Methodologies used to explore the online support seeking behaviours, through Facebook, of Smartphone running app users

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Abstract:

Clearly defined methodologies employed during Facebook research projects is lacking. This is problematic with a continual rise in Facebook research studies being published. Transparent methodologies will enhance future protocols and help to shape research practices when using Facebook as a research tool. As Facebook appears to provide an environment that fosters social support when adopting healthier behaviours, understanding best practice evaluation approaches of the site will help shape public health research agendas. Resultantly this paper presents the methods applied in a qualitative analysis of online support seeking communications of a group of running app users, actively engaging in Facebook groups related to the app. Strengths and limitations of utilising Facebook for research are addressed and points for consideration prior to undertaking Facebook research are presented.

Introduction:

Since the emergence of physical activity (PA) Smartphone applications (apps) behaviour change in this realm is becoming increasingly individualised. While much is known about social support provision within formal health and PA interventions, far less is known about how free-living, self-monitoring individuals get through the sticking points on their behaviour change journey. As getting more people more active more often is a key public health (PH) agenda, understanding methods used to investigate experiences of PA interventions is important for shaping PH campaigns.

Online social networking sites (OSNS) such as Facebook have been documented as providing positive social ties (Wilson et al., 2012) and support as an intervention tool (Graham et al., 2011). However reported research methodologies utilising Facebook are lacking in clarity and standardisation making study replication and credibility difficult to determine (Wilson et al., 2012). In a bid to provide transparency, and a baseline methodology, this paper reports the techniques employed in exploring the online social interactions of Smartphone running app users who communicate via Facebook group pages dedicated to the particular app under evaluation. Specific

processes and techniques of data collection and analysis are presented alongside a reflective account of conducting research through Facebook.

Background Literature:

The risks of leading an inactive lifestyle are well documented (Trost et al., 2014; Bailey et al., 2013; DH, 2012). In a bid to reduce the risk of lifestyle related conditions individuals are embarking on the quest to increase PA levels. Participation in sufficient PA has the potential to reduce deaths related to coronary heart disease, stroke, and colon cancer whilst reducing the onset of osteoporosis and type 2 diabetes (Warburton, et al., 2007). Hectic daily life schedules mean engaging in regular PA can be a challenge with structured PA interventions, set exercise class timetables and qualified instruction being costly and difficult to commit to. To achieve successful health outcomes Fineberg (2012) emphasises that healthcare needs to be not only affordable to everyone, but also accessible and in presented in an acceptable format.

In recent years there has been a rise in the availability of 'free' PA Smartphone apps. In their most basic form apps are a computer program that operates through a mobile device such as a Smartphone or tablet computer. In a more sophisticated form apps are designed with specific outcomes in mind such as storing and playing music, garnering information about the weather, providing guidance on lifestyle and health as well as fostering communication between social networks. Resultantly PA apps hold the potential to alleviate the barriers of time constraints and affordable PA guidance as they are accessible at times which are convenient to the consumer owing to their personal and portable design (Pickering et al., 2014).

Running apps:

Smartphone running apps designed for those new to running, or returning to the sport after a significant break, typically follow established exercise protocols and guide users through an incremental programme of intermittent walking and running. As the weeks progress the running intervals increase and walking intervals decrease with the programme culminating in the user running continuously for a set time or distance. Accessing free PA guidance, such as through a running app, at a time and place of convenience has the potential to amplify the likelihood of adopting and maintaining long-term PA behaviours and routines. Social support is a key mediator for PA change (Marcus and Forsyth, 2009). Yet with technological interventions there appears to be lack of obvious social support than experienced in more traditional group and class based PA programmes. Social support is an important factor in successful behaviour change (Oinas-Kukkonen and Harjumaa, 2008).

Social Support and OSNS:

Social support is vital for individuals adopting healthier behaviours such as PA (Kumanyiak and Economos, 2011). Traditional face-to-face PA and health behaviour interventions typically provide social support within a group context allowing like-

minded peers to help each other through their behaviour change journey (Graham et al., 2011). PA and running apps tend to be used individually which reduces the likelihood of social interaction, support, and professional guidance typically conveyed in structured group interventions. In these situations social support and advice appears to be delivered via OSNS, blogs and email. The efficacy of this method in providing relevant and appropriate social support and counselling is unclear. Albeit the internet offers ease of access to worldwide supportive communities with relatively little to no restrictions (Yardley, 2011), in theory providing access to supportive networks 24 hours a day.

