Connecting to Disconnect: How Interactive Media and other Technologies Affect The User Experience of Runners

Andrea Pereira de Almeida
Elon University
Elon, NC
apereiradealmeida@elon.edu

ABSTRACT

Technology can have a direct impact on the user's running experience. This literature review centers around the question, does the use of technology hurt or harm the running experience? Section 2 of this paper defines a runner, discusses motivations for running, its psychological benefits, and the negative impacts of running. Section 3 explores how running can unite people through road races and training, the act of partner or group running, the use of social networks in an online and offline context, and how social network technologies can enhance the running experience. Section 4 presents technologies used by runners such as mobile applications, and Section 5 takes a look at interactive map technologies in digital tourism and how they can benefit runners. Technology can easily interfere with the running experience, but it can also be beneficial to runners and help to enhance the overall running experience when used as a means to overcome certain obstacles that are present in issues that involve motivation, running with a partner, reinvigoration, and social networking.

Keywords

Running, technology, motivation, psychology, interactive maps

1. INTRODUCTION

This literature review argues that the use of technology by runners can enhance user experience as long as it does not distract from the running experience. Section 2 defines runners and their motives for participating in running as a leisure activity, which include physical, health, social and psychological benefits. Running as an aerobic activity can have a direct impact upon a person's stress levels, as well as be a beneficial tool in goal setting and achievement. Running can also have a negative effect upon its participants, especially in the areas of addiction and overtraining. Section 3 presents qualitative and quantitative benefits to running with a partner. Motivation is necessary in order to perform a physical activity, and the act of running with a partner can add additional motivating factors to keep running and achieve set goals. Section 4 explores technologies that can help to simulate this type of partner motivation when a partner is not present, and be used as a tool during partner running. When runners come together to form groups and networks, this connectedness can act as a support system and help motivate runners to accomplish and set higher goals. Section 5 explores the use of maps and their impact upon run quality. Maps used in a more traditional sense in a tourism arena are explored in order to synthesize new running related interactive maps that can enhance user experience in the same way. Technologies are ever changing, and it is important to look at powerful interactive technologies used in other areas to help create better technologies for runners.

2. RUNNING AND MOTIVATION

2.1 Defining a Runner

According to Collinson (2008), those who engage in the act of running can be categorized into three different groups: athletes, runners, and joggers/fun runners. "Athletes" are defined by their potential to win a race, while "runners" train regularly at higher levels than are necessary for basic fitness, but do not have any chance of winning a race (Collinson, 2008). "Joggers/fun runners" train infrequently, and usually only in fair weather (Collinson, 2008). It is important to note the different types of runners based on ability level, but for the purpose of this literature review, the term "runner" will be used in a broader sense, indicating any person who engages in the physical act of running over a set distance, regardless of ability level.

2.2 Motivation for Physical Activity

Runners participate in the act of running for a variety of different reasons, which can include physical benefits, mental clarity, and as a means to socialize and meet new people. An individual's motivation to run can determine how and where this task is accomplished. In a two-year qualitative study of twenty-five distance runners, Shipway & Holloway (2010) found that runners participate in distance running as a leisure activity primarily for physical, mental, and emotional health benefits. Running also gives runners the opportunity to set personal goals and to create a plan that will allow them to accomplish their goals. These goals can vary depending upon the ability level of the runner as well as the motivation behind accomplishing the task; they can also be the motivational factor behind why people begin running in the first place (i.e. the goal to lose weight).

