more), and on top of that also own

a technology device, such participants were found to be 47% out of total respondents, and 41% of these have gained and improved their activity levels with the help of such technology based devices.

These results reveal that technology has provided a very valuable source of improving the group based activities towards achieving the targeted goals. As an enabler of any business, similarly technology devices pose as an ideal vehicle to deliver sustained physical activity enhancement and growth, with its communication, fitness tracking and measurement facilities. Finally, the results also show that more than 94% of participants who got improvements with technology, do own one or more technology device(s).

6.2.2 Benefits are linked to awareness levels

Awareness of physical activity recommendations, city wide fitness infrastructure helps in actual improvement (real-benefits).

Twenty five percent of the readers of Turku sports magazine online have reportedly improved their physical activity, signaling awareness helps in motivating people to do more activity or stay on the growth track. We analyze that there are chances of making the magazine much more focused and motivating to increase the awareness and motivation levels towards technology. 57% of those who read the Turku sports magazine are also aware of the physical activity recommendations.

On the other hand, 28% of total participants who don't read the magazine online, out of these people 58% also don't own any technology device. this reveals a clue that those who are not aware of the sports related news and events information via this publication must be covered, which would increase their technology device adoption levels as well as awareness towards health and fitness recommendations. This is because 58% and 33% of those who are motivated and have increased their activity levels with technology respectively also read the sports magazine.

The heart rate monitors are available at the Turku sports center and most of the people who do exercises well at Turku sports center (at least once per week) do not know about this fact. Exactly 40% of those who know physical activity recommendations also knew about facility of loaning pedometers from Turku library. This reveals the above expected match between the awareness of city infrastructure and official activity levels recommendations.

92% of participants who knew about pa recommendations, own one or more technology devices. This result clearly establishes the fact that awareness and technology usage trend as well as pa adoption are highly linked.

6.2.3 Sustained PA with confluence of technology ownership and awareness levels

The earlier two propositions are inter-linked and thus awareness as well as ownership tends to benefit Physical Activity with increased motivation and reaping real benefits out of the whole process.

From cross-tabulation analysis, we found that 43% and 27% of participants, who got added value to their activity levels with the help of technology devices or those who simply own one or more technology devices for supporting their physical activity, knew about hrm devices being made available at Turku sports center. The same goes for 34% of people who also know the physical activity recommendations. In terms of motivation from technology devices vis-à-vis knowledge of such devices, any lack of the understanding of know-how of the tools was linked to individuals being unaware about the availability of devices like heart rate monitors at the sports center to loan and use.

In further analysis, we found that 16% of regular activity participants (exercising once or more than once per week) knew about the Turku library's facility of providing pedometer on loans. As 33% of such participants own a technology device, we can safely assume that this aspect does not negatively impacts their attitude towards technology for physical activity. 57% of those who have added benefits to their activity levels with help of some technology also know about Turku library's facility of pedometer availability on loan. Interestingly, just 24% of those who own a pedometer, knew about such a facility, while those who don't own a pedometer were 74% likely to know about the fitness facilities being provided.

Seventy percent of those who know the physical activity recommendations, also told that they were doing more than one exercises each week, which means they are either following the recommendations or are trying their level best to achieve the same. Some 83% of those people who know physical activity recommendations like the 10.000 steps a day or 30-minute of brisk walking three times a week, were also seen owning a technology device. Henceforth, awareness seems to be matched highly and linked to technology usage. Of the same knowledgeable people (aware of pa recommendations),

around 48% of them were able to benefit in their activity with improvements due to technology devices supporting the same.

6.2.4 Gaps within the interlinks of awareness, ownership and real-benefits

To some extent, the awareness, ownership and benefits from technology collectively are not matching. We need to find the gaps and fill them too!

The mismatch was found where we got the numbers of people who added benefits to activity from technology. As just sixteen of participants which collected benefits from technology usage within their physical activity performance, knew about availability of pedometer being facilitated at library. Since they already are getting the benefits from the technology devices, this mismatch could be due to lack of awareness about city infrastructure.

From those few cases of people who own one or more technology device and states that they got little or no benefit from technology usage. While those who got benefit were 30%, those who were unsure were also 30%. We can well see the free text area which makes us conclude this particular issue by regarding it as a case of lack of training. We figured out the heart rate monitors were more likely to be useful, once the user gets trained to use them properly.

6.2.5 Consistent with technology Vs. Consistent without technology

Technology helps for sure those who are consistent at maintaining their Physical Activity levels.

This assumption is more likely to be held true than now. we found that out of all the participants, more than 33% of people were found to be highly active (more than once exercises each week) and 44% were active (once or more than once exercise per week). Out of the highly active people and moderately active people, 52% of these active people, were able to retrieve benefits in their activity, from technology devices which are owned by more than 94% of these selected ones.