A recent systematic review exploring the effectiveness of OSNS revealed that 9 out of 10 studies reported improvements in at least one aspect of health behaviour (Maher et al., 2014). Social support is fundamental when striving for sustainable changes in healthful behaviours such as increasing PA (Oinas-Kukkonen and Harjumaa, 2008). Anytime access to OSNS through mobile devices such as Smartphones and tablets means that a high volume of social support is conveniently available. With peer comparison being a motivator in adopting healthier behaviours such as PA, those most in need of support can also satisfy this behaviour change technique through OSNS (Danaher et al., 2006; Kerr et al., 2006) such as Facebook. However the lasting outcomes of online social support, leading to the long-term maintenance of improved PA behaviours is unknown (Maher et al., 2014). Therefore understanding the role that OSNS play in PA behaviour modification and management has the potential to shape policy and practice for the future design of technology based PA and health interventions (Pickering et al., 2014).

Social Support and Facebook:

Facebook is one example of an OSNS and the most popular with 71% of online adults being worldwide consumers (Pew Research, 2014). In 2010 the Pew Research Center investigated the social impact of technology illustrating that internet users get more from social ties with Facebook clientele gaining the most support overall (Pew Research, 2011). Wilson et al (2012) conducted a review of Facebook research in social science. They identified 412 articles related to Facebook engagement grouped into five categories: descriptive analysis of users, motivations for using Facebook, identity presentation, the role of Facebook in social interactions, and privacy and information disclosure. Highlighting the breadth of Facebook related research being conducted the authors recommend careful consideration of relevant methodologies to address specific research questions, gather data and recruit participants in a suitable way. As uncertainty still exists about the most effective way to conduct Facebook research studies Wilson et al (2012) ascertain much is still to be done in Facebook research in all fields of study.

Mahan et al (2014) explored the impact of OSNS use on running behaviours via an online survey. Of 2463 participants who actively used social media at the time of research, 61.3% accessed Facebook for running content and socialising purposes

related to running. Regression analysis of findings indicate that online social interactions, through platforms such as Facebook, could be influential in increasing positive behavioural running outcomes encouraging more running. The authors postulate that the wealth of information available through SNS to runners, which includes training tips and sharing of experiences means this mode of support is potentially fundamental in increasing running and PA engagement in a more technologically advanced era. These results show promising insight into the mediating effects of SNS on running behaviours and PA engagement.

Although a large sample population Mahan et al's (2014) work cannot be generalised to runners of all levels and abilities, nor does it explain what communication and interactions ensue within the online running community. Findings from this study provide intriguing insight into the relationship that active use of OSNS have with active running behaviours. The results of this study are in line with other similar studies who posit OSNS use can improve behavioural participation in activities based on common interests (Kaplan and Haenlein, 2010; Pfeil, et al., 2009; Valenzuela et al., 2009). Mahan et al (2014) also state the potential of online social support in PA is unknown and further research required.

While the strength of existing Facebook research lies in its exploration of the motivations for engagement it is limited by several factors. Firstly, to the author's knowledge no research addresses the naturally occurring interactions of organically developed Facebook running groups. Much research exists around the creation of Facebook groups by health professionals' often incentivising participation (Cavallo et al., 2012). Secondly, there is a lack of research exploring how individuals who self-seek online social support via Facebook interact with peers, or their motivations for doing so. Thirdly, the lack of clarity in methodological approaches used during Facebook research studies has a limiting effect on the generalizability of findings. To explore these interactions qualitative approaches will provide clearer understanding of the electronic relationships that could provide policy and practice makers guidance on what leads to effective practice in health intervention strategies through an online forum.

The aims of this paper were therefore to clearly and accurately present the methods and techniques applied during a study which analysed the interactions of a group of running app users. The research aims of the study which took place were firstly to examine the social interactions between the running app users via Facebook, and secondly to determine if social support is offered during the PA behaviour change process. Data capture, collation and the analysis undertaken are detailed along with supporting rationale and researcher reflections.

