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ABSTRACT

This study examines the relationship between academic preparation in instructional technology programs, student characteristics, competency attainment, and on-the-job success. The subjects, who were 1980-85 graduates of the Wayne State University Instructional Technology programs, completed a mail survey that covered all of the variables for the study, and also included a self-assessment of 56 instructional technology competencies. The survey results did not show interactions between all of the variables tested, but do provide the basis for two models. The first model explains the links between learners' characteristics (demographic, situational, and occupational) and their reasons for program participation and on-the-job success, as defined by income levels. The nature of the academic program or the level of competency attainment cannot be seen as predictors of job success in this model. The second model explains competency attainment in terms of the academic program, the frequency of use of various instructional technology skills on the job, and learner characteristics, primarily personality variables. Thus, in general, academic program participation and, ultimately, income level are linked to life experiences, while personality variables are associated with instructional technology competency attainment. However, both models support the need to consider instructional technology students in more dimensions than learning capacities and competence in the discipline. The text is supplemented by 3 figures, with 12 tables and other data in 5 appendices. (10 references) (EW)

Instructional Technology Academic Preparation, Competency, an On-the-job Success

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Background and Issues

Instructional Technology graduates work in diverse settings, principally educational systems (both K-12 and higher education), private sector training environments, and health and human service training departments. Consequently, Instructional Technology (IT) academic programs cover a broad range of skills and application techniques, and the students are as diverse as their vocational aspirations, more varied than other students in schools of education.

This study is a follow-up of one particular group of IT graduates. It looks at their demographics characteristics, their jobs, the programs they elected, and their perceptions of their own competence. Moreover, since Instructional Technology is becoming more and more intertwined with adult learning issues, these graduates are seen as adult learners and the findings are discussed in light of that literature.

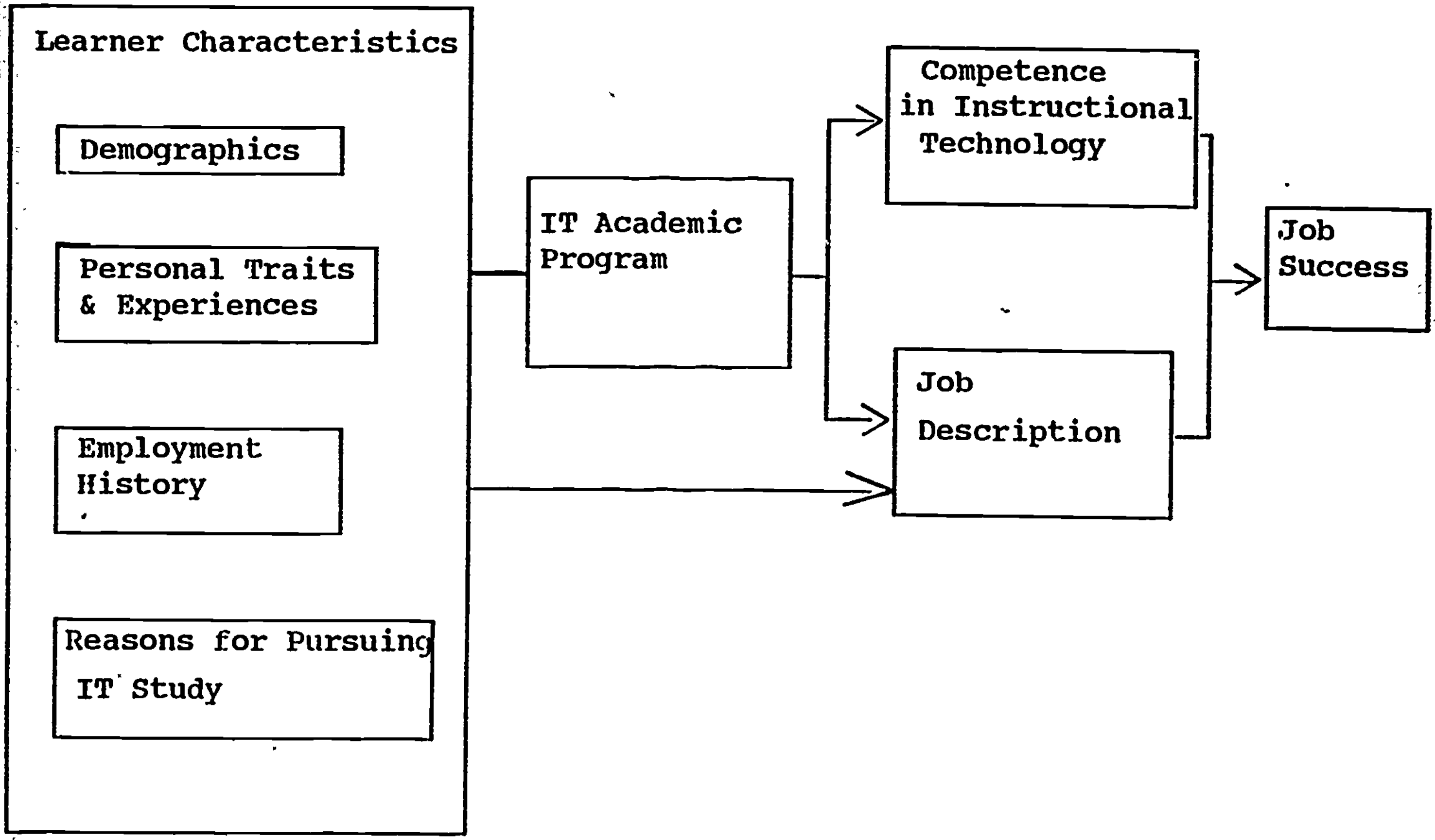
Most adult learners are not in higher education programs (only 14% are, according to Aslanian and Brickell, 1980). The graduates are thus not representative of adult learners, in general. However, they are typical adult learners in that their interests are primarily job-related (Darkenwald and Merriam, 1982). In addition, the graduates in this study seem typical of many professionals of the future because of their interest in career changes. Over forty percent reported that the primary reason they began this graduate program was to enable them to change careers, primarily from teaching positions to private sector training.