As an unsurprising fact, those who don’t own any technology device, we found that none of them were motivated from technology; over and above the fact than they were

unable to reap any real benefits out of support from technology based devices in their exercises and routine activity.

These results reveal a possible self-motivation issue, which means they require both of interaction as well as awareness about technology, in order to change their position with respect to patam. In another scenarios too, we recommend the usage of patam (physical activity and technology acceptance trends matrix model), which clearly states that attitude issues can be dealt with trainings, while awareness can be created with efficient marketing efforts as well as interaction with sports staff at regular intervals.

7 CONCLUSIONS

7.1 Literature review

As a result of literature review, we already know and thus conclude that such studies on physical activity and technology based measurement (e.g. using pedometers) have already established the fact that technology acts as the support function enabler and thus in itself does not create value, unless the activity is supported with counseling, motivation and awareness within participants.

Furthermore, those individuals who are already having knowledge of such devices are more aligned and motivated to use these devices along with group based activities, with counseling for achieving the goals for which awareness is made. Goals are related to the recommended levels of physical activity (such as 10,000 steps a day) (Cocker, 2009).

7.2 Summary

Technology devices were found within this study to be quite helpful for the participants, once the user knows how to use them. Individuals who are regular at their physical activity are also good at usage of technology and vice-versa. Those who own a sports related device or use some service online have shown quite positive results regarding their experience with technology devices within this study.

The level of awareness on technology based goals (for example achieving 10.000 steps counted via pedometer and secondly the three times a week 30-minute exercise recommendation) is found to be much more than our expectations and overwhelming. Henceforth, we know that people in Turku are well informed, as well as aware of their health related goals.

The results reinforce the concept of self-motivation within the participant(s), as the survey reveals (particularly within the free text) that it’s an individual’s self-discipline or will-power which proves an the vital component of getting success by achieving their physical activity goals, while with technology the benefits can be sustained in the long run. Individuals were found to be very willing to change their lifestyle for bringing better shape to their body, apart from weight management.

We've developed two models: pait and patam and presented them within this thesis. Both of them are suitable for practical application at the Turku sports center while doing individual as well as group based counseling. The models are based on well accepted and established theories, plus customized for people of our region. Further, the data has accepted the models as a solution to the research questions, hypothesis and propositions we made.

People are now-a-days found to be much interested in collectively doing activities which give them happiness, fun out of their social interactions while doing activities. For example, dance classes in groups, as well as Wii based games or video based dance practices. Such technology based activities make sure that people move more, irrespective of whether they are in a team or alone at home. We must target both the audiences well, as overcrowded activity groups as well as lonely people, both can get support with technology based decision making of events, tracking of activity levels as well as adding the fun part of all of this.

The overall research was well designed with participants being targeted through two mediums (email based, open for all on internet, as well as postal mails to 69 people). We found that people within focused groups were participating in greater numbers as compared to the participation we received from open for all on internet.

7.3 Suggestions

As we analyze whole of the thirty three questions and responses from 121 participants, we got to and we did found a tiny mismatch. This was in terms of level of user awareness vis-à-vis technology usage patterns while doing physical activity.

The individuals who are not getting information about the city infrastructure, facilities and services, are the ones which should be focused with customized marketing to reach the target audience. Counseling sessions are recommended for those identified to have a gloomy mindset towards the technology and city infrastructure usage due to lack of training or myths about its usefulness. Henceforth, the three goals with distinct areas of focus are (based on priority):

Training/Interactions: on how to use technology devices like hrm, for individuals identified as per patam.

Awareness: of technology devices available these days and recommended by the staff, as well as marketing of available facilities and infrastructure in the Turku city.

Online Knowledge Base: on how to do activities with help of technology devices. For the third option, there is a much larger possibility of adding instructor led training (ILT) video modules. Such asynchronous learning via technology based online services targeting healthcare of people is the bigger possibility we see for future, once the first two training and awareness goals are achieved. The video ILTs are known for making information visible and available to all.

Some tiny suggestions for Turku sports center and related healthcare institutions are:

1. Give schedule information updates via online calendar services, so that people are able to get updates with public calendar services like iCal or Google calendar, instead of the need to locate this information on website all the time.
2. City may provide tax relief or some other motivational scheme to the individuals who are consistent in using the healthcare infrastructure. Sports facilities may also be entitled to get subsidy/discounts for regular users. The cost of all these expenses would be less than the benefit in terms of health and fitness levels, as well as the reduction of load on healthcare services staff.

7.4 Future research

The data collected within this research reveals much more about physical activity patterns and perception of Turku people; however this thesis is focused on technology as the supporting function for achieving and maintaining physical activity. Henceforth, the existing data can be further analyzed with a different approach and research criterion, particularly for feedbacks purposed towards Turku city as well as Turku sports center.

