

Why Adolescent cannot Struggle for the "Web" : An instrument of Cyber Living Scale
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Abstract

With its increasing popularity, the Internet has a variety of functions for both work and leisure. The Internet is convenient, borderless, and does not have time limit. Internet addicted teenagers almost do everything on the Internet, such as playing online game, making friends, searching for information, buying books, and contacting with family and friends. The Internet improves one's interaction with family and friends. Online interaction can overcome people's lacking of contact owing to distance or lifestyle difference. With the Internet, interaction can be more frequent and convenient. The main purpose of this study is to develop a comprehensive model and instrument for measuring Taiwanese high school students' individual cyber living. This study will compile variables (online game, cyber friendship, individual psyches, family life, peer relationships) from previous research and establish Cyber living scale. Data was gathered from 2113 Taiwanese high school students (1162 males and 951 females, aged 16–19 years). Four types of models were analyzed. The resulting instrument, which is consisted of 22 items and five factors, is presented as a reliable, valid, and useful measure for assessing the students' cyber living. Drawing on some of the key factors that influence the cyber living, this paper also provides the way to predict future cyber living.

Keywords: Internet Leisure Activity, Scale Development, Cyber Living

1. Introduction

According to ITU's (International Telecommunication Union, ITU) report, the number of Internet users worldwide doubled in the past five years. People accessing to the Internet at home has increased from 1.4 billion in 2009 to almost 1.6 billion in 2010, and will surpass the 2 billion mark in 2010 (ITU, 2010). In Taiwan, the number of regular Internet users had increased from 10.73 million in 2010 (FIND, 2010; TWNIC, 2010). Internet has greatly impact our communication ability, working style, life in an unimaginable way (Papacharissi & Rubin, 2000).

In the previous Internet related research, researchers assumed that Internet have

negatively influenced users' daily life, school grades, and parental relationships. In addition, most studies focus on the minus impact online game have on teenagers, for example, cardiac diseases, pressure (Ng & Wiemer-Hastings, 2005), or psychological impacts such as isolated interpersonal relationships, anxiety and shyness (Chak & Leung, 2004; Lo et al., 2005; Odacı & Kalkan, 2010). However, National School Boards Foundation (NSBF, 2000) reported that most parents view Internet positively. They encourage their children to access Internet, especially on educational purposes. Parents trust the Internet and don't consider it dangerous. Hence, Internet also provides people with positive effect.

With its increasing popularity, the Internet has a variety of functions for both work and leisure. Online activities as a recreational tool (Denvir, Balmer, & Pleasence, 2011; Iske et al., 2005). McMillan and Morrison (2006) pointed out that teenagers have a growing tendency of Internet addiction. Internet addicted teenagers almost do everything on the Internet, such as playing online game, making friends, searching for information, buying books, paying bills, and contacting with family and friends. On the Internet, time and distance problems are solved, interaction between family and friends becomes more frequent (Galacz & Smahel, 2007). Therefore, the main purpose of this study is to develop a comprehensive model and instrument for measuring Taiwanese high school students' individual cyber living. This study will compile variables (online game, cyber friendship, individual psyches, family life, peer relationships) from previous research (Chou & Ting, 2003; Galacz & Smahel, 2007; Livingston & Helsper, 2007; McMillan & Morrison, 2006; Perdue, 2009; Shortland, 2010) and establish Cyber living scale. This is, to our knowledge, the first attempt in the literature to specifically measure this construct. The second objective of this study is to use ACSI to analyze and compare the relation between students' gender in the Individual Cyber Living.