Methods:

Methodologies presented in previous Facebook research papers tend to use a quantifiable approach in an attempt to present more robust findings. However these

approaches are not enlightening for the development of online social support groups and assisting PH agendas in the modern day technological world. Guest et al (2012) emphasize the data collection and analysis procedures used are paramount in meticulous qualitative research practices. A qualitative approach allows for experiential and narrative analysis from the participant's viewpoints (Braun and Clark, 2006). Data from this approach will provide a more comprehensive understanding of the nuances that individuals want from an OSNS during the behaviour change process. The methods presented here provide detail of how this study analysed the organic interactions of Facebook users in running group forums. Previous research has only looked at the purposefully created Facebook groups for research objectives (Cavallo et al., 2012).

Study participants:

Following research ethics clearance from Leeds Beckett University (formerly Leeds Metropolitan University), a convenience sample of 501 participants (females n= 419, 83.6%; males n=82, 16.4%), who are members of, and actively engaged in online communication in three public Facebook groups, took part in this research. As Facebook is the most used worldwide OSNS (PewResearch, 2014) it was selected as the most appropriate site to use.

In order to become a member of a Facebook group page each group page advert has a visible "Like" link which once selected provides access to the full page. Group membership is denoted by electronically "Liking" a page in this way. Once individuals become members of a Facebook group they do not have to contribute comments. Those who do are considered active members while those who do not are branded browsers (Song et al., 2004). Resultantly participant numbers represent 0.2% of 329,763 of the running app Facebook group members at the time of data extraction from the groups included for analysis.

Although a certain amount of data is freely accessible in the public domain through Facebook, when conducting internet based research it is important that researchers respect anonymity as it is unethical to access personal Facebook accounts for research purposes without permission (Zimmer, 2010). Understanding the issues of anonymity and as data were gathered from public common interest groups, it was deemed unethical by the research team to enter participant's personal Facebook pages to glean demographic profiles.

Demographics:

Gender was self-reported in participants' Facebook account profile name. Participant's public Facebook names were checked and cross referenced to ensure they were only recorded once. When this was satisfied all data were anonymised and participants simply categorised as either male or female.

Active members of each group were included in this research if they posted a public statement (any form of text written on the Facebook group home web page that can be viewed by members and non-members of the group) related to their use and experience of the running app on the group wall during the data collection period. A Facebook group wall refers to the visible layout of the group's interactions on a computer, tablet or Smartphone screen. Group members who did not upload a public post were not included in the research.

Data Collection:

In line with the aim of the study to explore social interactions between Facebook group members who commonly use the same running app, comments, conversation streams and general text were collected from each selected Facebook group over a 12 month period spanning January 1st-December 31st. To be collated for analysis all posted text and subsequent comments added by group members had to be related to the experience of engagement with the running app. Any information or other communications that were not associated with use of the running app were excluded from analysis. Exclusion also extended to advertisements made by running event organisers, product advertisement and Facebook group administrator comments. This left 1685 publicly posted statements for analysis contributed by the 501 study participants. Responses reflected advice seeking and giving communications, support lending, and personal running progression announcements. Data were organised and stored as password protected Word files in the formation they took as Facebook wall posts to allow for ease of communication patterns to be studied.

Data Preparation:

A data driven approach was undertaken in preparation for analysis. Analysing and preparing data through a data driven inductive approach allows the data to guide the themes rather than the researcher, presenting a truer reflection of the situation (Braun and Clark, 2006). Data were studied three times in preparation for analysis to ensure the researcher had a clear understanding of the variances between types of responses. This involved the researcher reading each data set on separate occasions to identify the types of communications that were occurring between the group members. Notes were made on key concepts and ideas at each reading in line with recommendations by Guest et al (2012). Familiarity with the data and communications between participants presents a truer reflection of what the data reveals.

Once data were reduced and a general insight attained, axial coding ensued. Codes and themes of communication patterns, categories of statements and other interactions were identified. Sixteen areas of exploration were initially found inductively. Areas of similar meaning were grouped together into eight codes. Reducing data into manageable chunks for analysis is advisable especially with large data sets (Guest et al., 2012). Strict analysis criteria increases quality assurances serving as a means of study reliability, competence, and validity (Zitomer and

Goodwin, 2014) therefore a highly detailed coding manual with strict inclusion and exclusion criteria was then generated to clarify which statements to categorise into each code (Guest et al., 2012). The coding manual allowed for innate inductive comprehension of the data and is explicitly clear for use in future research of a similar nature.