Further research is recommended for this region as a follow-up study, in order to review the effect of the study and awareness, which should include the existing questions apart from new additions, so as to review the changes (growth or decline) with help of identification of pattern of motivation and real benefit from technology based activities. Finally, the patam and pait models can hopefully be enhanced in future based on the fresh requirements and future researches.

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APPENDIX 1: JOURNALS REVIEWED

The journals we reviewed (apart from the ones listed in references) are listed below (name of author and journal title):

Last name	First name	Journal Title
Kolt	Gregory S	The Healthy Steps Study: A randomized controlled trial of a pedometer-based Green Prescription for older adults. Trial protocol
Tudor-Locke	Catrine	Correction: Expected values for pedometer-determined physical activity in older populations
Gentile	Douglas A	Evaluation of a multiple ecological level child obesity prevention program: Switch® what you Do, View, and Chew
Shoko	Miura	Daily calcium intake and physical activity status in urban women living on low incomes in Davao, Philippines: a primary study for osteoporosis prevention.
Nguyen	Houng Q	Pilot study of a cell phone-based exercise persistence intervention post-rehabilitation for COPD
Novoa	Nuria	Influence of major pulmonary resection on postoperative daily ambulatory activity of the patients
Tudor-Locke	Catrine	Expected values for pedometer-determined physical activity in older populations
Pal	Sebely	Using pedometers to increase physical activity in overweight and obese women: a pilot study
Albright	Cheryl L	Increasing physical activity in postpartum multiethnic women in Hawaii: results from a pilot study
Cocker	Katrien De	Moderators and mediators of pedometer use and step count increase in the "10,000 Steps Ghent" intervention.
Blaauwbroek	Ria	The effect of exercise counselling with feedback from a pedometer on fatigue in adult survivors of childhood cancer: a pilot study
Satoshi	Nakae	Accuracy of spring-levered and piezo-electric pedometers in primary school Japanese children
Mitsui	Takahiro	Pedometer-determined physical activity and indicators of health in Japanese adults
Baker	Graham	The effect of a pedometer-based community walking intervention "Walking for Wellbeing in the West" on physical activity levels and health outcomes: a 12-week randomized controlled trial
Papaspyros	Sotiris	Analysis of bedside entertainment services' effect on post cardiac surgery physical activity: a prospective, randomised clinical trial.
Papaspyros	Sotiris	Validity of Pedometers for Measuring Exercise Adherence in Heart Failure Patients
Vanhees	Luc	How to assess physical activity? How to assess physical fitness?
Bjørgaas	Marit Rokne	Norwegian: [Use of a pedometer in physically inactive persons]
Sugden	Jacqui A	The feasibility of using pedometers and brief advice to increase activity in sedentary older women--a pilot study
Tudor-Locke	Catrine	Tracking of pedometer-determined physical activity in adults who relocate: results from RESIDE
Mitsui	Takahiro	Gentle exercise of 40 minutes with dietary counseling is effective in treating metabolic syndrome
Fitzsimons	Claire F	The 'Walking for Wellbeing in the West' randomised controlled trial of a pedometer-based walking programme in combination with physical activity consultation with 12 month follow-up: rationale and study design
Prochaska	Judith J	Physical activity as a strategy for maintaining tobacco abstinence: a randomized trial

Dijkstra	Baukje	Detection of walking periods and number of steps in older adults and patients with Parkinson's disease: accuracy of a pedometer and an accelerometry-based method.
Murphy	Timothy P	The Claudication: Exercise Vs. Endoluminal Revascularization (CLEVER) study: rationale and methods
Irvin	Melinda L	Recruiting and retaining breast cancer survivors into a randomized controlled exercise trial: the Yale Exercise and Survivorship Study.
Booth	Alison O	Evaluation of an interactive, Internet-based weight loss program: a pilot study
Cleland	Verity	The provision of compulsory school physical activity: Associations with physical activity, fitness and overweight in childhood and twenty years later.
Richardson	Caroline R	A meta-analysis of pedometer-based walking interventions and weight loss
Duncan	Elizabeth K	Pedometer-determined physical activity and active transport in girls.
Bravata	Dena M	Using pedometers to increase physical activity and improve health: a systematic review
Richardson	Caroline R	A randomized trial comparing structured and lifestyle goals in an internet-mediated walking program for people with type 2 diabetes
Bennett	Gary G	Safe to walk? Neighborhood safety and physical activity among public housing residents
Doerksen	Shawna E	Environmental correlates of physical activity in multiple sclerosis: A cross-sectional study
Bohannon	RW	Number of pedometer-assessed steps taken per day by adults: a descriptive meta-analysis
Al-Hazzaa	Hazzaa M.	Pedometer-determined physical activity among obese and non-obese 8- to 12-year-old Saudi schoolboys
Eakin	Elizabeth G	Correlates of pedometer use: results from a community-based physical activity intervention trial (10,000 Steps Rockhampton)
One	Rei	Reliability and validity of the Baecke physical activity questionnaire in adult women with hip disorders
Nemoto	Ken-Ichi	Effects of high-intensity interval walking training on physical fitness and blood pressure in middle-aged and older people
Hyman	David J.	Simultaneous vs sequential counseling for multiple behavior change
Goodrich	David E	Adverse events among high-risk participants in a home-based walking study: a descriptive study
Berry	Diane	An intervention for multiethnic obese parents and overweight children
Strycker	Lisa A	Reliability of pedometer data in samples of youth and older women
Dasgupta	Kaberi	Walking behaviour and glycemic control in type 2 diabetes: seasonal and gender differences--study design and methods
Rye	James A	Pedometer and Human Energy Balance Applications for Science Instruction.
Nawata	Keiko	Japanese: [Relationship between the number of steps taken and body mass index for male workers in the metropolitan area]
Craig	CL	Twelve-month effects of Canada on the Move: a population-wide campaign to promote pedometer use and walking.
Kobayashi	Junji	Effect of walking with a pedometer on serum lipid and adiponectin levels in Japanese middle-aged men.
Kobriger	Samantha L.	The contribution of golf to daily physical activity recommendations: how many steps does it take to complete a round of golf?
Chan	Catherine B	Relationship between objective measures of physical activity and weather: a longitudinal study.
Bennett	Gary G	Television viewing and pedometer-determined physical activity among multiethnic residents of low-income housing