2.3 Psychological Benefits of Running

Motivation to run can include cognitive benefits, which can be influenced by a runner's physical environment. Distance running can be a way for participants to cope with and escape from stress present in their everyday lives and is also a way for runners to take in their natural environment (Shipway & Halloway, 2010). Running environment can influence the perceived experience of a runner. Bodin & Hartig (2001) conducted a field experiment to test the effects that different types of outdoor environment have on attentional and emotional restoration during a run. Twelve participants completed a total of four runs each (two in an urban setting and two in a park setting), and the researchers found that running provided the runners with restoration, a reduction in anxiety, depression, and anger (Bodin & Hartig, 2001). The park setting (compared to the urban setting) had a larger positive impact upon reducing anxiety and depression in runners (Bodin & Hartig, 2001). Furthermore, exercising in a natural environment

is associated with greater feelings of revitalization and decreases in tension and other negative emotions compared with exercising indoors (Thompson Coon et al., 2011). Runners are able to escape from constant connectivity to technology and people when they choose to run in a natural environment. Disconnecting from the world of technology can allow runners to better connect with the natural physical world around them, and allow for the brain to rest and enjoy the moment.

Convenience can play a big factor in whether or not a runner will choose to run for the benefit of mental clarity and stress relief. The availability of Public Open Space (POS) can determine whether a runner chooses to be active for this reason. The use of POS increases with increasing levels of access (Giles-Corti et al., 2005). According to Giles-Corti et al. (2005), people who had "very good access" to large and attractive POS were fifty percent more likely to attain high levels of walking (p.172). Runners (like walkers), who do not have access to POS, which include parks, may not attain as great of psychological benefits from running as those who have easier access.

2.4 Negative Impacts of Running

Running can help enhance peoples' lives, but it can also negatively affect runners due to the repetitiveness of the activity on a daily basis. Running can become highly addictive, which can lead to negative physical and mental side effects. When running becomes a "high level commitment" for runners, it can lead to obsession over staying fit, keeping up with training, and nutrition (Shipway & Halloway, 2010). Competitiveness with oneself can also be paralleled into competitiveness with others. Races are competitive in nature, and for an elite few, the desire to win is what drives them to run in the first place. For most runners who use running as a leisure activity, competitiveness and addiction can lead to overtraining, which is often associated with a disturbed mood, fatigue, increased tension, appetite loss, insomnia, and lower performance levels (Shipway & Halloway, 2010). It is necessary to keep a healthy balance between the level of physical exertion and the amount of training.

3. RUNNING AND GROUPS

3.1 Running Can Unite People

Running on a grander scale of road races can have an even larger impact upon its participants that goes beyond the physical and psychological. Engaging in running through the means of road racing can have sociological benefits, which can help to bring people together through a shared goal and equal playing field. Although goals may differ slightly, races bring people together through a shared goal of finishing the race. The act of running becomes a "common language", where all humans are able to communicate with one another (El-Khalil, 2013). In October 2003, El-Khalil (2013) organized a marathon in the war-torn country of Lebanon, consisting of over 6,000 participants, from 49 different countries. Running became a tool that was powerful enough to unite people with very little in common through the act of overcoming obstacles and accomplishing a shared task.

3.2 Running and Networks

The same reasons for coming together with others for a road race can be applied to training together, by connecting with others through shared goals and obstacles. Running with a partner can be a motivational factor in accomplishing the task of running and accomplishing goals set by participants for runs. There are a number of reasons for choosing to run with a partner(s), some of which include for socialization, as a motivational factor to participate in the activity, as a motivational factor to run faster, and for enjoyment purposes (Mueller, O'Brien, & Thorogood, 2007). Running is unique in that it can be both a solo activity as well as one performed in conjunction with one or more people. If a runner is running in order to disconnect and to de-stress, running solo may be the right choice that day. Solo running is a much less complex task than running with a partner. Finding the right can be difficult because there are a number of factors which influence accomplishing the task of running together, including being in the same location, running at the same pace, and being able to coordinate schedules of two or more runners (Mueller et al., 2007). A way for runners to still experience sociological benefits of interacting with others when it comes to running is by joining a group or network of other runners. Many runners believe that a running organization or club is an integral part of the distance running experience (Shipway, Holloway & Jones, 2012). Groups allow people with similar goals and an interest in the same activity to share stories and explore the act of running. Becoming a part of a running community can help a runner acquire more positive effects from the viewpoints of sustainability, skill, and motivation by being able to communicate with other runners (Otsuka et al., 2011). When running data is shared with others, runners are able to better analyze their own results and compare and contrast these with others. A social network of runners can also provide runners with recognition after they achieve a set goal (including a training run or race), which can help to develop a person's running identity (Shipway & Halloway, 2010). Because running with a partner(s) and/or being a part of a larger group or network of runners can have such a positive impact upon a runner's overall experience, technologies are being developed as tools to help make this social aspect of running better and easier to achieve. Otsuka et al. (2011) developed a web-based social network for runners where they are able to self manage their running. Online communities allow runners to connect more easily with one another, get feedback about their running, and form new friendships, enhancing the social area of a runner's life.

