Quantifying the Self: Ultra Athletes Acceptance and Use of Activity Tracking Technologies to Enhance Sports Performance

Stephanie Day
Eastern Institute of Technology
sday@eit.ac.nz

Michael Verhaart
Supervisor
Eastern Institute of Technology
mverhaart@eit.ac.nz

ABSTRACT

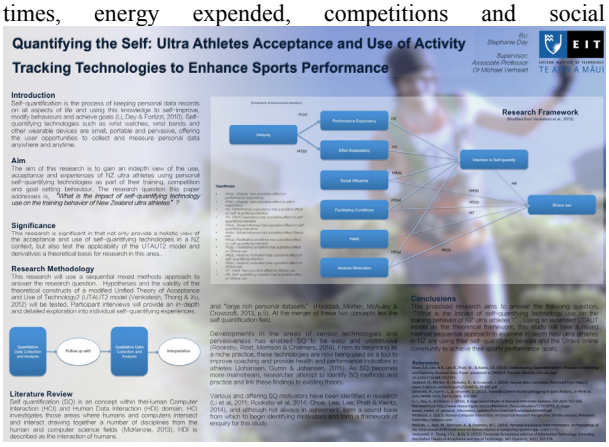
Self-quantification is the process of keeping personal data records on all aspects of life and using this knowledge to self-improve, modify behaviours and achieve goals. This applied research project proposes to investigate how self-quantification technologies impact on New Zealand ultra athletes as they track, analyse and share fitness goals within the online community Strava. The research question this paper addresses is, "What is the impact of self-quantifying technology use on the training behavior of NZ ultra athletes"? This research will take a sequential mixed methods approach to methodology. Survey analysis will test hypotheses consistent with a modified UTAUT2 model and additional participant interviews will provide a holistic view of the use and impact of self-quantifying technologies by the NZ ultra athletes. This research will extend previous research in pervasive technologies into the self-quantification field, provide a NZ context and strengthen the validity of UTAUT2 derivatives as explanatory frameworks of technology acceptance and use.

Keywords: self-tracking, self quantification, personal metrics, HCI, HDI, UTAUT

1. INTRODUCTION

Quantifying the self involves keeping quantitative data on aspects of daily life and using this in a qualitative manner to inform self-improvement, change behaviours and reach goals (Li, Dey & Forlizzi, 2010). The concept of self-quantification (or self-tracking) is not new, however the development of modern technologies such as sports watches and smartphones, now support this in an easy to manage, social and ubiquitous manner. As an area of study, the role these technologies play in motivating and supporting people to change behaviour for self-improvement is an emerging field.

This applied research project proposes to investigate the impact these technologies have on New Zealand ultra athletes as they track, analyse and share health and fitness goals within the online community Strava. Strava is a web based system that users can upload data to from their self-tracking device. Offering a variety of features, including planned routes, speed, times, energy expended, competitions and social networking, the Strava system is a popular service for those wishing to analyse their activity.



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Using a modified Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model (Venkatesh, Thong & Xu, 2012) as the theoretical framework, this research will investigate the use of self-quantifying technologies by NZ ultra athletes and the influence these have in informing behaviour with particular reference to the various identified motivators for personal tracking; achieving goals, documenting activities, diagnosing problems, registering achievements and using the technology because it is "cool" (Rooksby, Rost, Morrison & Chalmers, 2014) .

This research will take a mixed methods approach to methodology. Quantitative analysis will test hypotheses consistent with the UTAUT2 model and participant interviews will supplement this to answer the following question "What is the impact of self-quantifying technology use on the training behavior of NZ ultra athletes?" This research will not only test the applicability of the UTAUT2 model as a theoretical basis for research in this area, but will aim to provide a holistic view of the acceptance and use of self-quantifying technologies for goal setting and performance purposes within the NZ ultra athlete community. By expanding on previous research into pervasive technologies, this research will provide a NZ contextual reference and further strengthen the validity of the UTAUT2 model and its derivatives as an explanatory framework into technology acceptance and use.

