

PREDICTING COMPUTER SELF-CONFIDENCE FROM DEMOGRAPHIC AND PERSONALITY VARIABLES AND COMPUTER USE

Carlos L. M. Contreras

Saint Leo University

Demographic and personality variables and computer use were used to predict computer self-confidence with a sample of students enrolled in online college-credit classes. Computer self-confidence was measured with one 10-choice question. Demographic variables included age, annual income, geographic region, gender, and ethnicity. Computer use was measured with computer experience (in years, with one direct question) and by the number of online classes taken within a term. Personality variables were measured with the Bicognitive Orientation to Life Scale (BOLS). The BOLS measures field independence, field sensitivity, and cognitive flex. Computer experience, annual income, the number of online classes taken within a term, and cognitive flex were significant predictors of computer self-confidence.

Recent research by the United States government (United States Department of Commerce, 1995, 1998, 1999, 2000, 2002) has focused on the ownership and use of computers and the use of the Internet. This research has indicated that there are relationships between computer use and Internet access and demographic variables (including income, geographic region, age, ethnicity, and others). Other studies have examined similar relationships between demographic variables and computer attitudes. For example, Comber, Colley, Hargreaves, and Dorn (1997) found that groups differentiated by gender and age

differed significantly in terms of their computer experience and their enjoyment of computers. In their sample, males had more computer experience and more positive attitudes about computers than did females. The relationships between age and computer experience and age and computer attitudes were negative. Slate, Manuel, and Brinson (2002) also reported a gender difference in terms of attitudes toward computers and the Internet. Kastsinas and Moeck (2002) cited the U.S. government's research and reported that the gulf, in terms of computer use and Internet access, between urban and rural communities,

• **Carlos L. M. Contreras**, Distance Learning Program, Saint Leo University, 209A Dominion Blvd. South, Chesapeake, VA 23322. Telephone: 1-877-793-0624. E-mail: carlos.contreras@saintleo.edu

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is widening. The studies above are not a complete review of the literature, but they do indicate that demographic variables can be possible predictors of computer-related attitudes. The hypothesis that selected demographic variables will predict computer self-confidence will be tested in the current study.

Although Comber, Colley, Hargreaves, and Dorn (1997) found a positive relationship between computer experience and computer attitudes (i.e. attitudes about computers), they did not examine the relationship between computer experience and computer self-confidence (i.e. feelings about one's ability to use computers). Rovai and Childress (2003) used computer experience and computer confidence, among other variables, to predict computer anxiety; both of these predictors were significantly correlated with each other in their sample. In a Malaysian sample of school teachers, computer experience had a negative relationship with computer anxiety and a positive relationship with positive computer attitudes (Hong & Koh, 2002). In a model-testing approach, Arthur and Olson (1991) found support for a cognitive ability-computer experience-computer attitudes path. They did not find support for a cognitive ability-computer attitudes-computer experience path, supporting "the contention that computer experience precedes computer attitudes" (Arthur & Olson, 1991, p. 53). It remains to be seen whether a relationship between computer experience and computer self-confidence will exist for online students. One might expect restriction of range in terms of both computer experience and computer self-confidence. As an instructor of online classes, it has been my (admittedly anecdotal) experience that students vary widely in terms of both variables. The hypothesis that computer use will predict computer self-confidence will be tested in the current study. Personality variables as predictors will also be examined.

