

# THE PERCEIVED EFFECTIVENESS OF E-HEALTH, SELF-EFFICACY AND INTENTION OF PARTICIPATING IN PHYSICAL ACTIVITY AMONG COLLEGE STUDENTS IN TAIWAN

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## ABSTRACT

*Background: This study sought to provide a snapshot of current college students' self-evaluation of e-health effectiveness as a mean to encourage their participation in physical activity (PA) while exploring its relationships with the proven personal psychosocial factors of self-efficacy and behavioral intention of PA. Objective: In this study, we examined the relationships of perceived effectiveness of e-health, PA self-efficacy and intention of participating in PA among college students in Taiwan. Methods: A structured questionnaire survey was conducted in 2014 using a convenience sample of 624 study participants from one Taiwanese university where an Internet-based e-health system was introduced in 2012. All research measures were developed with reference to what was included in similar past studies and verified to be reliable. Descriptive statistics, chi-square analysis, t-test, and Pearson product-moment correlation were performed for analysis. Results: Results revealed the positive e-health effectiveness was perceived by college students of the current study. Findings also showed the significant correlations ( $p < .01$ ) found in college students' perceived effectiveness of e-health, PA self-efficacy and intention of participating in PA. Conclusions: The e-health as part of PA intervention for college students was found to be effective based on their subjective perception. The need assessment specifically on college students with PA habit of exercising regularly and higher behavioral intention of PA should be considered in further improving the e-health to become a better adaptive system.*

**Keywords:** *E-health effectiveness, Physical activity, Self-efficacy, Intention, College student*

## 1. INTRODUCTION

The term 'E-health' has been defined as a range of information and communication technologies, including Internet or computer-based technologies, telemedicine, electronic health records, videoconferencing, that help to provide or improve healthcare. Evidence of the effectiveness of Internet-based e-health, particularly self-monitoring features in relation to health behavioral changes exists [1-3]. Review of studies relevant to ehealth has confirmed beneficial effects technology on various groups, such as physical activity (PA) level, fitness, weight loss and maintenance, and other health risks, etc. [4-7].

Healthy habits established younger are more likely to persist throughout adulthood [8-9].

Unfortunately, college students nowadays are reported to become less involved in PA and spending more time online[10]. Given that students are familiar with the technology, there is a potential to apply e-health on them to promote PA among them. On the other hand, social cognitive theory [11] has shown that self-efficacy plays a key role in motivating oneself infor behavioral change including the engagement of regular PA participation[9,12]. The understanding of college students' view on e-health associated with PA participation as well as their self-efficacy is crucial before applying ehealth to them. This study investigates their perceptions regarding e-health effectiveness, self-efficacy and intention of participating PA.

## 2. METHODS

To gain insights on the PA habit, self-efficacy and behavioral intention of PA, and e-health effectiveness perception of today's college students, a structured questionnaire was distributed among undergraduate students from one Taiwanese university. In this university, a students' e-health system has been introduced since 2012, and all students enrolled in this study are those with experiences with such e-health system. Mainly, this Internet-based health system provides students with their PA records for self-monitoring, including exercise frequency, intensity and time, calories burned calculator, and so on. To measure students' PA habit as to regular PA engagement, we employed 2 questions similar to what was used by [13]. Students' self-efficacy of PA was assessed using 5 items developed upon [11] guide, which concern their confidence to become physically active or exercise on a regular basis to generate an aggregated score; the survey also explored students' behavioral intention of engaging PA. Perceived e-health effectiveness was assessed using three-item subjective measurement in relation to the benefits of e-health system to the "increase in my motivation of PA participation, contribution to goal setting of PA, and aid to maintain habits or improve behaviors of PA." All measures except the PA habit asked students to indicate their agreement with survey items on a scale from 1 (=strongly disagree) to 5 (=strongly agree) in which higher score indicated better self-efficacy, and more positive behavioral intention of engaging PA and perception of e-health effectiveness. All scales had achieved a Cronbach's  $\alpha$  over .80. The study and its design had been submitted to and approved by the university's ethical review board concerned. Students provided informed consent and permission to participate in this study, and then completed a questionnaire for data collection. This survey was answered by 624 students after a pretest in March, 2014. To analyze data, we used Statistical Package for the Social Sciences (SPSS, version 20.0, IBM, Inc.) and set the level of significance a priori at  $p < .05$ . The descriptive statistics were utilized to compute all demographic and research variables, and we used chi-square analysis, t-test and Pearson product-moment correlation to analyze and determine the relationships among the variables of PA habit, self-efficacy and behavioral intention of PA, and e-health effectiveness perception.

