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ABSTRACT
                Inspired by the increasingly important role of
computers in vocational preparation and the practical value of
determining curriculum and program needs on the basis of student
vocational interests, an investigation of the differences in computer
attitudes among students depending on their Holland type and their
sex was initiated. Data were collected from a sample of 289 incoming
freshmen (44% male, 56% female) at the University of Maryland,
College Park. The subjects completed the Computer Attitude Scale
(Loyd and Gressard, 1984), and were assigned a Holland vocational
type (Realistic, Investigative, Artistic, Social, Enterprising, or
Conventional) on the basis of their responses to an item which asked
them to list, by occupation, their top three vocational goals.
Results indicate that: (1) females are significantly more anxious,
less confident and lower in computer liking than males; (2)
Enterprising types are significantly more anxious, less confident,
and lower in computer liking than Realistic or Investigative types;
and (3) Artistic types are significantly more anxious than Realistic
types and less confident and lower in computer liking than both
Realistic and Investigative types. Statistical results are presented
in four annotated tables, and references are provided. (Author/KM)

COUNSELING CENTER

Office of Vice Chancellor for Student Affairs

UNIVERSITY OF MARYLAND

College Park, Maryland

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Abstract

Differences in computer attitudes due to sex and Holland type
were investigated. Subjects were 289 incoming freshmen at the
University of Maryland (44% male; 56% female). The Computer
Attitude Scale (Loyd and Gressard, 1984b) was used to assess
computer orientation. Females were significantly more anxious,
less confident, and lower in computer liking than were males
($p < .01$). Enterprising types were significantly more anxious,
less confident, and lower in computer liking than were Realistic
or Investigative types ($p < .01$). Artistic types were
significantly more anxious than Realistic types and less
confident and lower in computer liking than both Realistic and
Investigative types ($p < .01$). The significant sex differences
are not reflected in previous data on the Computer Attitude
Scale but the differences among Holland types are conceptually
consistent with predictions of which Holland types would have
more positive computer attitudes.

Sex Differences in

Computer Orientation by Holland Type

Exploring   student   vocational interests has much practical value for student affairs professionals, for these vocational interests can be effectively used to indicate curriculum and program needs (Campbell & Hansen, 1981).   It may be particularily important to examine student interests and attitudes toward computers since computers play an increasingly important role in vocational preparation today (Lawton & Gerschner, 1982).   Computer literacy has become as necessary to the contemporary student as literacy in reading and writing was to students of previous generations (Ringle, 1981).   However, not all students are comfortable with these new demands for computer competence; indeed, many may experience what Jay (1981) describes as "computerphobia."   Such students may be fearful or anxious about computers, resistent to talking or thinking about them, and/or hostile and agressive toward computers.   Loyd and Gressard (1984a) surmise that such attitudes preclude computer competence. Another group of students exist who have very different attitudes toward computers.   "Hackers" are so attracted to computer work that it becomes an obsession, to the exclusion of other work and human relationships (Ingber, 1981).   Hackers and computerphobic students are at the extreme ends of a continuum of student computer attitudes, and vocational and student affairs

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professionals must be prepared to work with both groups, as well

as the many other students who are between those two extremes.

Holland (1979) has developed a system of identifying

vocational types which may help in organizing knowledge about

student vocationally-related attitudes toward computers. Computer

work, in general involves Investigative qualities, although other

Holland types can be important in such related occupations as

computer technician (Realistic) or Computer Operator (Social,

Gottfredson, Holland & Ogawa, 1982). Given their task-oriented

nature and preference for abstract problem-solving, it might be

predicted that Investigative types would be more positive toward

computer work than Artistic types, who have more self-expressive,

individualistic needs. A systemmatic exploraton of such

differences is necessary in order to make generalizations.