Data Analysis:

Once all data were coded content analysis took place to quantify identified themes. Content analysis of qualitative data allows researchers to explore and generate themes that emerge from the data. Shenton (2004) postulates this is imperative to demonstrate that findings transpire from the data itself and not the researcher's own interpretations. In this particular research project it was necessary to investigate thematic patterns and responses in this way. This approach can be time consuming as the researcher must read the data several times to identify key words, trends and ideas before analysis takes place (Guest et al, 2012). Content analysis enabled comparison of data related to gender by calculating the frequency of themes. Frequency calculations assist in identification of commonly occurring indices within the data set directing the researcher to recognise emergent trends. Presenting frequency data also allows the reader to understand the specificity of the results to the sample population and not misconstrue results as generalizable to a wider population (Guest et al, 2012).

Discussion:

With a plethora of data collection and analysis techniques available to qualitative researchers, systematic processes should be clearly documented to ensure credible and reliable results are attained (Guest et al, 2012). The sharing of methods through publications will assist the research community in improving method and result comparisons (Ruths and Pfeffer, 2014). Shenton (2004) states researchers should strive to enable future scholars to replicate the study. Without clarity in methodologies this is unachievable. Detailed descriptions of the process undertaken should be transparent to address dependability issues (Shenton, 2004). This paper therefore presents the methodological process applied as part of a study to establish the online social interactions of an organically developed support community for users of a Smartphone running app.

To the author's knowledge this is the first study of its kind to not only analyse Facebook groups in this way, but to also outline each methodological process and analysis technique undertaken. Other studies utilising Facebook as a research tool have looked at user motivation, friendship groups and social connections. Key results from the study presented in this paper show that support giving, along with advice seeking interactions were most commonly occurring themes. In providing a detailed account of the data collection and analysis techniques used to determine these key findings

will lead to a more standardised approach to research utilising OSNS (Wilson et al., 2012).

Ethical Considerations in Facebook Research:

Using OSNS, and especially Facebook can lead to unintended breach of ethics with sample populations and even individual participants being identified (Zimmer, 2010). This was previously an unintentional outcome by the T3 research project in 2008 (Lewis et al., 2008). In a bid to preserve anonymity and confidentiality of the participants, yet provide sufficient population group information the sample group became identifiable within 24 hours of the research being disseminated (Zimmer, 2010). In order to compensate for the potential of this to happen in this study modest amounts of classifying information has been presented. For instance the year that the data was collected has been purposely omitted as this would narrow down the potential group of participants and could lead to them being identified. The specific names of the Facebook pages analysed has also been excluded for the same reasons, along with concealment of the identity of the running app used. It is also a recommendation by the researcher that this be taken into account when planning data collection and dissemination of findings in future research.

Demographic profiles have not been harvested in this research study. Information relating to age, ethnicity, educational and employment status, marital status, place or country of birth in this instance is classified as secondary data as it is held within the personal Facebook profiles of the participants. Within Smith et al's (1996) framework on privacy the illicit use of secondary personal data is deemed a breach of privacy. By avoiding the collection of this information strengthens the anonymity of the participants. Personal information privacy has been a concern since the early 1990's as the information era began to take full force (refs). It is therefore imperative that online researchers employ the utmost respect for online data and protect their participants in all possible avenues. As outlined by Smith et al (1996) personal data should only be accessed on a "need to know" basis. Unauthorised use of personal data in this context could be seen as improper access as the study did not have an essential requirement for this data.

For this research informed consent could not be given by participants in the same way as in traditional research practices as this would have diluted the quality of the natural interactions of the groups. It is subsequently important to ensure any Facebook, and social networking site data is unambiguously publicly attainable. Hence all intentions for use of data need to be clearly outlined in ethical applications prior to undertaking any data collection and specification of what types of information will be taken. In this study it was indicated that only information and posts that explicitly discuss the running app program and user experiences of the app would be collated. Any conversations that became personal in nature would not even be taken from the site. Only data pertinent to the research question should be collected (Son and Kim, 2008).