As with many follow-up studies, this one is concerned with both the competency of the graduates, as well as on-th-job success, and the extent to which these results can be attributed to the academic program. However, other variables have also been included because of the adult learning context. Previous studies of adult education participation have highlighted the importance of certain demographic characteristics (e.g. age, sex, and socio-economic status), and life experiences (Aslanian and Brickell, 1980; Cookson, 1986; Scanlan, 1986; Shipp and McKenzie, 1981). In addition to these, this study considers the role of certain affective characteristics of the graduates. These types of variables have explained much of the achievement of children in school situations (Bloom, 1976), and similar findings have been reported for adults (Cookson, 1986; Darkenwald and Valentine, 1985; Stamatis, 1986).

Figure 1 below summarizes the model of variable clusters which served as the framework for this study.

FIGURE 1

A Model of Variable Clusters
Relating to Competence in Instructional
Technology and On-the-job Success



Research Goals of the Study

The specific research questions explored in this study are:

1. What are the relationships between self-assessed competency levels and learner characteristics, including:
   a. demographics (sex, age, marital status, and educational background),
   b. situational background (activity level, and number of children),
   c. personality self-assessments (assertiveness, leadership, human interaction),
   d. employment experiences (settings, job title, income level), and
   e. reasons for program participation.

2. What are the relationships between self-assessed competency levels and academic program characteristics, including:
   a. total number of courses elected, and
   b. type of track elected.

3. What are the relationships between self-assessed competency level and key employment characteristics, including:
   a. current income,
   b. employment setting,
   c. job title, and
   d. on-the-job use of IT skills.

4. What are the relationships between current income and key learner characteristics, including:
   a. demographics (sex, age, marital status, and educational background),
   b. personal background (activity level, and number of children),
   c. personality self-assessments (assertiveness, leadership, human interaction),
   d. employment experiences (setting, job title, income level), and
   e. reasons for program participation.

Procedures

Population

The population of this study was the 1980-1985 graduates of the Wayne State University Instructional Technology programs. These include students with Master's Degrees, Educational Specialist Certificates, and Doctorates (both Ph.D and Ed.D). There are currently 404 active IT students in these programs (264 at the masters level, 53 educational specialists, and 87 doctoral students, of which 71 are in the Ph.D program). Almost all of the students are enrolled on a part-time basis. Wayne State University is an urban, research university in Detroit, Michigan with approximately 30,000 students. The University is close to major training and development departments housed throughout the automotive industry, computer manufacturing organizations, public utilities and insurance companies. These organizations provide diverse sites for practical applications in the IT program, as well as subsequent employment opportunities for graduates. The five county area also has K-12 employment sites, and large intermediate school districts, many community colleges, and other four-year colleges and universities.

Data Collection and Instrumentation

A mail survey instrument was constructed which covered all of the variables for the study. The instrument also included a self-assessment of 56 IT competencies.