Bicognitive theory (Ramirez, 1999), field independence (FI), field sensitivity (FS), and cognitive flex (having attributes of both field independent and field sensitive cognitive

styles) may have a relationship to computer self-confidence. While Ramirez (1999) does not specifically address computer self-confidence, the scoring of the Bicognitive Orientation to Life Scale (BOLS) indicates that those who are field independent will tend to be more interested and adept in the "physical and math sciences" (Ramirez, 1999, p. 189). Those who are field sensitive will tend to be more interested and adept in the "humanities and social sciences" (Ramirez, 1999, p. 189). Those with cognitive flex would be equally adept in either domain (Ramirez, 1999). So, one might predict that FI and cognitive flex would be related positively to computer self-confidence. While many students, across varied disciplines, are probably using computers as word processors, an intuitive prediction would be that students in the math and physical sciences might be more confident using computers than would students in the humanities and social sciences. Rather than examining this prediction directly, the current study will examine the relationships between cognitive flex, FI, and FS and computer self-confidence. The following predictions will be tested: (1) FI should have a positive relationship with computer self-confidence; (2) FS should have a negative relationship with computer self-confidence; (3) cognitive flex should have a positive relationship with computer self-confidence.

METHOD

Participants

Participants were undergraduate students enrolled in online classes offered by the Distance Learning Program at Saint Leo University; 228 students completed an online version of an informed consent form. Eight students completed the online informed consent form more than once. Two hundred twenty-three students completed all or part of an online questionnaire. Data were collected from February 19, 2002 through December 5, 2002. After March 27, 2002, students were asked if they had previously completed the questionnaire.

Their questionnaire responses were removed if they responded affirmatively, if they responded that they were not sure, or if they did not respond. Ten students' questionnaire responses were deleted based on the question above. Four students' questionnaire responses were removed because their responses were blank or missing too much data (e.g. only answering one question). So, responses from 209 students were used for analysis.

Measures

Demographic

Students were asked to indicate their ethnicity, gender, annual income, and age (see Appendix) with a secure, Web-based questionnaire. The question regarding age was a free-form question. Other questions regarding demographic variables were forced-choice questions. The ethnicity question allowed participants to pick more than one category and included a free-form, "Other" category.

Computer Use

Students were asked to indicate the amount of experience that they had with computers, in years (see Appendix). This was a free-form question on the Web-based questionnaire. Students were also asked to indicate the number of online classes they were currently taking. This was also used as a measure of computer use.

Personality

The items from the BOLS (Ramirez, 1999) were included on the Web-based questionnaire (see Appendix). "Twelve of the Bicognitive Orientation to Life Scale (BOLS) items express a field sensitive (FS) orientation in the areas of: interpersonal relationships, leadership style, learning style, attitudes toward authority, and interest and natural ability in physical and math sciences versus humanities and social sciences. Twelve corresponding items express a field independent (FI) orienta-

tion in the same areas of behavior" (Ramirez, 1999, p. 189). Based on their level of agreement with FI items, student FI scores could range from 12 to 48. Based on the same scale, FS scores could range from 12 to 48. Bicognitive (BC) scores are obtained by computing the absolute difference between FI and FS scores. BC scores could range from 0 to 36. So, a low BC score would indicate a high degree of cognitive flex (e.g. someone who is flexible in terms of his/her cognitive style). In terms of reliability, the BOLS has a Cronbach alpha of .85 for the FI scale and a Cronbach alpha of .82 for the FS scale (Ramirez, 1999).

Computer Self-Confidence

Computer self-confidence was measured with one item on the Web-based questionnaire (see Appendix). Using a 10-point scale, students were asked, "On a scale from 0 to 9 (0 = None; 5 = Moderate; 9 = High), rate the level of confidence you have when attempting computer-related tasks."

Procedures

After obtaining permission from the Saint Leo University Institutional Review Board and the Distance Learning Program (DLP), faculty from the DLP were asked to invite their students to volunteer for an online study. DLP faculty delivered their invitation to participate to students by posting an announcement in their online classes or by sending an invitation through an electronic mail system. DLP faculty were given an example in terms of their invitation but were able to modify the example.

Students who agreed to participate began their participation by going to a secure Web site that contained an online informed consent form. Students indicated their agreement to participate by typing their names in appropriate fields and by clicking a "submit" button. Data were collected on secure servers and informed consent form responses were collected separately from questionnaire responses. The Web site was configured to reject multiple

submissions: "Your form was submitted more than once. Duplicate submissions are not processed."

