香港浸會大學
HONG KONG BAPTIST UNIVERSITY

HKBU
Scholars

DOCTORAL THESIS

eHealth Literacy and Physical Activity in Chinese College Students: Scale
Development and Model Testing
LIU, Huaxuan

Date of Award:
2022

[Link to publication](#)

ABSTRACT

Introduction

The dramatic development of information technology has gone through three generations, including Web 1.0 – the read-only web, Web 2.0 – the participative social web, and Web 3.0 – a reading-writing-executing web. The Web 3.0, which is what we are experiencing, is leading to profound transformations in eHealth service, substantially orienting the innovations in the way that people interact with eHealth. A more diverse range of eHealth skills is subsequently required to properly use nowadays health facilities. The mixture of those skills was named as eHealth literacy (EHL). Yet, there is insufficient knowledge in nowadays eHealth usage or EHL. Existing EHL measurements are also seldomly focused on eHealth skills required by Web 2.0 and 3.0. Meanwhile, although eHealth literacy (EHL) was raised on the ground of health literacy (HL), few empirical studies were found to explore the association and differentiation between them. In addition, physical activity (PA) was identified as an important health outcome of HL. It was also reported that young adults were among the most frequently users of fitness Apps, which link EHL closely to PA. Yet, few studies about HL or EHL in conjunction with PA has been conducted. Based on the gaps mentioned above, three research questions were raised, which are: In Web 3.0 context, what is the content of EHL? How to measure it? How does it work on individual's PA? The current project is designed to conduct three studies among Chinese college students. Study 1 aimed to identify their eHealth usage and correspondingly required abilities, Study 2 aimed to develop and validate a tool eHLS-Web 3.0 to measure nowadays EHL, and Study 3 aimed to test a model exploring the relationship between EHL, HL and PA.

Methods

Eighteen Chinese college students (50%female, age = 22.1 ± 1.02 years) were deliberately selected in Study 1 for in-depth interviews. Interviewees included three males and three females of each sex from sports (SP), medical (MD), and non-health-

related (NH) majors. Conventional content analysis was applied for data analysis. Based on the results of Study 1 and previous literature, items were generated in Study 2 and the content validity were checked by ten college students (70%female, age = 20.3 ± 0.95 years) and eight experts (87.5%female, age =38.25 ± 5.92 years). Data from 393 college students (51.4%female, age =20.5 ± 1.36 years) were analyzed by the exploratory factor analysis (EFA), and subsequently 741 college students (52.2% female, age = 21.3 ± 1.39 years) were recruited to validate the new-developed eHLS-Web3.0 via confirmatory factor analysis (CFA), and multi-group CFA analysis. In Study 3, an integrated social-cognitive model based on the social cognitive theory (SCT) and the theory of planned behavior (TPB) was proposed. Following a prospective design, 280 college students (56%female, age=21.2 ± 1.35 years) completed both the baseline survey (T1) and the 1.5-month-later follow-up (T2). Correlation analyses and path analysis were performed to test the proposed model.

Results

Three themes and nine sub-themes were generated from Study 1. Every sub-theme respectively represented an aspect of eHealth usage of students from each major. The themes and subthemes included 1) Expectance: Stopgap (NH) – providing a general solution for urgent or temporary health need; Monitor (SP) – tracking and self-managing health behaviors; and Database (MD) – searching and obtaining health information. 2) Usage pattern: Personal (NH) – targeting on specific problem-solving and doing eHealth communication with acquaintance only; Practical (SP) – being active tryer, social player and warm-hearted sharer; and Theoretical (MD) – being skilled in obtaining in-depth health information, being good filterer, careful evaluator and rigorous truth-seeker. 3) Perception: Fear (NH) – feeling upset on being misled, being criticized and personal data being leaked; Curious (SP) – caring about feasibility, trying before trusting, and being confident in risk control; and Scepticism (MD) – being mindful in self-protection, cautious in sharing and felling obligated to be responsible for what they said online. Based on the item pool of 374 statements collected from Study 1, a 24-item three-factorial *eHLS-Web3.0* was developed in Study 2 through cognitive testing, content validity examination and EFA, consisting

of dimensions as Acquisition (8 items), Verification (6 items), and Application (10 items). CFAs supported the construct validity of the 24-item three-dimensional *eHLS-Web3.0* ($\chi2$ = 903.076, $\chi2$/df =3.701, CFI = 0.924, TLI = 0.914, RMSEA = 0.060, SRMR = 0.051). Good convergent validity, concurrent validity and discriminant validity of the *eHLS-Web3.0* were also proven (AVE=0.6, correlation with eHEALS = .725- .880, P < .001, correlation with HL screening questionnaire= .435). Results additionally supported satisfactory internal consistency reliability (α = .976, ρ = .934 - .956), test-retest reliability (r = .858, P < .001) and measurement invariance across gender, major and region of the scale. Applied the *eHLS-Web3.0* in Study 3, a proposed model exploring the relationship between EHL, HL and PA was tested. Self-perceived EHL was found to significantly associate with self-perceived HL (β=0.22, p ＜0.01), but had no relationship with HL actual performance. Significant mediation effects of self-efficacy (β=0.39, p＜0.001) and social support (β=0.06, p＜0.05) were found on the relations from self-perceived EHL to PA intention. Self-efficacy was also found to negatively mediate the relation between self-perceived HL and PA intention (β=-0.1, p＜0.01). Additionally, stronger PA intention successfully predicted more PA participation one and a half month later (β=0.22, p＜0.001).

Conclusions

A cutting-edge understanding of eHealth usage and required EHL of Chinese college students was emerged in the qualitative research, represented a first look at web 3.0 related eHealth behaviors. Whereafter, a 24-item three-dimensional eHLS-Web3.0 was developed based on that understanding and verified to be a reliable and valid measurement of EHL in Web 3.0 context. A model was proposed and tested to explore the relationships among EHL, HL and PA. The findings specifically highlighted that self-efficacy and social support played different roles in relationships from HL to PA and from EHL to PA, suggested a new underlying mechanism for constructing EHL and HL interventions in future studies.

Keywords: eHealth literacy; Health literacy; Physical activity; College students; Web 3.0.