The competency list (See Appendix A) was based upon several other documents identifying critical IT competencies. The first list used was the core competencies for instructional/training development developed by the Task Force on ID Certification of the AECT Division of Instructional Development (Task Force on ID Certification, 1981). Secondly, competency lists used by private organizations for employee evaluations were used. These lists were combined and standarized in format. Finally, changes were made to be congruent with the Wayne State IT program.

Surveys were mailed to 263 graduates. Fifty-eight were returned because of inaccurate addresses; thus the population was reduced to 205 graduates. With a 37% return rate, the total number of responses available for analysis was 75. There was no follow-up to non-respondents.

Date Analysis Methods

The model shown in Figure 2 provided the initial hypotheses. Path analysis was conducted to evaluate and more fully define this model.

Job success (see Figure 2) was measured by self-reported 1986 income. Job description was measured by job title and employment setting, and the frequency with which the graduates used the 56 IT competencies. The IT academic program was first described by simply identifying the total number of Instructional Technology and Evaluation and Research courses elected. Then the program was described by more specific program tracks.

These tracks were determined by: 1) identifying those courses commonly elected that form the core of classes, and 2) performing a factor analysis of the remaining course election data to identify distinctive patterns of course election. The common core group was separated from the analysis since it represented the least variance. Graduates were identified with the track in which they had elected the largest fraction of courses when compared to the other tracks. These tracks were then used to distinguish the various academic programs of the graduates in this study.

Two Models of the Effects of Academic Preparation in Instructional Technology

The intent of the study was to investigate the links between the characteristics of students, academic preparation in Instructional Technology, competency attainment, and on-the-job success. The major conclusion that can be drawn from the data is that interactions do not exist between all of these variables. It seems that there are two distinct models. The first explains the links between learners' characteristics (demographic, situational, and occupational) and their reasons for program participation and on-the-job success, as defined by income level. The nature of the academic program or the level of competency attainment can not be seen as predictors of job success in this model. The second model explains competency attainment in terms of the academic program, the frequency of use of the various IT skills on the job, and learner characteristics, primarily personality variables. These two models will be described in the following section.

A Model of IT Program Participation and On-the-Job Success

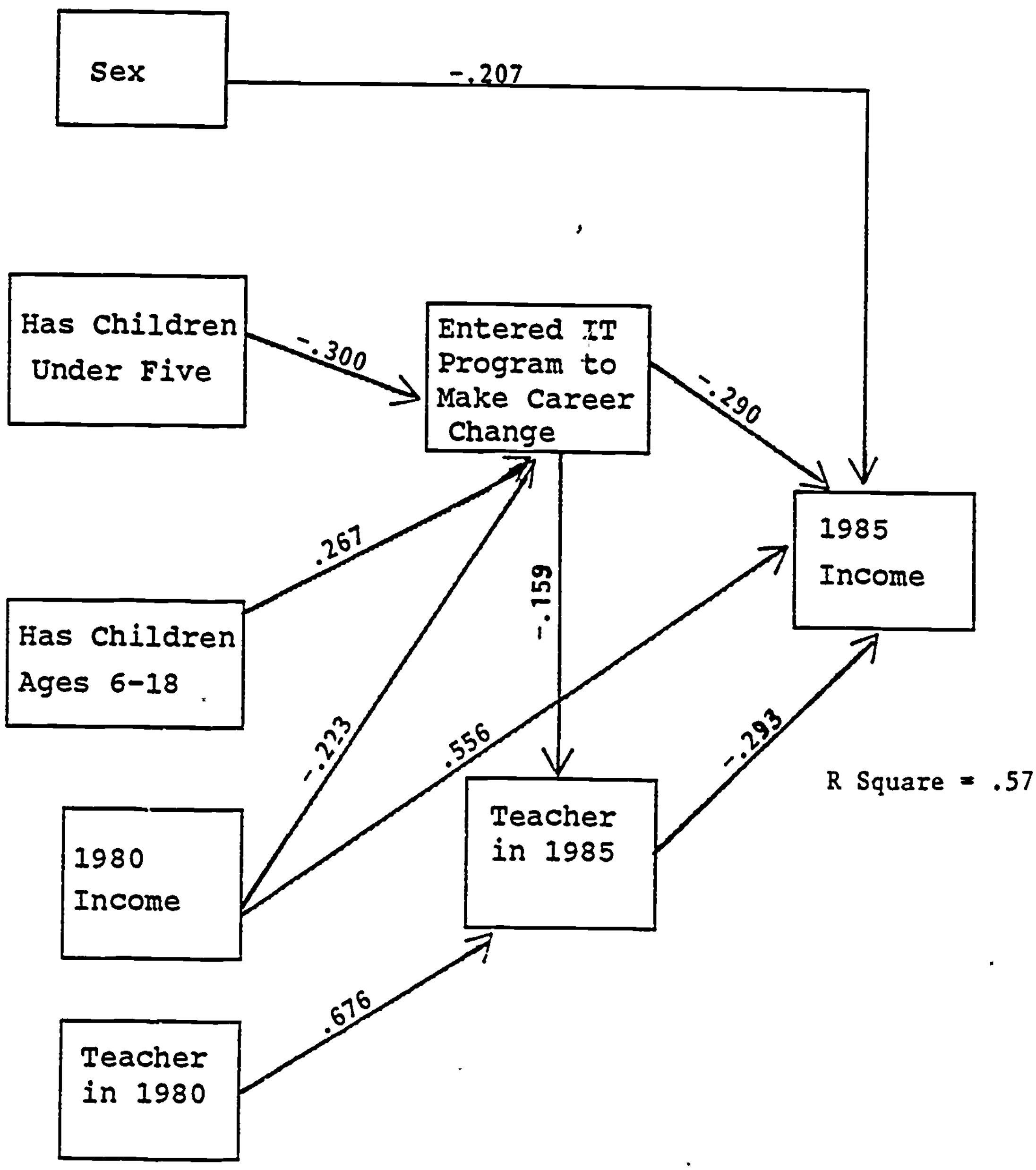
The model in Figure 1 shows the effects of Instructional Technology program participation on the 1985 income of graduates. This is a model which focuses on life experience variables, both family and professional, as motivation for program participation. It also tends to explain what can depress income, rather than explain high incomes.