Macfarlane	Duncan J	Convergent validity of six methods to assess physical activity in daily life.
Bennett	Gary G	Pedometer-determined physical activity among multiethnic low-income housing residents
Thompson	Dylan	Assessment of low-to-moderate intensity physical activity thermogenesis in young adults using synchronized heart rate and Accelerometry with branched-equation modeling.
Richardson	CR	Feasibility of adding enhanced pedometer feedback to nutritional counseling for weight loss.
LeChemi-nant	James D	A comparison of meal replacements and medication in weight maintenance after weight loss.
Stovitz	Steven D.	Pedometers as a means to increase ambulatory activity for patients seen at a family medicine clinic
Ballesteros	Martha Nydia	High intake of saturated fat and early occurrence of specific biomarkers may explain the prevalence of chronic disease in northern Mexico.
VanWorm-er	Jeffrey J	Pedometers and brief e-counseling: increasing physical activity for overweight adults.
Loucaides	CA	Differences in physical activity levels between urban and rural school children in Cyprus.
Parshuram	Christopher S	Fellowship training, workload, fatigue and physical stress: a prospective observational study
Cieslak	Thomas J	Effects of physical activity, body fat, and salivary cortisol on mucosal immunity in children.
Mikami	Satoko	Physical activity, energy expenditure and intake in 11 to 12 years old Japanese prepubertal obese boys.
Sugiura	Hiroko	Effects of long-term moderate exercise and increase in number of daily steps on serum lipids in women: randomised controlled trial
Tudor-Locke	Catrine	The relationship between pedometer-determined ambulatory activity and body composition variables.
Puente-Maestu	I	Comparison of effects of supervised versus self-monitored training programmes in patients with chronic obstructive pulmonary disease.
Rowlands	Ann V	Relationship between activity levels, aerobic fitness, and body fat in 8- to 10-yr-old children
Andrews	R	A double-blind, cross-over comparison of the effects of a loop diuretic and a dopamine receptor agonist as first line therapy in patients with mild congestive heart failure.
Walsh	J T	Failure of "effective" treatment for heart failure to improve normal customary activity
Suzuki	M	Nutritional status and daily physical activity of handicapped students in Tokyo metropolitan schools for deaf, blind, mentally retarded, and physically handicapped individuals.
Patrick	JM	The effect of a week's beta-adrenoceptor antagonism on daytime heart-rates, subjective responses to exercise, and physical activity in normal subjects.
King	DJ	The effect of propranolol on CSF amine metabolites in psychiatric patients
Johnson	MA	Dihydrocodeine for breathlessness in "pink puffers".
Riddoch	Chris J	Prospective associations between objective measures of physical activity and fat mass in 12-14 year old children: the Avon Longitudinal Study of Parents and Children (ALSPAC)
Aloha	Riikka	Time-course of exercise and its association with 12-month bone changes
Hernandes	Nidia Aparecida	Profile of the level of physical activity in the daily lives of patients with COPD in Brazil
Tudor-Locke	Catrine	Expected values for pedometer-determined physical activity in older populations
Amy Z	Fan	Validation of reported physical activity for cholesterol control using two