Methodological Challenges:

As much investigation is still necessary to gain innate perspective on the extent that Facebook and OSNS influence and encourage running and PA behaviours, a qualitative approach to this type of research employing rigorous methodologies was necessary. The lack of clearly outlined methodological approaches in Facebook research papers led to data analysis techniques being adopted from qualitative research methodology texts (Braun and Clark, 2014; Guest et al., 2012; Braun and Clark, 2006). Gauging what was effective practice in this instance was difficult with there being no other studies of the same nature to corroborate with.

Data was procured from each Facebook group as it appeared on screen. It was copied and pasted into a Word file and saved in the format it appeared as would be seen on the Facebook group. It was decided to store the data in this way rather than capture the data and generate a transcript as would be normal practice in similar research studies. The researcher felt that altering the format of the data would compromise its natural flow. Maintaining the spontaneity of the data also allows for each thread of conversation to be kept together increasing data integrity. Assembling data in this way was a quick and easy format to gain a large data set, however the analysis procedures are lengthy and researchers should be aware of this.

Methodological Strengths:

Internet research methods are cost effective and allow access to worldwide populations, thus enhancing the scope of the research and quality of data collected (Ahern, 2005). Online social research can be deemed an easy option for quick yet based data capture (Ruths and Pfeffer, 2014) with large participant numbers and data sets leading to rushed analysis and languid methods of enquiry. Consequently it is essential that the methodologies and analysis techniques applied are of utmost integrity and precision in order to withstand intense scrutiny. Ruths and Pfeffer (2014) affirm the sharing of methodologies in this type of research will improve method and results comparison issues that currently exist alleviating the documented limitations associated with this type of research.

Guest et al (2012) suggest strategies to improve reliability of coding between researchers should be implemented prior to commencement of data analysis. Incorporating category benchmarks and principles of analysis techniques to be adhered to, alongside identifying how to interpret data under various conditions, eliminates mis-interpretation of the data by peripheral analysts. For this particular project there was one analyst and no pressing time constraints for results. This therefore meant that the data could be, and was revisited several times fostering examination of fresh ideas at each visit. Having a singular analyst reduced the risk of mis- understanding that can often occur with multiple analysts (Namey et al, 2008). However the creation of the detailed coding manual addresses grey areas for others who may need to re-analyse the same data set. Inter-coder agreement in thematic

analysis is vital to maintain rigor of data analysis (Guest et al., 2012). The coding manual was also used to clarify themes with the research supervisory team when data were ambiguous.

Qualitative research often increases the likelihood of participants providing responses and information that they feel the researcher wants to hear. Including pre-existing Facebook groups in the analysis reduces the chance of participants adding comments to the group that they feel would enhance the research. This approach fosters a more natural insight into the online interactions of the app users without creating researcher bias (Wilson et al., 2012).

Limitations and Reflections:

As with any research study there are limiting factors in the research design and/or methodology. One limitation of conducting research with existing Facebook groups is that communication between the researcher and participants doesn't subsist. This means that participant member checking and clarification of data meaning cannot take place. Text talk, slang words and a community group's own terminologies can be misinterpreted. Code books therefore need to be extremely clear for secondary analysis by other researchers can clarify unclear content. Becoming immersed in the data and re-reading transcripts as many times as is necessary helps reduce misconception of data during analysis. Analysing large data sets in this way is extremely time consuming. Code books require generation and editing before becoming actively usable. Thus planning for this prior to commencing the research is necessary.

Although it is possible to collect data from large sample populations using Facebook, findings cannot and should not be generalised to a whole population. This is amplified with the percentage of participants this study had the potential to include. If all members of each Facebook group were recruited this still would not be representative of the whole population as it does not include those app users who do not access Facebook. The sample population of this study reiterate this point well. Whilst there was 329,763 members of the Facebook groups, only 501 members were part of the study. Not having contact with the participants and wider population group limits the research in that the researchers cannot investigate what benefit the 'watching' population gains from being group members. It may be that these individuals gain just as much support and advice form just reading what others discuss and do not feel the need to engage. The overall sample population may also be highly overestimated as an individual may be a member of multiple groups. Unless creating a page specifically for research purposes this cannot be determined.