Demographic Characteristics of Learners The only significant demographic characteristic to explain income level is sex. (See Table 1 in Appendix B for the data supporting the relationships found between the causal variables and the endogenous variables and the dependent variable, 1985 income.) As has been repeatedly reported, females earn lower salaries than males. The results of this study are no different. Being female explained lower salaries.

It is interesting to note that the male-female split in this study was almost precisely the split that has been found among adult learners in general (Aslaniane and Brickell, 1980), a 49%-51% division. This is true even though the IT population is not representative of the typical adult learner in other respects, principally age, education level, and employment rate. (See Appendix C for the demographic data comparing the IT graduates to general adult learners.)

Figure 2

A Model of Instructional Technology Program Participation and its Effects upon on-the-job Success*



* = Path Coefficients are indicated on each path

Personal Traits and Experiences. Anslanian and Brickell's (1980) extensive study of life changes as reasons for the causes and timing of adult learning identified a cause and effect relationship between life circumstances, which preceeded transitions, and learning. In this study, the situational variable which most affected an individual's motivation to begin graduate study were the ages of his or her children. This is evident, however, only in the cases of those students who entered the IT program with the intention of making career changes. In such instances, both men and women delayed starting graduate study until their children were in school.

Given the previously discussed effects of being female on income level, the effects of an interaction between being female and having children were also examined. This process did reveal some effects, but only of an indirect nature. The interaction between females and children does not explain 1985 income, nor job titles, nor reasons for IT program participation. What was discovered was that the 1980 income was negatively effected by this combination. Therefore, since the 1980 income is a powerful predictor of the 1985 income, the effects of this interaction are important.

Employment History. The graduates' occupational experiences proved to be key variables in both models which have emerged from this study. Here, it precipitated enrollment in the IT program for many. A low income in 1980 seemed to motivate the career changers to pursue graduate study.

Being a teacher explained the lower 1985 salaries in this study; although conversely it was not true that holding other job titles explained the higher incomes. Nevertheless, there was a tendency for the highest incomes to be earned by those in non-education settings, or by those who were in education, but not classroom teachers (primarily school administrators).

Reasons for Program Participation. A central part of the on-the-job success model is the role of the reasons students had for initially entering the IT graduate program. Data was collected in relation to three reasons for graduate study -- to obtain an advanced degree, to prepare for advancement in one's current job, and to prepare for a career change. The latter reason proved to be a predictor of 1985 income.

The major difference between the career change sub-group and the total population of the study is that the former group did appear to make the desired job changes. In 1980, 50% of those who intended to change careers were employed as teachers; 19.7% were employed in non-education jobs and nearly 13% were unemployed. Five years later no one was unemployed, 40.7% were working in non-education jobs, and just under 30% were still teachers.