3.3 Running and Online Networks

Social networking websites can help to unite a much larger group of runners into a single network in comparison to running groups that are formed without the use of technology. Through the use of social networking online, more runners are able to connect with one another because obstacles such as distance are no longer a major deterrent to the formation of a group. The website dailymile.com has almost 750,000 members who share their runs, routes, and training goals with online friends (Trageser, 2012). Other social media platforms including Facebook, Twitter, connect.garmin.com, athlinks.com, Pinterest, and Instagram are ways for runners to share their own running data, connect with other runners, get inspiration, track others, and talk about running (Trageser, 2012). Nike+ is another application that allows runners to track their running and connect with other users (Trevorrow, 2013). The social media platform can be used as a motivational tool among runners. According one distance runner, "when I wasn't running with these friends I was reading about their upcoming race and completed training runs every time I logged onto Facebook and Twitter, further pushing me to get out and run" (Trageser, 2012, p.2). Even if runners are not running with a partner(s), they are still able to benefit from the social aspects of being a part of a group by using an online social running network as a tool to share personal running data with others.

4. RUNNING AND TECHNOLOGY

4.1 Jogging Over a Distance

In a world that is connected through networks and ever-changing technologies, there has been a major shift in the use of technology as a tool to enhance user experience during physical activity. Technology is now being used to enhance user experience during runs, as a motivational tool for runners to begin running, as a way to help motivate runners to achieve bigger and better goals, and as a means to unite runners. "Jogging Over a Distance" is a system created to provide users with a close alternative to running with a partner, when that activity cannot be accomplished, but does not aim to replace the act of running with a partner in the same geographical location (Mueller et al., 2007). The system allows runners of different speeds to have the experience of running "together", while geographically apart through the use of an audio feedback system worn by both runners, which allows each runner to hear localized sounds either in front, side, or back, depending on where the other runner is virtually running according to pace (Mueller et al., 2007). Runners of varying speeds are able to have the experience as if they were running at the same pace through the use of a baseline variable for pace that can be adjusted according to the skill level of each runner (Mueller, O'Brien, & Thorogood, 2007). Although running together can be accomplished without the use of technology, it can also provide runners with opportunities that were once impossible, such as running with someone who is physically in a different location. Technology helps to create new experiences based off of non-technology running that may not be possible due to certain obstacles. Technologies that do not visually distract runners from their environment such as the use of an audio interface can enhance a user's running experience (Mueller et al., 2007). The "Jogging over a Distance" system supports outdoor running because it can be worn and used on the go compared to a static technology like the treadmill (Mueller et al., 2007).

4.2 Virtual Runner

The Virtual Runner app used in conjunction with an iPad, takes obstacles into consideration and allows users to virtually run a route outside while simultaneously running on a treadmill (Outside, 2012). The objective behind this technology is to enhance the running experience on treadmills as well as allow people to explore popular race courses before they run the race (Outside, 2012). This kind of new technology allows runners to have access to an outdoor course in a city where they may not be training. In this case, interactive technology enhances the user experience by providing the next best alternative to running a route, when that option is not available due to distance, weather, timing, etc.