Sex differences in computer attitudes may be a complex but

potentially important consideration. Contrary to initial

expectations, Loyd and Gressard (1984a) found no differences

between male and female attitudes toward computers. However as

women become more vocationally oriented, especially toward

nontraditional, technical careers, computer competence becomes

increasingly important. Martinez, Sedlacek, and Bachhuber (1985)

found that recent women college graduates wished they had taken a

more practical, career-oriented major. The impact of computers

on the market-place has been noted (Loyd & Gressard, 1984a); how

many of those women wished they had received more training in

computer-related work? Further, women who had expressed an
interest in nontraditional fields (more likely to require
extensive computer work) early in their undergraduate careers
reported receiving less support in their vocational planning than
did women choosing traditional carreers (Boulle-Lauria, Sedlacek
& Waldo, 1985).

Given the importance of computer competence in vocational
planning and given possible differences in computer attitudes
between students depending on their Holland type and their sex,
an investigation of these variables was conducted.

Method

A sample of 289 incoming freshmen (44% male; 56% female) at
the University of Maryland, College Park completed the Computer
Attitude Scale (Loyd & Gressard, 1984b). The Computer Attitude
Scale consists of three subscales, each of which represents a
specific computer-related attitude significantly affecting
student achievement. The Computer Anxiety score reflects fear
about computers and/or learning to use them; the Computer
Confidence score indicates the degree of self-confidence about
computer abilities; and the Computer Liking score represents how
well one likes computers and enjoys computer work. Loyd and
Gressard (1984b) found alpha coefficients of .87, .91, and .91
for Computer Anxiety, Computer Confidence, and Computer Liking,
respectively. The items on each subscale are computer-related

statements worded in positive or negative terms.   Students were

assigned a one letter Holland code on the basis of their

responses to an item which asked them to list, by occupation,

their top three vocational goals.   Trained recorders   coded the

occupation as Realistic, Investigative, Artistic, Social,

Enterprising, or Conventional.   Valid results using this method

of assigning Holland codes have been demonstrated (Toenjes &

Borgen, 1974; Tonesk, Suziedelis & Lorr, 1974; Wakefield &

Doughtie, 1973).

Analysis

Results were analyzed using 2-way multivariate analysis of

variance MANOVA (sex and Holland type) on the three computer

subscales with Student-Newman Kuels post-hoc tests.

Results

The MANOVA revealed significant main effects for both

variables on Computer Anxiety, Computer Confidence, and Computer

Liking ($p < .01$).   No interaction effects were demonstrated on any

of three subscales.   Table 1 shows the Holland codes for the

Insert Table 1 about here

entire sample, grouped by sex.   The absence of any Conventional

females is to be noted.

Table 2 shows the means and standard deviations for

Computer Anxiety scores.   Females were significant'y more anxious

than males (F=31.10, p < .01).   Holland type was also significant
as a main effect (F=3.69, p < .01).   Post hoc tests revealed that
Enterprising and Artistic types were significantly more anxious
than Realistic types.   Enterprising students were also
significantly more anxious than Investigative students.

Males were also significantly more computer confident than
females (F=34.37, p < .01) (Table 3).   Again, Holland type was
also significant (F=5.64, p < .01).   Post hoc procedures showed

that Realistic students were significantly more confident than
Enterprising, Artistic, and Social students.   Investigative
students were also significantly more confident than Enterprising
and Artistic students.

Table 4 shows similar trends for Computer Liking.   Again,
males indicated a higher liking for computers than did females
(F=19.01, p < .01).   Post-hoc testing on the significant main
effect of Holland type (F=4.82, p < .01) revealed that Realistic

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Insert Table 4 about here

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and Investigative students liked computers more than did
Enterprising and Artistic students.

Discussion

Several results appear to have implications for vocational
and student affairs professionals. First is the information
provided by the Holland coding. Across all dimensions (Computer
Anxiety, Computer Confidence, and Computer Liking), Realistic and
Investigative students expressed more postive computer attitudes
than did Enterprising and Artistic students. Since they like to
work with mechanical equipment and function better with things
than with people or ideas, the technical aspects of computer work
are likely very appealing to Realistic types. Investigative
students also had positive computer attitudes, but possibly for
different reasons than did Realistic students. Programming
aspects of computer work would probably be very appealing to
Investigative types because of the abstract, problem-solving
nature of the tasks involved.