However, making these career changes seems to have had a depressing effect upon salaries. It is hypothesized that since these persons have been in their new positions for a relatively short period of time, they have not yet begun to advance and salaries are, therefore, lower.

A Model of Academic Preparation, On-the-Job Skill Use and Competency Attainment

The second model resulting from this study emphasizes the IT academic program itself and the extent to which competencies were acquired, as measured by self-assessments. While life experiences were important to program participation, the critical learner characteristics in this context are personality variables. The important job descriptors are the extent to which the various IT skills are used in the workplace. The model is shown in Figure 3 below.

Demographic Characteristics of Learners. Again, the only major demographic predictor (now in relation to competency self-assessment) is sex. However, rather than having a negative impact as with salaries, being female is linked here to higher competency assessments. (See Table 2 in Appendix B for the data relating the causal variables to the endogenous variables and to the dependent variable, the average of all IT competency self-assessments.) While sex is not as strong a predictor in this model as in the previous situation, the contrasting results are nevertheless noteworthy. Either the women graduates are giving themselves positively biased competency ratings, or there is little correlation between skill and income.

Personal Traits and Experiences. Respondents rated themselves in terms of three personality traits -- assertiveness, leadership, and outgoingness. While leadership abilities did not predict competency attainment, the other two variables did have a positive, though indirect, relationship to overall competency self-assessment.

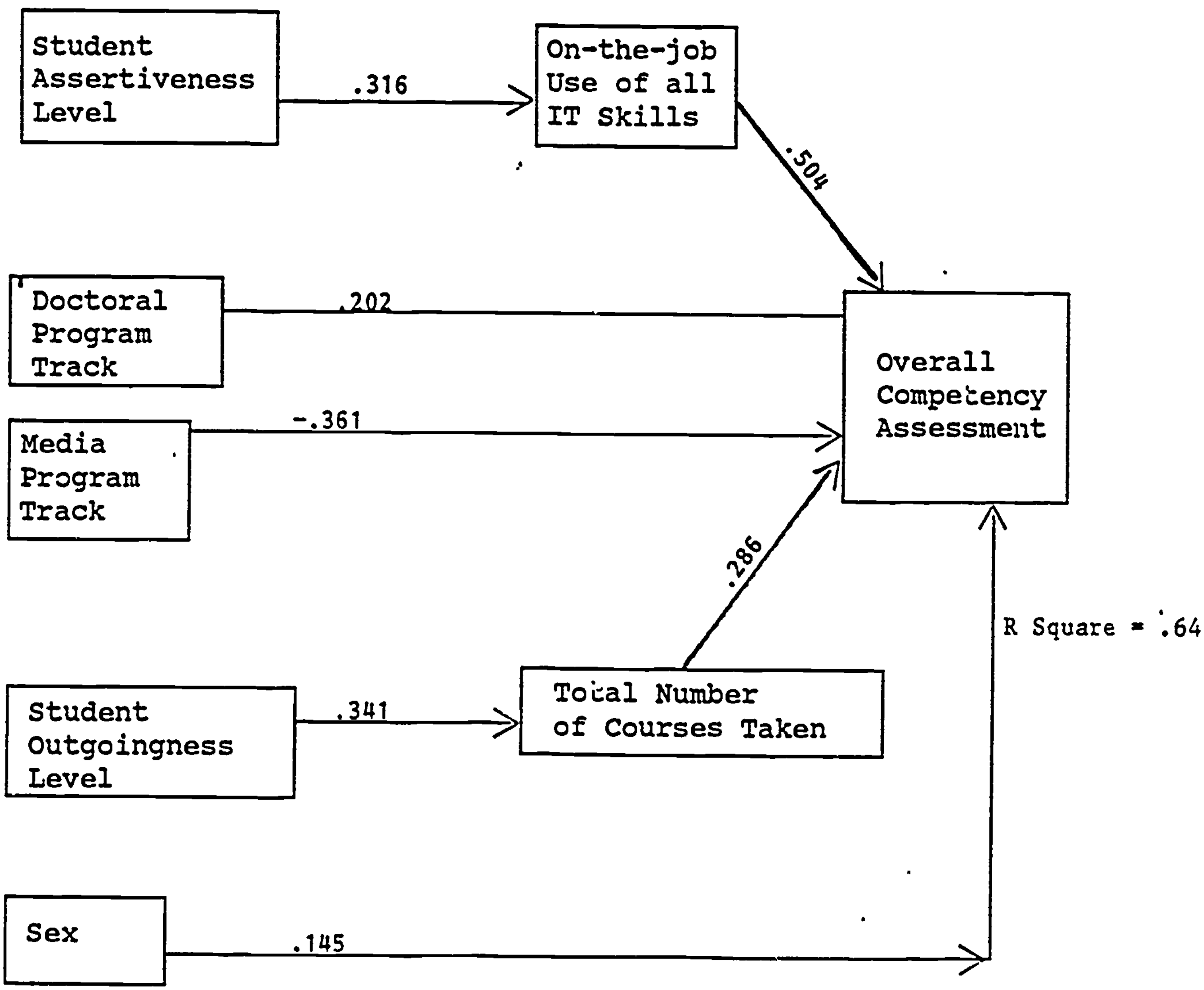
Assertiveness was linked to the on-the-job use of IT skills. This may indicate that in the workplace self-initiative explains the scope of some jobs. In addition, those persons who saw themselves as being more outgoing tended to take more university classes. Perhaps the social aspect of graduate programs is satisfying and contributes to competency attainment.