2. LITERATURE REVIEW

Self quantification (SQ) is an concept within the Human Computer Interaction (HCI) and Human Data Interaction (HDI) domain. HCI investigates those areas where humans and computers intersect and interact and emerged in the 1980s, drawing together a number of disciplines from the human and computer science fields (McKenzie, 2013). HDI is described as the interaction of humans and"large rich personal datasets" (Haddadi, Mortier, McAuley & Crowcroft, 2013, p.5). At the

merger of these two concepts lies SQ, where people are analyzing their personal data to make informed decisions on their lives (Li, et al., 2010).

Recording data about oneself is not new, however developments in the areas of sensor technologies and pervasiveness have enabled SQ to be easy and unobtrusive (Rooksby, et al., 2014). From its beginning as a niche practice, these technologies are now being used as a tool to improve coaching and provide health and performance indicators in athletes (Johansen, Gurrin & Johansen, 2015). As SQ becomes mainstream, researchers attempt to identify SQ methods and practice and link these findings to existing theory or to inform the development of new theory.

Various and differing SQ motivators have been identified in research (Li et al, 2011; Rooksby et al, 2014; Choe, Lee, Lee, Pratt & Kientz, 2014), and although not always in agreement, form a sound base from which to begin identifying motivators and form a framework of enquiry for this study.

3. RESEARCH FRAMEWORK

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh, Morris, Davis and Davis (2003) and identifies factors influencing behavioural intention to accept and use of technology. Based on the extended UTAUT model and the work Salinas and Thiesse (2015), the proposed model for this research includes the integration of a pervasiveness related construct, ubiquity.

The hypotheses for this research are:

- H1(a). Ubiquity (U) has a positive effect on performance expectancy
- H1(b). Ubiquity (U) has a positive effect on effort expectancy
- H2. Performance expectancy (PE) has a positive effect on self-quantifying intention.
- H3. Effort Expectancy (EE) has a positive effect on self-quantifying intention
- H4(a). Social Influence (SI) has a positive effect on self-quantifying intentions
- H4(b). Social Influence (SI) has a positive effect Strava usage
- H5(a). Facilitating conditions (FC) has a positive effect on self-quantifying intention
- H5(b). Facilitating conditions (FC) has a positive effect on Strava use
- H6(a). Hedonic motivation (HM) has a positive effect on self-quantifying intention
- H6(b). Hedonic motivation (HM) has a positive effect on Strava use (SU)
- H7. Habit (HA) has a positive effect on Strava usage (SU)
- H8. Self-quantifying intention (SQI) has a positive effect on Strava usage (SU)

4. RESEARCH METHODS

This research will use a sequential mixed methods approach to answer the research question, "What is the impact of self-quantifying technology use on the training behavior of NZ ultra athletes"? In this research, the explanatory sequential approach requires quantitative data to be collected to test the theoretical constructs of the modified UTAUT2 model and then qualitative data to provide an in-depth and detailed exploration into individual experiences (Cresswell, 2009). This research will begin with the quantitative phase and obtain data using a survey designed around UTAUT2 constructs and relationships. The qualitative phase will consist of participant interviews.

5. LIMITATIONS

This research is limited by the small NZ based convenience sample size, the application of a modified and untested research model, self reporting of data by participants and the uniqueness of the data measures.

6. CONCLUSION

This proposed research aims to answer the following question, "What is the impact of self-quantifying technology use on the training behavior of NZ ultra athletes?". Using an extended UTAUT model as the theoretical framework, this study will take a mixed method sequential approach to examine in depth how ultra athletes in NZ are using their self-quantifying devices and the Strava online community to achieve their sports performance goals. Various hypotheses that link motivational constructs to technology acceptance and use will be tested for influence, and participants will be offered the opportunity to expand on their answers during an interview process. It is recommended that this proposed research be accepted as a valid area of study within the HCI and social informatics domain.

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