4.3 Technology and Runner Motivation

The use of technology as tool to improve physical fitness can be beneficial to runners when their motivation to run is based around improving physical fitness. Technologies can be very beneficial to users when used properly, but users need to remember that they are simply a tool. The act of running can still be accomplished, and done so at the same level of physical exertion without the use of technology. The use of technology in running can play a role in making an active lifestyle more fun, thereby increasing the number of runners, and making a positive impact on their overall health. By looking at motivational factors that technology can offer runners, it is easy to see its benefit to runners' wellbeing. If the technology helps to motivate the runner to exercise in the first place, then that motivation in addition to the actual use of the technology can help to enhance the running experience by associating the act of running with positive attributes (de Oliveira 2008). TripleBeat is a mobile phone based technology that allows runners to set fitness goals, and helps them reach these goals through the use of two persuasive techniques (virtual competition and a glanceable interface) (de Oliveira 2008). de Oliveira believes that systems such as TripleBeat will allows users to pursue a more active lifestyle by enhancing the exercise experience (de Oliveira 2008). This gamification of running allows runners to have fun in the process of accomplishing a task that can be physically painful.

Technology for runners is often used to help solve a problem or to help enhance the running experience. Ståhl, Gambäck, Hansen, Turunen & Hakulinen (2008) present a Mobile Companion prototype created in order to enhance user experience by allowing the planning and tracking of exercise via user speech .The data is stored and can be opened at a later time, allowing the user to compare data from different workouts (Ståhl et al., 2008). Using speech to communicate with a mobile device for exercise is a key component to a technology that can enhance the running experience, without distracting a runner during a run.

4.4 Technology and User Experience

Designers face many challenges when creating systems that help enhance the user experience of runners. Due to the physical movement and need for instant feed back during a run, technology prototypes need to be carefully planned out even before testing and implementation. The technology systems need to be unobtrusive to the runner (especially since he/she will most likely be wearing a form of the technology), where the relevant information that is needed by the runner is communicated to him/her in a way that does not disrupt his/her workout (de Oliveira & Oliver, 2008). Designers also need to take into consideration when, where, and for how long the feedback systems for runners need to be used. A "glanceable" interface, enabling the quick intake of information with minimal effort on the part of the runner is an important detail that can contribute to the quality of user experience, and size of the screen on a devise for runners can also factor into the way that information needs to be displayed in order for it to be understood easily by runners on the go (de Oliveira & Oliver, 2008).

5. RUNNING AND MAP TECHNOLOGY

5.1 Connecting to Disconnect

Interactive maps can have many different uses depending on the context in which they are needed. They can be a beneficial tool to help users learn about a point of interest or to plan out a route to hike (Halkosaar et al., 2013). Map technologies can be useful to runners in the same way as they are to hikers, by enhancing user experience through training route planning. The physical location of a run plays a major factor not only in psychological restoration, but also in actually accomplishing running goals. In order to do so, runners must be able to safely navigate through an area. When an area is new to the runner, the use of a map can help him/her to navigate through the unknown space. The act of hiking can be perceived as navigating land and planning routes and can be a time for the hiker to stop and reflect on life (Halkosaari et al., 2013). Runners can use space exploration in the natural environment as a way to disconnect from the world of technology, but in order to do so, can use map technologies to help enhance this 'disconnect'. The idea of 'connecting' to 'disconnect' illustrates how technologies can enhance a runner's experience without distracting a runner from the experience. The current widespread use of mobile devices as a tool to interact with a natural environment can benefit runners by allowing for quick and

easy access to maps. Santhatam (2013) explores the use of Google Map API's and Android Java in the creation of interactive bike and running trails that allow users to capture geospatial time sensitive data, and use the application to create their own trail map.