The IT Academic Program. As a result of the analysis of data rather than prior program definition), the IT courses elected by the respondents of this study were divided into a core set of courses and four separate tracks. (See Appendix D for these courses and the percentage of the respondents who elected each course). The four course groups are: 1) the doctoral track, 2) the private sector training track, 3) the media track, and 4) the school track.

The total number of courses taken positively predicts overall

Figure 3

A Model of Instructional Technology Academic Preparation, On-The-Job Skill Use, and Competency Attainment*



* Path Coefficients are indicated on each path

competency assessment. However, only two of the four tracks also are related to the overall average competency rating. The doctoral track, logically, explains higher competency assessments. These students have not only participated in more graduate study than other student groups, but they are superior students in terms of traditional academic standards. On the other hand, the media track has a negative influence on overall competency assessment. There is a danger in concluding that students in this track are less competent than their counterparts in other tracks. It is hypothesized that media-oriented students tend to be more specialized, both in terms of course election and in skill application. Since the dependent variable is an average competency rating for all 56 competencies, this measure may be biased against students with specialized areas of interest. Moreover, the Wayne State program has not emphasized traditional media production; the program is more design-oriented and the student population is skewed towards those in private sector training.

On-the-Job Skill Use. The major predictor of average overall competency assessment is the frequency of use of these same competencies on the job. On separate analyses, this same relationship occurred when viewing the six separate competency categories. This speaks to the great importance of practice and application of skills taught in the university classroom.

Although not reflected in the general model, the most frequently used skills are design skills; analysis skills are the second most frequently used. The least used competencies were in the development category, highlighting the existence of IT specializations in the work place. (See Appendix E for specific data describing the extent of competency use on the job.)

Summary

This study has resulted in two general models. These models theoretically separate academic preparation in Instructional Technology and competency attainment from on-the-job success (as measured by income). The two models also highlight the varying roles of different types of learner characteristics. Academic program participation and ultimately income level is linked to life experiences, while personality variables are associated with IT competency attainment. Thus both models support the need to consider IT students in more dimensions than learning capacities and competence in the discipline.

Unlike most adult learners, demographic characteristics of IT students have only limited effects on achievement in this program. The most notable exception from the norm is the absence of age effects, in this context, age does not have a depressing effect on achievement, even though this IT population is older than most pre-retirement adult learners. However, this phenomenon is consistent with the view that age is less of a deterrent to those who are receiving instruction within their domains of interest and specialization (Richey in press). The only critical demographic variable is sex.

The effects of career changes is important to many IT students. This group has been growing at Wayne State. In this study 73.3% of the career changers began their programs since 1981. In spite of the resurgence of teacher education, the pattern does not seem to be changing to any great extent. Realistic views of the advantages and disadvantages of making career changes should be discussed with students.

The competency attainment model shows the importance of academic coursework, but not without the practice that occurs on a job. Perhaps more emphasis should be given to student internships, and to incorporating real world application assignments into IT classes.

However, one is finally left with the question of the adoptability of these general models to specific areas of Instructional Technology. While the sample in this study is small, the more detailed analyses conducted seem to point to the strength of the general model. In relation to competency attainment, analysis by competency category resulted in essentially the same relationships. Moreover, competency assessment still can not be linked to on-the-job success if the data is analyzed more specifically. Therefore, the general models can serve as the bases of hypotheses of cause and effect relationships. They can lend themselves to expanding the tests of these relationships to other variables, (e.g. other measures of on-the-job success can be tested). The models can serve as one way of viewing standard program follow-up data in ways which shed light on adult learning and the role of key design variables in instructional programs.