2. Methods

2.1 Instrument

Items were drawn from literatures and interviews with researchers of empirical site visiting result investigations. A self-administered, closed-ended questionnaire with ordered choices was used to survey a sample of Taiwan's senior high school students. The questionnaire is comprised of 34 questions divided into three major areas: (1) demographic profile of students, (2) general information about behavior for students' Internet using behavior, (3) evaluating students' attitude toward using Internet, the levels in relation to 27 attributes on a 4-point scale (ranging from strongly disagree to strongly agree). A pilot test was conducted with 159 senior high school students in Yunlin city. The reliability analysis (Cronbach's alpha) was

performed to test the reliability and internal consistency of each of the 22 attributes measured. The results showed that the alpha coefficient for all 22 attributes were high, which ranges from 0.918 to 0.923. They were well above the minimum value of 0.6 which is considered acceptable as an indication of reliability (Hair Jr. et al., 2009). Subjects who had participated in the pilot test were excluded from the subsequent study.

2.2 The survey method

The data for this study were collected using a questionnaire survey in Taiwan from March 1 to June 30, 2010. In the study, 2,500 students took the test. Following three reminders, a total of 2,153 students completed the questionnaire and produced a 86.12% respond rate. After scrutinizing for missing responses and eliminating the decisions that did not meet our specifications, we chose 2,113 respondents (1162 males and 951 females, aged 16–19 years) as our analysis subjects. This research synthesizes critical factors related to cyber living competence and then develops a parsimonious set of four constructs from which multi-item measurement scales are developed.

3. Data analysis

3.1 models specified

Before conducting the CFA, the data was examined for normality, a condition necessary for CFA (Anderson & Gerbing, 1988). The goodness-of-fit indexes (GFI), adjusted goodness-of-fit index (AGFI) for the alternative models (see Figure 1) and the null model are summarized in Table 1.

Table 1 Goodness-of-fit measures for the structural model

Model	χ^2 (d.f.)	GFI	AGFI	CFI	RMSEA
Null Model	8746.07(230)	0.715	0.687	0.914	0.136
1 First-order factor (model 1)	8122.58(209)	0.730	0.673	0.923	0.138
5 First-order factors (Uncorrelated) (model 2)	7357.81(209)	0.749	0.696	0.914	0.131
5 First-order factors (Correlated) (model 3)	1848.42(199)	0.922	0.901	0.977	0.064
5 First-order factors 1 second-order factor (model 4)	2126.13(204)	0.912	0.891	0.974	0.069
Suggested cutoff value	Statistical test of significance	≥ 0.9	≥ 0.8	≥ 0.9	≤ 0.08

Using alternative models tested, Models 3 and 4 were judged to demonstrate the best fit with the sample data. The study provides good evidence (Target coefficient index equals¹ 0.869) of a single second-order construct and estimates that item validity and reliability are not sensitive to the addition of a second-order factor; thus,

¹ The Target coefficient index (the ratio of the chi-square of the first-order model to the chi-square of the higher-order model) is used to provide evidence of the existence of a higher-order construct (Marsh & Hocevar, 1985).

conclusions concerning the validity and reliability of the twenty-two items would be the same regardless which model was selected. The researchers recommend Model 4 and proceed with the analysis of the validity and reliability of factors and items assuming this second-order model.

3.2 Confirmatory factor analysis validity

Using confirmatory factor analysis, the LISREL's maximum likelihood estimates of Model 4's standardized parameter estimates. For the observed variables, the factor loading range of online game by subgroup was 0.70 to 0.80, the cyber friendship was 0.72 to 0.79, the individual psyches was 0.52 to 0.74, the family life was 0.60 to 0.70, the peer relationship was 0.55 to 0.64. The Structural equation coefficients range of all variables was 0.69 to 0.97 (see Figure 1). All 22 items have significant factor loadings (t values above 18.63) on their corresponding factors.