Accurate documentation of every data collection point is vital in order to capture all relevant material when using Facebook for research. Each time access of the relevant Facebook pages is accessed the exact time and date must to be recorded to ensure no data is lost. Time and date is usually visible next to each group member's new

comment. With many posts being uploaded at any one time it is impossible to observe real-time interactions and relationship formation. Researchers would need to remain logged onto the site and continuously monitor all communications. This means data collection will almost certainly be collected retrospectively regardless of research design and question. The generation of, and regularly updated data collection databases will assist in organising each collection period so that data is not unintentionally missed.

Future Directions:

Future research methodologies should be clearly documented as much as is possible to allow researchers to cross reference approaches of similar nature. Within in the context of exploring online social support groups interactions, each conversation stream could be analysed to explore relationships which may have formed (i.e. with peers who seem to prefer each other's support more, or interact more often than with other group members). Tracking conversation streams or particular group member interactions over time could reveal insights into long term peer support giving and receiving. Researchers could approach group members individually and gain informed consent to use and access demographic data or to member check. Approaches to address future research should be distinctly outlined for ease of cross referencing between researchers.

Conclusions:

It is clear that there is much planning to be undertaken prior to embarking on research utilising Facebook, and other similar OSNS. This paper aimed to provide a complete guide to the methods used in one particular study that explored how a small subsample of a running app community communicate and support each other via Facebook. It was a difficult process deciding the best approach to take in this research as there is very little literature available analysing natural online common interest networks. This paper responds to outcries from other researchers for clear methods to be presented (refs). Future research should explore best practice approaches when using Facebook for research purposes, and the various ways and types of research questions that may be posed. Ethical guidance documentation, especially outlining privacy issues in data collection in internet and OSNS research practices should be generated.

References

- Ahern, N.R. (2005). Using the internet to conduct research. *Nurse Researcher.* **13**(2), 55-70.
- Bailey, R., Hillman, C., Arent, S. and Petitpas, A. (2013). Physical Activity: An Underestimated Investment in Human Capital? *Journal of Physical Activity and Health,***10**, 289-308.
- Braun, V. and Clark, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology.* **3**,77-101.
- Braun, V. and Clark, V. (2014). What can "thematic analysis" offer health and wellbeing researchers? Guest Editorial. *International Journal of Qualitative Studies in Health and Wellbeing,* **9**, 1-2.
- Cavallo, D.N., Tate, D.F., Ries, A.V., Brown, J.D., DeVellis, R.F. and Ammerman, A.S. (2012). A Social Media-Based Physical Activity Intervention: A Randomized Control Trial. *American Journal of Preventative Medicine,* **43**(5). 527-532.
- Danaher, B., Boles, S.M., Akers, L., Gordon, J.S., Severson, H.H. (2006). Defining participant exposure measures in Web-based health behavior change programs. *Journal of Medical Internet Research,* **8,** e15.
- Department of Health. (2012). Annual Report of the Chief Medical Officer, Surveillance Volume 2012: On the State of the Public's Health. London:UK.
- Fineberg, H.V. (2012). A successful and sustainable health system – how to get there from here. *The New England Journal of Medicine.* **366**(11), 1020-1027.
- Graham, A., Papandonatos, G.D., Kang, H., Moreno, J.L. and Abrams, D.B. (2011). Development and Validation of the Online Social Support for Smokers Scale. *Journal of Medical Internet Research,* **13**(3), e69
- Guest, G., MacQueen,K.M. and Namey, E.E. (2012). Applied Thematic Analysis. Sage Publications:USA.
- Kaplan, A.M. and Haenlein, M. (2010). Users of the world unite! The challenges and opportunities of social media. *Business Horizons,* **53,** 59-68.
- Kerr, C., Murray, E., Stevenson, F., Gore, C., Nazareth, I. (2006). Internet interventions for long-term conditions: patient and caregiver quality criteria. *Journal of Medical Internet research,* **8**, e13.
- Kumanyika, S., Economos, C. (2011). Prevention of obesity: Finding the best evidence. *World Nutrition.* **2**(3), 283-299.
- Lewis, K., Kaufman, J., Gonzalez, M., Wimmer, A. and Christakis, N. (2008). Tastes, Ties, and Time: A new social network dataset using Facebook.com. *Social Networks,* **30(**4), 330-342.
- Mahan III, J.E., Seo, W.J., Jprdan, J.S. and Funk, D. (2014). Exploring the impact of social networking sites on running involvement, running behaviour, and social life satisfaction. *Sport Management Review,* http://dx.doi.org/10.1016/j.smr.2014.02.006
- Maher, C.A., Lewis, L.K., Ferrar, K. Marshall, S., De Bourdeaudhuij, I. and Vandelnotte, C. (2014). Are Health Behavior Change Interventions That Use Online Social Networks Effective? A Systematic Review. Journal of Medical Internet Research. **16(**2):e40)
- Marcus, B.H. and Forsyth, L. (2009).Motivating People to Be Physically Active-2nd Edition**.** Human Kinetics: USA.