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Appendix A
Instructional Technology
Competencies

Instructional Technology Competency

ANALYSIS

1. Conduct Job/Task Analysis
2. Analyze Knowledge Structure and Construct a Learning Heirarchy
3. Conduct Problems/Needs Analysis
4. Determine which projects are appropriate for instructional design/development
5. Analyze and evaluate existing instructional systems

DESIGN

6. Define your goals
7. Write Behavioral Objectives
8. Select Appropriate Media
9. Sequence Content
10. Design Lessons
11. Design Workshops
12. Design Courses
13. Design Programs
14. Sequence Learning Activities
15. Design Individualized Instruction
16. Design Group Instruction
17. Design A Total Instructional System

ASSESSMENT AND EVALUATION

18. Write Knowledge Test Items
19. Write Performance Test Items
20. Write Pre/Post Tests
21. Write Prerequisite Skills Test

22. Write Questionnaire/Survey Instrument
23. Design/Conduct Tryout Phases
24. Design Formative Evaluations
25. Design Summative Evaluations
26. Evaluate Instructional Materials
27. Interpret Evaluation Data
28. Write Evaluation Reports

DEVELOPMENT

29. Write Self-Instructional Modules
30. Write Training Manuals
31. Write Learning Guides
32. Write Instructors Guides
33. Write Workbooks
34. Write Job Aids
35. Arrange Copy to Enhance Communication
36. Write Audioscripts
37. Write Sound/Slide Scripts
38. Write Multi-Image Scripts
39. Write Videodisk Scripts
40. Design Computer-Assisted Instruction
41. Design Computer-Managed Instruction
42. Write Role Play, Case Study Simulations
43. Develop Learning Games
44. Write Brochures, Flyers etc.

45. Produce Mediated Instruction

MANAGEMENT

46. Design Instructional Management Systems

47. Plan For Organizational Change

48. Implement Organizational Change

49. Write a Funding Proposal

50. Plan/Manage a Design Project

51. Cost a Job and Develop a Budget

COMMUNICATION

52. Interview Subject Matter Experts

53. Demonstrate Consulting Skills

54. Demonstrate Technical Writing Skills

55. Edit Copy

56. Write Design Procedures

Appendix B

Table 1 Hypothesized Causes of 1985 Income Level

Table 2 Hypothesized Causes of IT Competency Self-Assessment

Table 1

Hypothesized Causes of
1985 Income Level

Endogenous Variable	Causal Variable	B	SE B	T	Prob.
	Constant	.70	.301		
Entered IT Program to Make Career Change	Has Children Under 5	-.37	.152	-2.40	.020
Mean=.419 S.D.=.497	Has Children Ages 6-18	.27	.121	2.19	.032
	1980 Income	-.05	.030	-1.79	.079
	R Square =	.15	N = 74		
	Constant	.13	.075		
Teacher in 1985	Teacher in 1980	.66	.090	7.35	.000
Mean=.400 S.D. = .493	Career Change Intent	-.16	.091	-1.72	.090
	R Square =	.49	N = 70		

Dependent Variable	Causal Variable	B	SE B	T	Prob.
	Constant	6.70	.878		
1985 Income Level	1980 Income	.51	.088	5.83	.000
Mean=7.10 S.D. = 1.91	Career	-1.11	.357	-3.43	.001
	Teacher in 1985	-1.13	.367	-3.08	.003
	Sex	-.78	.371	-2.11	.039
	R Square =	.57	N = 71		

Table 2

Hypothesized Causes of
IT Competency Self-Assessment

Endogenous Variable	Causal Variable	B	SE B	T	Prob.
	Constant	1.21	.234		
Average Frequency of on-the-job use of all IT Skills	Assertiveness	.17	.067	2.58	.012
Mean = 1.804 S.D. = .396					
	R Square =	.10	N = 66		
	Constant	.97	3.77		
Total Number of Courses Taken	Outgoingness	2.57	.96	2.69	.010
Mean = 10.947 S.D. = 4.992					
	R Square =	.12	N = 75		

Dependent Variable	Causal Variable	B	SE B	T	Prob.
	Constant	1.29	.492		
Average Self-Assessment of all IT competencies	Average Freq. of use on the job IT Skills	.88	.152	5.77	.000
Mean = 4.037 S.D. = .688					
	Total Number of Courses taken	.04	.012	3.07	.003
	Media Academic Track	-.70	.182	-3.84	.000
	Doctoral Track	.51	.242	2.11	.039
	Sex	.20	.120	1.65	.105
	R Square =	.64	N = 66		