Perhaps more imporant to consider are the possible reasons
why Artistic and Enterprising students did not have positive
attitudes toward computers. As mentioned above, the self
expressive, individualistic nature of Artistic students'

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vocational interests is not clearly compatible with computer-related tasks, and Artistic students may not see computer competence as relevant to their career goals. However, computers are becoming important in many Artistic occupations, and students interested in those occupations must be prepared. In the theatre, for example, computers are being used in set design as well as in lighting (Klepper, 1984). In the art room, computers are used in interactive video roles, for printing techniques, and to create graphics (Snyder, 1985). One group for which computer skills are obviously not irrelevant but who demonstrated less than positive computer attitudes was the Enterprising group of students. In Enterprising occupations such as sales manager, stock broker, public relations manager, and account executive, computers provide important functions, yet without positive attitudes toward computer work Enterprising students could have a more difficult time dealing with their job responsibilities. Much of the strength of Enterprising types lies in their energy, leadership, and persuasatory skills; these are among the most important qualifications they bring to their jobs. However, specific skills that are required, such as competence in computer tasks, are not necessarily avoidable.

Vocational counselors should be aware of this possibility of computer anxiety and lack of computer confidence and liking when working with Enterprising students. Further, workshops conducted through a joint effort of the business department (where many

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Enterprising students are enrolled), the campus computer science center, and the campus vocational counselors could be used to inform these students early about the importance of computer competence in their career goals. This could give them experience in simulated Enterprising-relevant tasks (making the skills more meaningful for them), and provide them with opportunities for more extensive computer classes. Given that Loyd and Gressard (1984a) found that computer experience was positively related to better computer attitudes, such workshops could help to increase positive attitudes toward computers of Enterprising students.

Sex differences between male and female computer attitudes is interesting, especially in light of Loyd and Gressard's finding indicating no sex differences on the same computer attitudes (1984a). Given the three components of computer attitudes—Computer Anxiety, Computer Confidence, and Computer Liking—the present results do not necessarily mean that female students are less interested in computers than men. True, they did not indicate a great deal of liking for computers, but this could easily relate to their high anxiety and lack of confidence. The anxiety and the confidence problems must be overcome before the degree of liking will change, and again, Loyd and Gressard's (1984a) discussion of the importance of computer experience is relevant here. Instructors in particular academic curricula can be sensitive to possible computer-related problems of their

female students (especially those in Enterprising and Artistic
fields, as discussed previously). Campus women's center groups
might work with career counselors and computer science center
professionals on workshops such as the sort recommended for
Enterprising students, with particular emphasis on learning
computer skills in a nonthreatening environment.

The importance of computer skills for those entering the job
market cannot be ignored, and the present results identify groups
of students who may particularily benefit from extra computer-
related attention from vocational and student affairs
professionals. The results are conceptually consistent with
informal observations regarding which students would be likely to
have more positive computer attitudes. Given what we know about
Holland types (Campbell & Hansen, 1981) it is not surprising that
Investigative and Realistic students indicated more positive
computer attitudes than did Artistic students. However, logical
assumptions and informal observations need to be investigated
empirically, as done in the present study. Sometimes results can
be surprising. A case in point is the lack of sex differences in
computer attitudes found by Loyd and Gressard (1984a). Results
of the current study strongly indicate significant differences,
and given these conflicting findings, replications are needed to
determine whether sex differences exist in other settings. By
being better attuned to student computer attitudes and problems,
vocational and student affairs professionals can better help

students in successful vocational planning.

References

Boulle-Lauria, E., Sedlacek, W. & Waldo, M. (1985). A

longitudinal comparison of traditional and nontraditional

career choices by sex. College and University, 60, 235-256.

Campbell, D. & Hansen, J. (1981). Manual for the SVIB-SCII.

Palo Alto, CA: Stanford University Press.

Gottfredson, G., Holland, J., & Ogawa, D. (1982). Dictionary of

Holland Occupational Codes. Palo Alto: CA: Consulting

Psychologists Press.

Holland, J. (1985). The Self-Directed Search (1985 ed.)

Odeessa, FL: Psychological Assessment Resources.

Ingber, D. (1981). Computer addicts. Science Digest, 89, 88-

91; 114.

Jay, T. (1981). Computerphobia: What to do about it.