		different physical activity instruments
Bettina	Bringolf-Isler	Assessment of intensity, prevalence and duration of everyday activities in Swiss school children: a cross-sectional analysis of accelerometer and diary data
Andrew P	Jones	Environmental supportiveness for physical activity in English schoolchildren: a study using Global Positioning Systems.
D	Martínez-Gómez	Preliminary evidence of physical activity levels measured by accelerometer in Spanish adolescents: the AFINOS Study
GV	KRISHNAVENI	Accelerometers for Measuring Physical Activity Behavior in Indian Children
Russell	Jago	Development of new physical activity and sedentary behavior change self-efficacy questionnaires using item response modeling
Sander M	Slootmaker	Disagreement in physical activity assessed by accelerometer and self-report in subgroups of age, gender, education and weight status
Marilyn L.	Moy	Free-living physical activity in COPD: assessment with accelerometer and activity checklist
Esther	MF van Sluijs	Physical activity and dietary behaviour in a population-based sample of British 10-year old children: the SPEEDY study (Sport, Physical activity and Eating behaviour: environmental Determinants in Young people).
Stéphane	Choquette	Accelerometer-based wireless body area network to estimate intensity of therapy in post-acute rehabilitation
Carl K	Lachat	Validity of two physical activity questionnaires (IPAQ and PAQA) for Vietnamese adolescents in rural and urban areas
Pietro	Ferrari	The role of measurement error in estimating levels of physical activity
Marilyn L.	Moy	Accuracy of uniaxial accelerometer in chronic obstructive pulmonary disease
Michelle L	Gattshall	Validation of a survey instrument to assess home environments for physical activity and healthy eating in overweight children
Femke De	Meester	Interventions for promoting physical activity among European teenagers: a systematic review
Ralph	Maddison	Global positioning system: a new opportunity in physical activity measurement.
Andreas	Nilsson	Correlates of objectively assessed physical activity and sedentary time in children: a cross-sectional study (The European Youth Heart Study).
Andrew R	Maroko	Feasibility and effectiveness of online physical activity advice based on a personal activity monitor: randomized controlled trial.
Andrea	Altschuler	Physical activity questionnaire comprehension: lessons from cognitive interviews.
John	Worobey	Mechanical measurement of infant activity: a cautionary note
Wendy	Hardeman	Impact of a physical activity intervention program on cognitive predictors of behaviour among adults at risk of Type 2 diabetes (proactive randomised controlled trial).
Russell	Jago	Development of new physical activity and sedentary behavior change self-efficacy questionnaires using item response modeling.
Kim	Tae-Kwang	Comparison of an accelerometer and a condenser microphone for mechanomyographic signals during measurement of agonist and antagonist muscles in sustained isometric muscle contractions.
Laurie A.	Lindamer	Assessment of physical activity in middle-aged and older adults with schizophrenia
Ralph	Maddison	International Physical Activity Questionnaire (IPAQ) and New Zealand Physical Activity Questionnaire (NZPAQ): A doubly labelled water validation.
Marshall	Hagins	Does practicing hatha yoga satisfy recommendations for intensity of physical activity which improves and maintains health and cardiovascular fitness?
Ann M.	Harris	Measurement of daily activity in restrictive type anorexia nervosa.

Catherine	Bolman	Question order in the assessment of misperception of physical activity
William H	Gage	Ambulatory monitoring of activity levels of individuals in the sub-acute stage following stroke: a case series
Chris J	Riddoch	Objective measurement of levels and patterns of physical activity
Madlyn I.	Frisard	Physical activity level and physical functionality in nonagenarians compared to individuals aged 60-74 years.
Jeffrey M	Hausdorff	Gait dynamics, fractals and falls: finding meaning in the stride-to-stride fluctuations of human walking
James	Huddleston	Ambulatory measurement of knee motion and physical activity: preliminary evaluation of a smart activity monitor.
Oddrun	Samdal	Trends in vigorous physical activity and TV watching of adolescents from 1986 to 2002 in seven European Countries
Paul W.	Franks	Comparing the roles of physical activity and fitness in arterial stiffness: how important is exposure measurement error?
Colin	Boreham	Tracking of physical activity, fitness, body composition and diet from adolescence to young adulthood: The Young Hearts Project, Northern Ireland.
Esther	M.F. van Sluijs	Physical activity measurements affected participants' behavior in a randomized controlled trial
Susan L.	Murphy	Review of physical activity measurement using accelerometers in older adults: Considerations for research design and conduct
Juliette	Hussey	Validation of the RT3 in the measurement of physical activity in children
Eva L.	Ribom	Estimation of physical performance and measurements of habitual physical activity may capture men with high risk to fall—Data from the Mr Os Sweden cohort
Billie	Giles-Corti	Development of a reliable measure of walking within and outside the local neighborhood: RESIDE's Neighborhood Physical Activity Questionnaire
Louise C.	Masse	Emerging Measurement and Statistical Methods in Physical Activity Research
I. B.	de Groot	Actual everyday physical activity in patients with end-stage hip or knee osteoarthritis compared with healthy controls
Mitch J.	Duncan	Applying GPS to enhance understanding of transport-related physical activity
Nicola M.	Kayes	Exploring Actical Accelerometers as an Objective Measure of Physical Activity in People With Multiple Sclerosis
Hans-H.	Osterhues	Influence of Physical Activity on 24-Hour Measurements of Heart Rate Variability in Patients With Coronary Artery Disease
Catherine B.	Chan	Health benefits of a pedometer-based physical activitynext term intervention in sedentary workers
James	Dollman	A hitchhiker's guide to assessing young people's physical activity: Deciding what method to use
Eva L.	Ribom	Estimation of physical performance and measurements of habitual physical activity may capture men with high risk to fall—Data from the Mr Os Sweden cohort
N.	Wedderkopp	High-level physical activity in childhood seems to protect against low back pain in early adolescence
Nicola M.	Kayes	Exploring Actical Accelerometers as an Objective Measure of Physical Activity in People With Multiple Sclerosis
Kate	Ridley	Intra-individual variation in children's physical activity patterns: Implications for measurement
DANIEL R.	TABER	The Effect of a Physical Activity Intervention on Bias in Self-Reported Activity
G.	Vicente-Rodríguez	Extracurricular physical activity participation modifies the association between high TV watching and low bone mass
EO RIN	CHO	Leisure-Time Physical Activity is Associated with a Reduced Risk for Met-