## 3. RESULTS

Most study participants (83.3%) were 18-19 years old, and the rest ranged between ages of 20 and 23. The sample was predominantly freshman with a mean age of 18.8 years ( $SD=.89$ ). About two-thirds of participants were female (62.5%), while 63.1% of surveyed students do not exercise regularly in terms of the PA habit. The data extracted from this questionnaire pointed out that today's college students in Taiwan remain a lack of habitual PA participation. Also we found significantly higher proportion (68.4%) of female college students have the PA habit of being not exercising regularly compared with the male by chi-square analysis ( $\chi^2=15.28$ ,  $p=.000$ ) As to participants' subjective evaluation of self-efficacy and behavioral intention of PA and e-health effectiveness, responses indicated higher positive mean self-efficacy scores ( $M=4.18$ ,  $SD=.62$ ) in contrast with the perceived e-health effectiveness ( $M=3.54$ ,  $SD=.93$ ) and behavioral intention ( $M=3.11$ ,  $SD=.64$ ). A comparison of gender and PA habit differences in these above-mentioned variables was conducted, and the t-test results showed male students have significantly higher positive behavioral intention of PA ( $M=3.21$ ,  $SD=.64$ ,  $t=3.01$ ,  $p=.003$ ), and those with PA habit of exercising regularly also demonstrate significantly higher mean scores of positive self-efficacy ( $M=4.31$ ,  $SD=.61$ ,  $t=-4.06$ ,  $p=.000$ ) and behavioral intention of PA ( $M=3.40$ ,  $SD=.56$ ,  $t=-9.24$ ,  $p=.000$ ). At the same time, t-test analyses revealed no significant differences of gender and PA habit in college students' perception of e-health effectiveness. Correlations between PA habit and behavioral intention of PA revealed different relationships for male and female students (Table 1). For male students, PA habit of exercising regularly was positively related with behavioral intention of PA ( $p<.01$ ). We also found significant positive relationships among PA habit, self-efficacy and behavioral intention of PA, and perceived e-health effectiveness. Correlations of these variables revealed that the higher self-efficacy ( $\gamma=.32$ ,  $p=.000$ ) and behavioral intention ( $\gamma=.32$ ,  $p=.000$ ) of PA college students have, the more effective they perceive the e-health system in use. In addition, it was confirmed a significant relationship between PA habit of exercising regularly and perception of e-health effectiveness ( $\gamma=.15$ ,  $p=.000$ ). In general, PA habit, self-efficacy and behavioral intention of PA were found significantly related with each other, with stronger correlations between the measures representing higher degree and confidence of engaging regular exercises.

#### 4. DISCUSSION AND CONCLUSIONS

This study confirmed that college students in Taiwan have moderately positive perception about effectiveness of the Internet-based e-health system in use as to PA participation. The finding once again underscored the effectiveness of Internet-based self-monitoring e-health as revealed in studies by [1,3]. Data also concluded participants have much confidence in themselves to overcome barriers to PA in terms of self-efficacy which was found in relation to their perception of e-health effectiveness. The e-health has the potential to provide basic health and PA information for college students, particularly the incoming freshmen. For improving PA participation and in turn cultivating PA habit, it is likely to support college students to plan and set goals for PA or fit exercise into their daily schedules, etc. with the aid of e-health. Results further reported a significant association between their perceived e-health effectiveness and behavioral intention of PA. Therefore, Internet delivery of personal health and PA related information, when considered effective to college students can provide an actor- or user-centered context with self-monitoring opportunities, which also contributes to promoting their intention of engaging PA. Although e-health of varied kinds offer promise to support behavior changes in increasing PA participation as evidenced in past studies[6,7,10], study findings suggested that there is much more to learn about what most needed contents are to successfully and substantially facilitate behavior changes of college students' PA participation using this e-health system. Likewise, there were significant relationships observed for recommending further research to aim at college students with PA habit of exercising regularly and higher behavioral intention of PA to assess e-health contents necessary for customizing it to become better adaptive to students or users' needs. This study provided valuable information including verified e-health effectiveness and its interactions with varied PA measures about a large number of Taiwanese college students but there are some limitations. A major limitation of current study is the use of a convenience sample of students coming from one university in Taiwan, which limits the representativeness of the data to the general Taiwanese college student population. The limitation also includes the subjective assessment of study variables. Despite these limitations, this study suggests a need to promote PA participation levels in Taiwanese college students by all means. The outcomes of analyzing perceived e-health

effectiveness suggest that for the college students with higher PA self-efficacy than behavioral intention of PA as those participants of this study, continuous improvement in e-health to better meet their needs of self-regulation or self-management can contribute to increased PA participation.

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Table 1 Correlation matrix of study variables

Variable	1	2	3	4	5
1. Gender	1	-.22**	-.07	-.12**	.05
2. PA habit		1	.26**	.54**	.15**
3. Self-efficacy of PA			1	.40**	.32**
4. Behavioral intention of PA				1	.32**
5. Perceived e-health effectiveness					1

Note. Each column represents a row variable with corresponding number in left-hand column.

\*\* $p < .01$ .