5.2 Running Space

Runners are very aware of the physical environment in which they run, but there are also other areas of space that are less explored. Perceived space is the physical space runners run through and is also known as training routes (Collinson, 2008). Conceived space is imagined, and lived space is a combination of all of the spaces (Collinson, 2008). It can be beneficial for runners to think in terms of conceived space and lived space because these are the spaces that are involved in course planning. High-Dimensional space is space that is independent of the physical space in which we live. Nam & Mueller (2013) identify the following five activities to be used in tourist navigation: identification of sights of interest, linking these points of interest to create a path, actually traveling the route, stopping at a random point in order to actually experience that location, and finally orienting oneself by using the map. This type of High-Dimensional space exploration can be applied to the area of running, because like tourists, runners explore an area, create routes based on points of interest, link these points to create a running route for that day, and then run the course. Sometimes runners can lose their bearings and get lost along the way, and the use of an interactive map can be beneficial in this part of the run. The act of getting lost can also be viewed as a way to better understand one's surrounding by completely immersing oneself in the foreign environment.

User-friendly interfaces for maps allow users to easily navigate through a large assortment of data. In the past, users had to find information to prepare for a hike by searching a variety of different sources (pertinent information includes terrain, general area, local weather, public transportation, location of parking lots, related outdoor activities, etc.) (Halkosaari et al., 2013). The use of a multichannel map service allows the user to interact with different channels from which he/she can choose to obtain spatial information depending on his/her needs at the time (web maps, mobile maps, multi-touch maps, and printed maps) (Halkosaari et al., 2013).

5.3 Maps and Tourism Related to Running

By exploring new areas through running, many runners become tourists of that area. User experience for runners (before, during, and after running) could be enhanced through practices similar to those used by digital tourism. Benyon at al. (2013) present ways in which to create a positive user experience for tourists, and discuss designing for the user in blended tourist spaces in order to enhance overall user experience. The tourist visitor experience is becoming more enhanced by the combination of the real world and digital content (Benyon et al., 2013). Due to the widespread use of smartphones and tablets, this mix of reality and technology is becoming more and more popular (Benyon, et al., 2013). Standard tours are being replaced by tours with more personalized options, allowing the user to focus on what aspects of the experience are most important to them (Rodríguez, Molina, Pérez & Caballero, 2012). Standard running, much like these tours, is being replaced by running with technology, which can also allow for a more personalized running experience.

Running allows people to explore a new area, but in doing so, they often have to plan out ahead of time where to run. The use of interactive maps can simplify the planning by allowing access to large amounts of data in an easy to understand format. The DESTOUR system (an abbreviation for "Destination Management System in the field of tourism") is an interactive technology that aids the tourist in trip planning with the use of an interactive map by merging tourism and geographical data into a single database (Tallinucci 2013).

6. CONCLUSION

Running is a unique physical activity that can be performed solo or with a partner(s). Many technologies can help enhance the running experience, but it is important for these technologies to not take away from the act of running. Running sans technology can be a way for runners to disconnect from a world of connectedness and be a means to de-stress. Runner technology need not take away from the psychological benefits, but help to overcome obstacles that runners face when trying to accomplish the task of running. Knaving & Woźniak (2013) call for a new technology system to help improve the running experience that would allow the runner and his/her non-runner friends (supporters) to communicate back and forth with one another on race day, where support can be exchanged, but not distract from the act of running. This idea uses technology as a way to improve user experience, but not take away from the benefits of running. Other technologies that use gamification and the involvement of networks can be beneficial to enhancing user experience and increase runner motivation. Future technologies should be created to help better enhance user experience through the use of technology, without taking away from the experience of running.

7. REFERENCES

[1] Benyon, D., Quigley, A., O'Keefe, B., & Riva, G. (2013). Presence and digital tourism. *AI & Society*, 1-9. doi:10.1007/s00146-013-0493-8

[2] Bodin, M., & Hartig, T. (2003). Does the outdoor environment matter for psychological restoration gained through running?. *Psychology of Sport and Exercise*, *4*, 141-153. doi:10.1016/S1469-0292(01)00038-3

[3] Collinson, J. A. (2008). Running the routes together: Corunning and knowledge in action. *Journal of Contemporary Ethnography,* 37(1), 38-61. doi:10.1177/0891241607303724

[4] de Oliveira, R., & Oliver, N. (2008). TripleBeat: Enhancing exercise performance with persuasion. *Proceedings of the 10th international conference on Human computer interaction with mobile devices and services*, 255-264. doi:10.1145/1409240.1409268