		abolic Syndrome
Dylan P.	Cliff	Methodological considerations in using accelerometers to assess habitual physical activity in children aged 0–5 years
Jeanine A.	Verbunt	Assessment of physical activity in daily life in patients with musculoskeletal pain
James F.	Sallis	Measuring physical activity environments: a brief history
Esther	M.F. van Sluijs	Physical activity measurements affected participants' behavior in a randomized controlled trial
Marti H.	Rice	Measurement of physical activity, exercise, and physical fitness in children: Issues and concerns
B.	CARTMEL	Comparison of two physical activity questionnaires, with a diary, for assessing physical activity in an elderly population
Clemes	Stacy A.	Four-week pedometer-determined activity patterns in normal-weight, overweight and obese adults
Tudor-Locke	Catrine	How many days of pedometer monitoring predict weekly physical activity in adults?
Farah A.	Ramirez-Marrero	Self-Reported Physical Activity in Hispanic Adults Living With HIV: Comparison With Accelerometer and Pedometer
Vanesa	Lores	Recording the Daily Physical Activity of COPD Patients With an Accelerometer: An Analysis of Agreement and Repeatability
Leigh A	Hale	Measuring Free-Living Physical Activity in Adults With and Without Neurologic Dysfunction With a Triaxial Accelerometer
McGrath	L	Classification of physical activity in children using accelerometers
Kehoe	S. H.	No association between size at birth and levels of physical activity measured by accelerometers in Indian children
Vilarnau	Eva Balcells	Evaluation of Regular Physical Activity in COPD Patients With an Accelerometer and a Questionnaire: A Pilot Study
Schreurs	K. M. G.	Measuring daily physical activity in fibromyalgia: is an accelerometer more useful than self-report questionnaires or daily logs?

APPENDIX 2: ONLINE SURVEY QUESTIONNAIRE

The questions are listed as it is, in Finnish language below:

Turku takes steps

Tervetuloa vastaamaan "Turku suuntaa tulevaisuuteen: teknologia auttaa liikkumaan" opinnäytetyön kyselyyn. Selvitämme Turun kaupungin liikuntapalvelukeskuksen asiakkaiden mielipiteitä liikuntateknologiasta.

Kaikki vastaukset ovat arvokkaita. Kyselyssä on 33 kysymystä, joista 9 käsittelee liikuntateknologiaa kuten askel- ja sykemittari, liikuntaan liittyvä internetsivu, mp3-soitin, pelikonsoli ja liikuntaohjelma, tv-/video-/cd-/dvd-liikuntaohjelma.

Kysely on avoinna 10. - 28.2.2011. Vastaamiseen kuluu aikaa noin 30 minuuttia. Liiku lomakkeella eteenpäin hiirellä tai tabulaattorinäppäimellä. Turun seudulta (sis. lähikunnat) tulevien vastaajien kesken arvotaan kolme lahjakorttia (100€, 50€, 50€).

Tutkimuksen suorittaa maisteriopiskelija Ritesh Serene. Työtä ohjaa Eija Koskivaara, Turun kauppakorkeakoulu / Turun yliopisto: eija.koskivaara@tse.fi, eija.koskivaara@utu.fi; p. 040-1497587.

Kaikkia vastauksia käsitellään luottamuksellisesti ja siten, että yksittäinen vastaaja ei paljastu. Vastauksia ja tuloksia hyödynnetään toiminnan kehittämisessä.