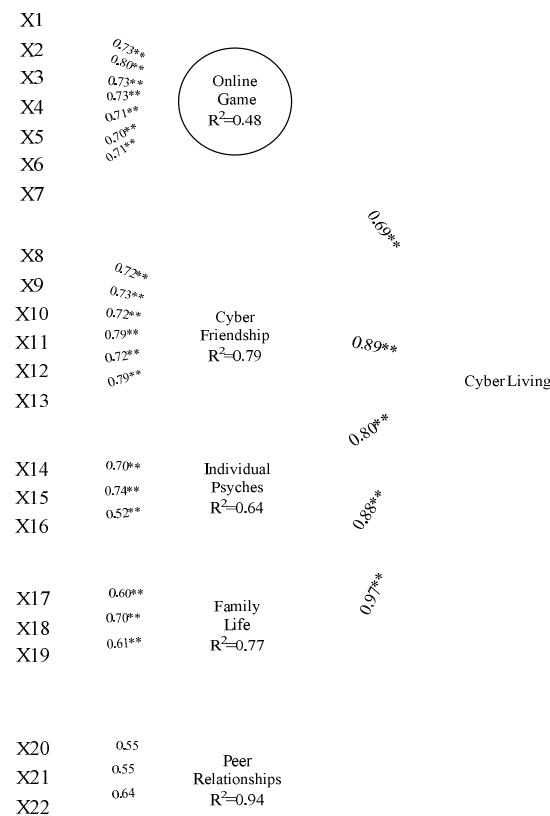


Figure 1: The Second-order confirmatory factor analysis

3.3 model validity and reliability

Internal consistency was assessed using Cronbach's alpha coefficient and composite reliabilities. Cronbach's alpha coefficient ranges from 0.603 to 0.888. The high instrument internal consistency is shown in the results in Table 2. In the table, all values are above the suggested 0.6 level for scale robustness (Hair Jr., et al, 2009). Composite reliability (CR) is a set of latent construct indicators consisted in their measurement. That is, the reliability is the degree of a set of two or more indicators in

a construct measurement (Hair Jr. et al., 2009). The composite reliability coefficients ranges from 0.604 to 0.889 (see Table 2), all constructs display a higher composite reliability than the 0.60 benchmark recommended by Fornell and Larcker (1981).The test of construct validity is central to stabilize the measure dimensionality while conducting measure development (DeVellis, 2003).

The value of the average variance extracted for all constructs is above the 0.5, which exceeds the limit recommended by Fornell and Larcker. All constructs demonstrated AVE values between 0.338 and 0.556 (see Table 2), which online game and cyber friendship are higher than the 0.5 benchmark recommended by Fornell and Larcker (1981), and other domain are lower than the 0.5.

Table 2 Validity and reliability

	Online Game	Cyber friendship	Individual Psyches	Family Life	Peers relationship
Cronbach's alpha	0.888	0.881	0.687	0.668	0.603
AVE	0.534	0.556	0.436	0.399	0.338
CR	0.889	0.882	0.694	0.665	0.604

In this investigation we carried out discriminant validity test. According to According to previous research (Ahire, Golhar and Waller, 1996; Hatcher, 1994) suggest using CFA to do paired comparison with all variables, and conducted nested

model comparison. All variables were grouped into 10 paired variables, the χ^2 of all

groups are significant ($\alpha=0.01$). In addition, non-constrained model showed a better data fitness, which means the variables in our research have adequate discriminant validity test (Anderson, 1987; Bagozzi & Phillips, 1982).

4. Results

4.1 Assessment of the Structural Equation Model

In the second-order CFA Cyber living, the second order latent variable, is added to complete the measurement model. As illustrated in Figure 1, the path between factors (online game, cyber friendship, individual psyches, family life, peer relationships) and cyber living are positive and of high magnitude. The structural equation describes the relationships or paths among the factors are being examined. In this study, the range of standardized path coefficients from 0.69 to 0.97. Squared multiple correlation (R-square) indicated that online game (0.476) scored relatively low to individual reliability among the indicators. This implies that factors contribute uniquely to the adoption of cyber living. It is notably that the mathematical manifestation of these relationships is consistent with developed instrument perspectives outlined in the opening sections of this paper.