Educational Technology, 21, 47-48.

Klepper, M. (1984). The Macintosh: Is it the answer for

designers? Theatre Craft, 18, 20.

Lawton, J. & Gerschner, V. (1982). A review of the literature

of attitudes towards computers and computer-based instruction.

Journal of Research and Development in Education, 16, 50-55.

Loyd, B. & Gressard, C. (1984a). The effects of sex, age, and

computer experience on computer attitudes. Association for

Educational Data Systems Journal, 17, 67-77.

Loyd, B. & Gressard, C. (1984b). Reliability and factorial validity of computer attitude scales. Educational and Psychological Measurement, 44, 501-505.

Martinez, A., Sedlacek,W., & Bachhuber, T. (1985). Male and female college graduates: Seven months later. Vocational Guidance Quarterly, 34, 77-84.

Ringle, M. (1981). Computer literacy: New directions and new aspects. Computers and People, 30, 12-15.

Snyder, R. (1985). Art and computers. Arts and Activities, 18, 15.

Toenjes, C. & Borgen, F. (1974). Validity of generalization of Holland's hexagonal model. Measurement and Evaluation in Guidance, 7, 79-85.

Tonesk, X., Suziedelis, A. & Lorr, M. (1974). Vocational interest types of men-in-general. Measurement and Evaluation in Guidance, 7, 74-78.

Wakefield, Jr., G., Doughtie, E. (1973). The geometric relationship between Holland's personality typology and the Vocational Preference Inventory. Journal of Counseling Psychology, 20, 513-518.

Table 1

Holland Types by Sex

Holland Type	Male	Female
Realistic	40%	20%
Investigative	30%	28%
Artistic	7%	14%
Social	4%	11%
Enterprising	18%	27%
Conventional	1%	0%
Total	100%	100%

Table 2

Means and Standard Deviations of Computer Anxiety Scores
by Holland Type and Sex

	Sex			
	Male		Female	
Holland Type	M	SD	M	SD
Realistic	4.08	.65	3.65	.61
Investigative	4.10	.66	3.48	.85
Artistic	3.29	.55	3.42	.63
Social	4.00	.61	3.41	.89
Enterprising	3.51.1>79		3.27	.73
Conventional	3.50	.00	–	–

Note:

1. Both Sex and Holland Type were significant (p < .01).

2. A higher score indicates less anxiety.

3. Post hoc tests revealed Enterprising and Artistic types significantly more anxious (p < .01) than Realistic types. Enterprising students were also significantly more anxious (p < .01) than Investigative types.

4. There were no Conventional female students in this sample.

Table 3

Means and Standard Deviations of Computer Confidence Scores

by Holland Type and Sex

	Sex				
	Male			Female	
Holland Type	M	SD		M	SD
Realistic	4.03	.66		3.54	.56
Investigative	3.97	.64		3.45	.69
Artistic	3.19	.53		3.23	.69
Social	3.86	.53		3.27	.69
Enterprising	3.33	.89		3.14	.79
Conventional	3.60	.00		–	–

Note:

1. Both Holland Type and Sex were significant ($p < .01$).

2. A higher score indicates more computer confidence.

3. Post hoc tests indicated that Realistic students were significantly ($p < .01$) more confident than Enterprsing, Artistic, and Social students. Investigative students were also significantly more confident ($p < .01$) than Enterprising and Artistic students.

4. There were no Conventional females in this sample.

Table 4

Means and Standard Deviations of Computer Liking Score
by Holland Type and Sex

	Sex				
	Male			Female	
Holland Type	M	SD		M	SD
Realistic	3.66	.78		3.24	.66
Investigative	3.81	.64		3.24	.83
Artistic	2.53	.53		3.00	.71
Social	3.64	.70		3.03	.83
Enterprising	3.03	.93		3.00	.76
Conventional	3.70	.00		–	–

Note:

1. Both Sex and Holland Type were significant ($p < .01$).

2. A higher score indicates more computer liking.

3. Post hoc tests revealed the Realistic and Investiative
   students liked computers more than did Enterprising and
   Artistic students.

4. There were no Conventional females in this sample.