After clicking the "submit" button, students' Web browsers were redirected to another secure Web site that contained the Web-based questionnaire. The Web site was configured to reject multiple submissions. The Appendix contains the instructions, questions, and choices given on the web-based questionnaire. Students could leave questions blank and could withdraw from participation at any time. The last question on the Web-based questionnaire, "I have completed this ONLINE survey in a previous term" was added after the first academic term of data collection. After completing the questionnaire, students submitted their responses by clicking a "submit" button at the end of the questionnaire.

After submitting their responses to the questionnaire, students' Web browsers were redirected to a Web site that contained a debriefing form. Contact information was posted on the debriefing form. Students were thanked for their participation and invited to ask questions about the research.

RESULTS

Because of too few responses within some categories, ethnicity was reduced to two cate-

gories: "European American, White, Caucasian" and "not European American, White, Caucasian." All students who identified with an ethnicity other than "European American, White, Caucasian," including those who chose multiple categories (even if "European American, White, Caucasian" was one of the multiple categories), were categorized as "not European American, White, Caucasian" for analysis. For the same reason, too few responses within some categories, annual income was reduced to three categories: less than \$35,000, \$35,000–\$49,999, and more than \$49,999. Group sizes for demographic variables are shown in Table 1. Descriptive statistics for age, computer use, and the BOLS are reported in Table 2.

Two stepwise multiple regression analyses were conducted with computer self-confidence as the criterion variable and pairwise deletion of missing data. One analysis included the number of online classes taken within a term, gender, age, annual income, geographic region, computer experience, cognitive flex (BC score), and ethnicity as predictors. The other analysis included the same variables as predictors except FI and FS were added as predictors and cognitive flex was removed as a predictor. FI, FS, and cognitive flex were not included in one multiple regression equation because FI and FS are used to compute BC scores—increasing the likelihood of correlated

TABLE 1
Demographic Characteristics of Participants

	<i>n</i>
Ethnicity	
European American, White, Caucasian	124
Not European American, White, Caucasian	83
Gender	
Female	138
Male	71
Annual Income	
<\$35,000	69
\$35,000-\$49,999	48
>\$49,999	90
Geographic Region	
Urban	147
Rural	62

TABLE 2
Descriptive Statistics: Age, Computer Use, BOLS

<i>Variable</i>	<i>Mean</i>	<i>SD</i>	<i>n</i>
Age	35.39	8.26	206
Number of online classes within a term	1.94	.90	209
Computer experience	11.88	6.00	207
Cognitive flex (BC Score)	6.50	4.46	189
Field independence	29.11	3.72	197
Field sensitivity	34.59	3.57	198
Computer self-confidence	7.57	1.53	205

TABLE 3
Significant Variables in Equation, Alpha = .05

<i>Predictor Variable</i>	<i>Beta</i>	<i>R²</i> <i>(Based on Part Correlations)</i>
Computer experience	.366	.123
Number of online classes within a term	.189	.035
Cognitive flex (BC Score)	-.152	.023
Annual income	.138	.018

TABLE 4
Significant Variables in Equation, Alpha = .05

<i>Predictor Variable</i>	<i>Beta</i>	<i>R²</i> <i>(Based on Part Correlations)</i>
Computer experience	.356	.118
Number of online classes within a term	.185	.034
Annual income	.150	.021

residuals with BC scores. Rather than risk the possibility of correlated residuals affecting a single multiple regression equation, two separate multiple regression analyses were conducted instead of one.

In the first multiple regression analysis, a significant model emerged, $F(4, 181) = 13.76$, $p < .05$. $R^2 = .233$; adjusted $R^2 = .216$. The model accounted for 21.6% of the variance in computer self-confidence. Significant variables (computer experience, number of online classes within a term, cognitive flex, and annual income) are shown in Table 3.