[5] El-Khalil, M. (2013). Making peace is a marathon. Retrieved from http://www.ted.com/talks/may_el_khalil_making_peace_is_a_marathon.html

[6] Giles-Corti, B., Broomhall, M. H., Knuiman, M., Collins, C., Douglas, K., Ng, K., Lange, A., & Donovan, R. J. (2005). Increasing walking: how important is distance to, attractiveness, and size of public open space?. *American journal of preventive medicine*, *28*(2), 169-176. http://dx.doi.org/10.1016/j.amepre.2004.10.018

[7] Halkosaari, H., Sarjakoski, L. T., Ylirisku, S., & Sarjakoski, T. (2013). Designing a Multichannel Map Service Concept. *Human Technology*, *9*(1), 72-91. Retrieved from http://www.humantechnology.jyu.fi

[8] Knaving, K., & Woźniak, P. (2013). The extra mile: Augmenting the experiences of runners and their supporters. *MIDI 2013 Conference*. Warsaw, Poland.

[9] Mueller, F., O'Brien, S., & Thorogood, A. (2007). Jogging over a distance: Supporting a "jogging together" experience although being apart. *Extended Abstracts on Human Factors in Computing Systems, 1989-1994.* doi:10.1145/1240866.1240937

[10] Nam, J., & Mueller, K. (2013). TripAdvisor N-D: A tourism-inspired high-dimensional space exploration framework with overview and detail. IEEE Transactions on Visualization and Computer Graphics, 19(2). doi:10.1109/TVCG.2012.65

[11] Otsuka, S., Matsuura, K., Gotoda, N., Tanaka, T., Kanenishi, K., Ogata, H., & Yano, Y. (2011). Designing the web-community for self-managed training of runners. *Knowledge-Based and Intelligent Information and Engineering Systems*, 520-528.

[12] Outside interactive released virtual runner app for the iPad. (2012). Retrieved from http://www.runningusa.org/outside-interactive-virtual-runner-app

[13] Rodríguez, B., Molina, J., Pérez, F., & Caballero, R. (2012). Interactive design of personalized tourism routes. *Tourism Management*, *33*, 926-940. doi:10.1016/j.tourman.2011.09.014

[14] Santhatam, A. (2013). Bike and running trails on android based on Google maps API (Master's thesis). San Diego State University, San Diego, California.

[15] Shipway, R., & Holloway, I. (2010). Running free: Embracing a healthy lifestyle through distance running. *Perspectives in Public Health*, *130*(6), 270-276. doi:10.1177/1757913910379191

[16] Shipway, R., Holloway, I., & Jones, I. (2012). Organizations, practices, actors, and events: Exploring inside the distance running social world. *International Review for the Sociology of Sport*, 43(3), 259-276. doi:10.1177/1012690212442135

[17] Ståhl, O., Gambäck, B., Hansen, P., Turunen, M., & Hakulinen, J. (October, 2008). A mobile fitness companion. Proceedings from *The Fourth International Workshop on Human-Computer Conversation*. Bellagio, Italy.

[18] Tallinucci, V., Zehrer, A., Pechlaner, H., & Frew, A. (2004). Using interactive maps as tourism information source–The case of DESTOUR. *Information and communication technologies in tourism,* 49-57. Cairo, Egypt.

[19] Thompson Coon, J., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M. H. (2011). Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A systematic review. *Environmental science & technology*, *45*(5), 1761-1772. http://dx.doi.org/10.1021/es102947t

[20] Trageser, C. (2012). Does Social Media Mean Better Running?. *Runner's World.* Retrieved from http://www.runnersworld.com/fun/does-social-media-mean-better-running

[21] Trevorrow, P. (2012). Technology running the world: The Nike+iPod kit and levels of physical activity. *Loisir et Société / Society and Leisure*, 35(1), 131-154. http://dx.doi.org/10.1080/07053436.2012.10707838