1) Mikäli haluat tiedon tutkielman valmistumisesta, niin kirjoita alla olevaan laatikkoon sähköpostiosoitteesi. Lisäksi tulokset julkaistaan liikuntapalvelukeskuksen medioissa ja mahdollisuuksien mukaan muissa alan julkaisuissa.

2) Taustatietoja

Nimi:

Syntymävuosi (XXXX):

Sukupuoli (M tai N):

Sähköposti:

Puhelinnumero:

Osoite:

Postinumero:

Paikkakunta:

3) Mihin Turun kaupungin liikuntapalvelukeskuksen liikuntaryhmiin olet osallistunut, voit valita useamman kohdan:

- ☐ Poweraction (13-19v)
- ☐ Power20+
- ☐ Leidit liikkeellä
- ☐ Ihanaiset naiset
- ☐ Hikinen tusina
- ☐ Raskas sarja
- ☐ 55+
- ☐ Muu, mikä? Kerro:
- ☐ En ole osallistunut Turun kaupungin liikuntapalvelukeskuksen liikuntaryhmiin.

4) Oletko käyttänyt jotain muita Turun kaupungin liikuntapalvelukeskuksen palveluita? Kerro mitä.

5) Mikä motivoi Sinua liikkumaan? Rastita parhaiten Sinuun sopiva vaihtoehto.

	Täysin samaa mieltä	Samaa mieltä	En samaa, enkä eri mieltä	Eri mieltä	Täysin eri mieltä	En osaa sanoa
Haluan muuttaa elämäntapani.	☐	☐	☐	☐	☐	☐
Haluan laihtua.	☐	☐	☐	☐	☐	☐
Haluan olla hyvässä/paremmassa kunnossa.	☐	☐	☐	☐	☐	☐
Haluan liikkua ystävieni/ryhmäni kanssa.	☐	☐	☐	☐	☐	☐
Työpaikkani tukee liikuntaani.	☐	☐	☐	☐	☐	☐
Liikuntaan liittyvät suositukset motivoivat minua.	☐	☐	☐	☐	☐	☐
Liikuntamyönteinen ilmapiiri ja viestintä.	☐	☐	☐	☐	☐	☐
Teknologiset apuvälineet kuten askelmittari, syke-mittari, liikuntaan liittyvä internetsivu, mp3-soitin, pelikonsoli ja liikuntaohjelma, tv-/video-/cd-/dvd-liikuntaohjelma.	☐	☐	☐	☐	☐	☐
Aurinkoinen ilma motivoi minua liikkumaan.	☐	☐	☐	☐	☐	☐
Puhdas luonto motivoi minua.	☐	☐	☐	☐	☐	☐

Toimivat kevyenliikenteen väylät.	☐	☐	☐	☐	☐	☐
Toimivat ja hyvin hoidetut kuntoradat.	☐	☐	☐	☐	☐	☐
Arvioi muun motivoivan tekijän vaikutus.	☐	☐	☐	☐	☐	☐

6) Kerro, mitkä muut tekijät motivoivat sinua liikkumaan:

7) Mitkä eri tekijät ovat vaikuttaneet liikkumiseesi positiivisesti? Rastita parhaiten Sinuun sopivat vaihtoehdot.

	Täysin samaa mieltä	Samaa mieltä	En samaa, enkä eri mieltä	Eri mieltä	Täysin eri mieltä	En osaa sanoa
Halu muuttaa elämäntapa.	☐	☐	☐	☐	☐	☐
Helpottunut painonhallinta.	☐	☐	☐	☐	☐	☐
Halu olla hyvässä/paremmassa kunnossa.	☐	☐	☐	☐	☐	☐
Halu liikkua ystävieni/ryhmäni kanssa.	☐	☐	☐	☐	☐	☐
Työpaikan tuki.	☐	☐	☐	☐	☐	☐
Tavoite saavuttaa liikuntaan liittyviä suosituksia.	☐	☐	☐	☐	☐	☐
Liikuntamyönteinen ilmapiiri ja viestintä.	☐	☐	☐	☐	☐	☐
Teknologiset apuvälineet kuten askelmittari, sykemittari, liikuntaan liittyvä internetsivu, mp3-soitin, pelikonsoli ja liikuntaohjelma, tv-/video-/cd-/dvd-liikuntaohjelma.	☐	☐	☐	☐	☐	☐
Aurinkoinen ilma.	☐	☐	☐	☐	☐	☐
Puhdas luonto.	☐	☐	☐	☐	☐	☐
Toimivat kevyenliikenteen väylät.	☐	☐	☐	☐	☐	☐
Toimivat ja hyvin hoidetut kuntoradat.	☐	☐	☐	☐	☐	☐
Arvioi muun tekijä vaikutus liikuntaan.	☐	☐	☐	☐	☐	☐

8) Kerro, mitkä muut tekijät ovat vaikuttaneet liikuntaasi:

9) Oletko tietoinen liikunnan suosituksista kuten UKK: n liikuntapiirakka, liikuntaresepti tai Käypä hoito -suositukset (Duodecim)?