In the second multiple regression analysis, a significant model emerged, $F(3, 185) = 16.43$, $p < .05$. $R^2 = .210$; adjusted $R^2 = .198$. The model accounted for 19.8% of the variance in

computer self-confidence. Significant variables (computer experience, number of online classes within a term, and annual income) are shown in Table 4.

The hypothesis that selected demographic variables would predict computer self-confidence was not supported. Annual income was the only demographic variable that significantly predicted computer self-confidence. The hypothesis that computer use would predict computer self-confidence was supported by the results of this study. The hypotheses that FI and FS would predict computer self-confidence were not supported in this study. However, the hypothesis that cognitive flex would have a positive relationship with computer self-confidence was supported.

DISCUSSION

In terms of the limitations of this study, restriction of range (both predictors and criterion) is possible. The number of variables could have also affected the findings. In terms of demographic variables (although restriction of range does not strictly apply), all variables except annual income were skewed in terms of frequency distributions. All other demographic variables were 2-category variables, and in terms of frequency distributions, an almost 2-to-1 difference could be found in all demographic variables except annual income. Although the normal range of computer self-confidence is not known to the author, the mean for the current study (7.57 out of 10) indicates that most students who participated in the study were comfortable with computers. It should be noted that despite the possibility of restriction of range in both the predictors and criterion, significant multiple regression equations still emerged; significant predictors of computer self-confidence were still found.

In terms of computer self-confidence, a one-question item may not have sufficiently tapped this domain. This could also be said about computer experience. Future studies may use more questions to measure these domains. However, given the ease with which respondents can end participation with an online questionnaire, the use of an online questionnaire may need re-evaluation.

The use of an online questionnaire may also be considered a limitation of the current study. The ability of participants to respond more than once is a possibility with online questionnaires. The current study used techniques designed to reduce the possibility of multiple submissions. However, these techniques could be circumvented. Participants would need knowledge (i.e., knowing the difference between static and dynamic IP addresses) and motivation (the willingness to take the questionnaire from different machines) to submit their responses more than once. Because the number of participants who submitted questionnaire responses was less than the number

of participants who submitted Informed Consent Form responses, the author is not convinced that any participants were sufficiently motivated to respond to the questionnaire more than once.

Computer experience, the number of online classes taken within a term, cognitive flex, and annual income were found to be significant predictors of computer self-confidence. In general, the online students who participated in this study were confident about their computer abilities. However, there was enough variance in this confidence that computer use, personality, and annual income were able to account for a significant proportion of variance in computer self-confidence scores. Online instructors should not assume that their students would feel universally self-confident about their computer abilities. Online instructors should also be aware of the relationship between individual differences (in particular, in personality characteristics) and computer self-confidence.

Future studies might concentrate on better measurement of computer experience and computer self-confidence. Future studies may need to be conducted with paper-and-pencil questionnaire(s). A more diverse sample (including both online and traditional students) might also be helpful in terms of future studies. In order to account for more variance in computer self-confidence, more predictors may need to be added in future studies. Finally, the relationship between computer self-confidence and academic performance (especially in online classes) should be the focus of future investigations. If no relationship between computer self-confidence and academic performance exists, investigations of computer self-confidence may be moot.

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APPENDIX

Questionnaire Instructions, Items, and Choices

If you don't feel comfortable answering any of the questions below, leave them blank.

In how many ONLINE class(es) are you currently enrolled?

Please select the response(s) which BEST match(es) your ethnic/racial identity. You can select more than one.

African American, Black
Asian
Chicano/a, Hispanic, Latino/a, Mexican-American
European American, White, Caucasian
Native American
Other

Please select the response which BEST matches your gender.

Female
Male

Please indicate your age (in years).

Please select the response which BEST matches your household income.

under \$5,000
\$5,000-\$9,999
\$10,000-\$14,999
\$15,000-\$19,999
\$20,000-\$24,999
\$25,000-\$34,999
\$35,000-\$49,999
\$50,000-\$74,999
\$75,000+

Please select the response that BEST matches the area in which you live.