4.2 Integrated multi-dimensional Adolescent Attitudes Towards the Cyberliving Scale index(AATCI)

The approach of structural equation modeling has allowed examination of the individual sub construct within the cyber living adoption attitude construct, providing insights to the particularly salient constructs in the adoption function. The model provides the correlation between five constructs (e.g. online game and cyber friendship), and its specific attributes. These path coefficients and factor loading scores can then be used as weightings for computation of the index. The calculation of the Adolescent Attitudes Towards the Cyberliving index follows the formula of the Anderson & Fornell (2000) ACSI (American Customer Satisfaction index, ACSI).

$$= \frac{\sum_{i=1}^n W_i * \bar{x}_i}{3 * \sum_{i=1}^n W_i} * 100$$

Adolescent Attitudes Towards the Cyberliving Index (AATCI)

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In this study, the index for Cyber Living (83.717) was calculated by using the weights of these factor scores with a better result. In order to get more information about students cyber living, we also calculated specific behavior driven indices. The index for online game is 92.901, 85.277 for cyber friendship, 91.932 for individual psyches, 73.936 for family life, and 77.412 for peer relationships respectively. The index for family life was the lowest value of the five constructs. The index of family life and peer relationships are lower than ACSI bench-mark of 80 recommended by Bruhn (2003), therefore, the index need improvement. According to cyber living scoring conditions, the result order of students is online game, individual psyches, cyber friendship, peer relationships, and family life. Online game and individual psyches were two most important Internet leisure of both sexes.

Table 3: Cyber Living Scale Index

Variables	All student	Male student	Female student
Online game	92.901	99.534	85.541
Cyber friendship	85.277	89.859	80.241
Individual Psyches	91.932	93.557	90.323
Family Life	73.936	78.731	68.613
Peer Relationships	77.412	82.354	72.169
Cyber Living	83.717	88.133	78.883

From benchmarking perspective, understanding how Internet using characteristic influences students' usage behavior facilitates the understanding of what constitutes a good score. Consequently, the model estimation leads to a greater perceived objectivity of students cyber living and Internet using time.

5. Conclusions

5.1 Implications

² W_i : factor loading score; \bar{x}_i : mean of variable

The analytical results are to provide schools and governments with useful information for strategic planning. Based on the study results, the following implications are suggested:

- (1) The main purpose of this study is to develop a comprehensive model and instrument for measuring student's cyber living. In Taiwan, access to the Internet is ubiquitous, convenient, and fast. This study reviews the literature related to Internet behavior and some evidences of Internet addiction, in which we conclude five factors (22 items). We hope that the AATCI will be able to contribute to cyber psychometric areas in the assessment of adolescent cyberliving attitudes. More specifically, the instrument can be used to investigate the reasons of cyber addiction which can help administrators to diagnose the most influential reasons behind cyber addiction instances.
- (2) The index of online game, female student are lower than male student. According to the previous studies (Hakkarainen et al., 2000; Papastergiou & Solomonidou, 2005) reported that males' preference to recreational use of ICT is perhaps rooted in the male-oriented online game tradition (Chen, 2010). The gender gap in ICT has been attributed to sex role stereotypes, male-oriented online games and boys' earlier access to computers, thus girls lag behind boys in computer usage (Austin & Totaro, 2011; Eden, Maloney & Bowman, 2010; Haddadain, Abedin & Monirpoor, 2010). Recently, to attract girls' access to technology, several girl-friendly computer games have been developed and the Internet and the World Wide We have made computer technology more accessible, interesting and appealing to girls (Fountain, 2000; Miller et al., 2001).

Results of this study showed that the Internet is changing central aspects of everyday life, such as how adolescent keep themselves informed, communicate, leisure activities, allocate time during the day. This findings from this study indicate that cyber living has a strong social foundation for adolescent. Peer relationships may be the most important factor that account for elevated incidence rates of cyber living among adolescent. Online communication with friends or family members leads to increased contacts and better peer relationships improving psychological well being.

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