☐ Kyllä ☐ En

10) Kerro, mitä liikuntasuosituksia tiedät ja miten sovellat niitä omassa elämässäsi.

11) Oletko käyttänyt jotain teknologista apuvälinettä harrastaessasi liikuntaa (liikunta-teknologiaa)?

☐ en (jos vastasit tähän, siirry kysymykseen 17)

☐ askelmittaria

☐ sykemittaria

☐ liikunta-aiheisia internetsivuja, kerro mitä sivuja olet käyttä-nyt

☐ mp3-soitin, -radio tai muu mukana oleva viihde-elektroniikka

☐ pelikonsoli ja liikuntaohjelma

☐ tv-/video-/cd-/dvd-liikuntaohjelma

☐ jokin muu, kerro

12) Jos olet käyttänyt jotain liikuntateknologiaa, niin kerro ensimmäisestä kokemukses-tasi, jos vielä muistat.

13) Jos olet käyttänyt jotain liikuntateknologiaa, niin miten se on vaikuttanut liikunta-aktiivisuuteesi?

☐ ei vaikutusta

☐ vähentänyt

☐ lisännyt

14) Kerro teknologian vaikutuksesta liikuntaharrastukseesi.

15) Omistatko liikuntateknologiaa?

- [ ] en
- [ ] kyllä, minkä
- [ ] en omista, mutta olen lainannut, minkä

16) Kerro, miten sinusta tuli liikuntateknologian omistaja tai mistä olet lainannut ja millaisia kokemuksia sinulla on lainauksesta:

17) Tiesitkö, että Turun kirjastoista voi lainata askelmittareita?

- [ ] kyllä
- [ ] en

18) Tiesitkö, että liikuntapalvelukeskuksesta voi lainata sykemittarin?

- [ ] kyllä
- [ ] en

19) Oletko lukenut Turku liikkeelle -lehteä internetissä?

- [ ] kyllä
- [ ] en

20) Millä Turun kaupungin liikuntaan liittyvillä internetsivuilla (ml. facebook-sivut) olet vieraillut tai käyt säännöllisesti? Kerro kokemuksistasi.

21) Oletko löytänyt etsimääsi tietoa Turun kaupungin liikuntaan liittyviltä sivuilta? Kerro kokemuksistasi.

22) Niinä päivinä, kun liikkumaan lähteminen on erityisen vaikeata, niin mikä saa sinut liikkeelle?

23) Miten liikuntaharrastustasi on tuettu?

24) Miten haluaisit, että liikuntaharrastustasi tuettaisiin?

25) Millaista palautetta haluaisit saada liikuntaharrastuksestasi?

26) Keneltä haluaisit saada palautetta tai tukea liittyen liikuntaharrastukseesi?

- [ ] terveydenhuollon ammattilaisilta, lääkäreiltä, sairaanhoitajilta,terveydenhoitajilta
- [ ] liikunta-alan ammattilaisilta kuten liikunnanohjaajilta
- [ ] urheiluseurojen vetäjiltä
- [ ] henkilökohtaiselta valmentajalta
- [ ] omalta perheenjäseneltä
- [ ] ystäviltä
- [ ] työnantajalta

☐ joltain muuulta, keneltä?

27) Miten haluaisit saada palautetta?

☐ kasvotusten

☐ tekstiviestillä

☐ sähköpostilla

☐ internetin sosiaalisessa mediassa (esim. facebook, twitter)

☐ puhelimella

☐ muulla tavoin, miten?

28) Miten usein olet osallistunut Turun kaupungin liikuntapalvelukeskuksen ohjattuihin palveluihin?

☐ useamman kertaa viikossa

☐ kerran viikossa

☐ kerran kahdessa viikossa

☐ kerran kuukaudessa

☐ harvemmin

☐ en ole osallistunut

29) Mikä on ollut parasta Turun kaupungin liikuntapalvelukeskuksen palveluissa?

30) Mitä kehitysideoita haluaisit antaa Turun kaupungin liikuntapalvelukeskukselle?

31) Miten usein harrastat kohtuukuormitteista kestävyystyyppistä liikuntaa kuten kävelyä vähintään 30 minuuttia päivässä?(arvioi tilanne viimeisen kolme kuukauden ajalta)

32) Miten usein harrastat reipasta liikuntaa (hengästyit ja hikoilit) vähintään 20 minuuttia päivässä?(arvioi tilanne viimeisen kolmen kuukauden ajalta)

33) Lopuksi, sana on vapaa...

Kiitos ajastasi ja vaivannäöstäsi! Hyvää Liikuntavuotta 2011!