Rural (comprised of all territory, population, and housing units of LESS THAN 2,500 persons)

Urban (comprised of all territory, population, and housing units of 2,500 or more persons)

How many years have you used computers?

On a scale from 0 to 9 (0 = None; 5 = Moderate; 9 = High), rate the level of confidence you have when attempting computer-related tasks.

From Manuel Ramirez, III *Multicultural psychotherapy: An Approach to Individual and Cultural Differences*, 2nd ed. Published by Allyn & Bacon, Boston, MA. Copyright © 1999 by Pearson Education. Reprinted by permission of the publisher.

Indicate your level of agreement or disagreement with each statement below.

I have always done well in subjects such as history or psychology.

Strongly Agree Agree
Disagree Strongly Disagree

I prefer parties that include my parents and other family members.

Strongly Agree Agree
Disagree Strongly Disagree

An individual's primary responsibility is to himself or herself.

Strongly Agree Agree
Disagree Strongly Disagree

I learn best by working on a problem with others.

Strongly Agree Agree
Disagree Strongly Disagree

I like a leader who is primarily concerned with the welfare of the group, even if it means that the job takes a little longer.

Strongly Agree Agree
Disagree Strongly Disagree

When learning something for the first time, I prefer to have someone explain it to me or show me how to do it.

Strongly Agree Agree
Disagree Strongly Disagree

What my professors or job supervisors think of me is never as important as feeling that I am really making progress in my studies or in my job.

Strongly Agree Agree
Disagree Strongly Disagree

Math has always been one of my favorite subjects.

Strongly Agree Agree
Disagree Strongly Disagree

Some persons do not deserve respect even though they are in positions of authority.

Strongly Agree Agree
Disagree Strongly Disagree

Whenever I experience some failure or let-down, the encouragement of my family helps me get going again.

Strongly Agree Agree
Disagree Strongly Disagree

I enjoy living alone more than living with other people.

Strongly Agree Agree
Disagree Strongly Disagree

I like to get suggestions from others and frequently ask my family for advice.

Strongly Agree Agree
Disagree Strongly Disagree

It is less important to achieve a goal quickly than to make sure no one gets their feelings hurt in the process.

Strongly Agree Agree
Disagree Strongly Disagree

When I look at a mural or large painting, I first see all the little pieces and then, gradually, I see how they all go together to give a total message.

Strongly Agree Agree
Disagree Strongly Disagree

I have always done well in courses such as chemistry or physics.

Strongly Agree Agree
Disagree Strongly Disagree

One of the greatest satisfactions in life is the feeling of having done better than others.

Strongly Agree Agree
Disagree Strongly Disagree

I learn better from listening to a teacher than from reading a book.

Strongly Agree Agree
Disagree Strongly Disagree

History and social studies, in general, have always been among my favorite subjects.

Strongly Agree Agree
Disagree Strongly Disagree

I give people honest criticism even though it might hurt their feelings.

Strongly Agree Agree
Disagree Strongly Disagree

Getting individuals to compete with one another is the quickest and best way to get results.

Strongly Agree Agree
Disagree Strongly Disagree

I like to read biographies and autobiographies.

Strongly Agree Agree
Disagree Strongly Disagree

I prefer to learn things on my own, even if I make repeated mistakes before finally understanding.

Strongly Agree Agree
Disagree Strongly Disagree

I learn better by reading about something myself than by listening to a teacher lecture about it.

Strongly Agree Agree
Disagree Strongly Disagree

When I look at a photograph of someone, I am more aware of the total person than of the details such as hair color, facial expressions, or body type.

Strongly Agree Agree
Disagree Strongly Disagree

Before submitting your responses...
I have completed this ONLINE survey in a previous term.

I'm not sure.
Yes.
No.