- Namey, E., Guest, G., Thairu, L. and Johnson, L. (2008). Data Reduction Techniques for Large Qualitative Data Sets. *Handbook for Team-Based Qualitative Research: Edited by Guest, G. and MacQueen, K.M.* AltaMira Press: USA.
- Oinas-Kukkonen, H.,Harjumaa, M. (2008). A systematic framework for designing and evaluating persuasive systems. In: Persuasive Technology. pp. 164-176. Springer, Heidelberg.
- Pew Research Center. (2011). Technology and Social Networks. http://www.pewinternet.org/Reports/2011/Technology-and-social-networks.aspx.
- Pew Research Center. (2014). Internet Project January Omnibus Survey, January 23-26. *Social Networking Fact Sheet.* http://www.pewinternet.org/fact-sheets/social-networking-fact-sheet/
- Pfeil, U., Arjan, R. and Zaphiris, P. (2009). Age differences in online social networking – A study of user profiles and the social capital divide
- ong teenagers and older users in MySpace. *Computers in Human Behavior,* **25**, 643-654
- Pickering, K., Pringle, A. and McKenna, J. (2014).The Internet, Apps and Physical Activity: A Faceless Approach to Behavior Change. In Conference proceedings Persuasive Technology 9. Springer, Heidelberg.
- Ruths. D. and Pfeffer, J. (2014). Social media for large studies of behaviour. *Science.* **346** (6213). 1063-1064.
- Trost, S.G., Blair, S.N. and Khan, K.M. (2014). Physical inactivity remains the greatest public health problem of the 21st century: evidence, improved methods and solutions using the '7 investments that work' as a framework. *British Journal of Sports Medicine,* **48**(3), 169-170.
- Shenton A.K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information,* **22**. 63-75.
- Smith, J.H., Milberg, S.J. and Burke, S.J. (1996). Information Privacy: Measuring Individuals' Concerns About Organizational Practices. *MIS Quarterly.* June. 167-196.
- Son. J.Y. and Kim, S.S. (2008). Internet users' information privacy-protective responses: a taxonomy and a nomological model. *MIS Quarterly,* **32**(3). 503-52
- Song, I., Larose, R., Eastin, M.S. and Lin, C.A. (2004). Internet Gratifications and Internet Addiction: On the Uses and Abuses of New Media. *CyberPsychology and Behavior,* **7** (4), 384-394.
- Valenzuela, S., Park, N. and Kee, K.F. (2009). Is there social capital in a social network site? Facebook use and college students' life satisfaction, trust, and participation. *Journal of Computer-Mediated Communication,* **14**, 875-901.
- Warburton, D.E., Katzmarzyk, P.T., Rhodes, R.E. and Shephard, R.J. (2007). Evidence-informed physical activity guidelines for Canadian adults. *Canadian Journal of Public Health,* **98** (2). 16-68.
- Wilson, R.E., Gosling, S.D. and Graham, L.T. (2012). A review of Facebook research in the Social Sciences. *Persectives on Psychological Science.* 7(3). http://pps.sagepub.com/DOI:10.1177/1745691612442904
- Yardley, L. (2011). The potential of internet-delivered behavior change interventions. *European Health Psychologist.* **13**(3), 40-43.

- Zimmer, M. (2010). "But the data is already public": on the ethics of research in Facebook. *Ethics of Information Technology,* **12**. 313-325.
- Zitomer, M.R. and Goodwin, D. (2014). Gauging the Quality of Qualitative Research in Adapted Physical Activity. *Adapted Physical Activity Quarterly,* **31**. 193-218.