Appendix C

A Description of the IT Graduate
Respondents in Comparison to
General Adult Learners*

Table 3 - Sex
Table 4 - Age
Table 5 - Marital Status
Table 6 - Highest Degree
Table 7 - Employment Status
Table 8 - Ages of Children

*Data from Aslanian and Brickell (1980)

Table 3

A Comparison of IT Graduates
and General Adult Learners: Sex

Sex	IT Graduates (N=75)	Adult Learners (N=744)	Difference (in %)
Male	48.0%	49%	-.1%
Female	50.7	51	-.3

Table 4

A Comparison of IT Graduates and
General Adult Learners: Age

Age	IT Graduates (N=75)	Adult Learners* (N=744)	Difference (in %)
26-30	4.0%	20*	-16.0
31-35	25.3	17%	+8.3
36-45	44.0	21	+23.0
46-55	22.7	15	+7.7
Over 55	4.0	20	-16.0

*The adult learner age grouping reported by Aslanian and Brickell (1980) were 25-29, 30-34, 35-44, 45-54, and 55 and older.

Table 5

A Comparison of IT Graduates
And General Adult Learners: Marital Status

Marital Status	IT Graduate (N = 75)	Adult Learner (N = 744)	Difference (In %)
Married	69.3	67.0	+2.3
Single	16.0	14.0*	+2.0
Divorced	10.7	10.0	+.7
Widowed	4.0	9.0	-5.0

*Includes separated (2%) and never married, single

Table 6

A Comparison of IT Graduates and
General Adult Learners: Highest Degree

Education	IT Graduates (N = 75)	Adult Learner (N = 744)	Difference (in %)
Bachelor's Degree	0	130%	-13.0
Master's	38.7		
M.A.+ Additional Hours	17.3	12.0	+85.3
Ed. Spec. Certificate	28.0		
Doctorate	13.3		

Appendix D

A Description of the
IT Academic Programs

Table 9

Undergraduate Majors of
The WSU IT Graduates (1980-85)

Major	Frequency	% of Respondents
Education	38	50.7
Liberal Arts	25	33.4
English or Humanities	8	10.7
Social Science	5	6.7
Speech Communications	4	8.3
Computer Sci, Math, or Eng.	4	5.3
Psychology	2	2.7
Natural or Physical Sci	2	2.7
Nursing or other Medical Area	6	8.0
Business Administration	2	2.7
Other	2	2.7

Table 7

A Comparison of IT Graduates
and General Adult Learners: Employment Status

Employment Status	IT Graduates (N = 75)	Adult Learners (N = 744)	Difference (in %)
Employed	93.3	71.0	+22.3
Retired	*	9	
Homemaker	1.3	15.0	-13.7
Student	1.3	2.0	- .7
Unemployed	2.7	3	- .4

*Data not gathered

Table 8

A Comparison of Male and Female IT Graduates
and Female Adult Learners: Ages of Children

Ages of Children	All IT Graduates (N = 75)	Female Adult Learners (N = 792)	Difference (in %)
Under 5	20.0%	8.0%	+12.0%
6-18	53.4	39.0	+14.4
over 19	25.3	59.0	-33.7

Table 10

A Description of the IT Program Core, the 4 tracks, and the Frequency of Course Election

Program Category	Course Number and Name	Percentage of Respondents who Elected the Course
Core Group	IT 711 Instructional Design	90.7%
	IT 710 Intro. Graduate Seminar	84.0
	IT 714 Seminar in Computer Assisted Instruction	62.7
	IT 715 Educ. Product Eval.	61.3
	IT 611 Systems Applications In Education Planning & Management	60.0
Track 1	EER 763 Fund. of Statistics	33.3%
	IT 811 Adv. Instruc. Design	28.0
Doctoral	IT 815 Needs Assessment	28.0
	IT 810 Program Design	26.7
	IT 818 Readings in IT	18.7
	IT 911 Adv. Research Seminar	16.0
	IT 915 Educational Futures	12.0
	IT 816 Adv. Instruc. Management	9.3
	EER 864 Variance & Covariance	8.0
	IT 910 Issues in IT	6.7
	EER 865 Multivariate analysis	5.3
Track 2	IT 712 Instructional & Organizational Instruction	54.7
Private Sector Training	IT 812 Practicum	40.0
	IT 716 Computer-Managed Instruction	36.0

Program Category	Course Number and Name	Percentage of Respondents who Elected the Course
Track 3	IT 510 Using Audiovisual Methods Materials and Equipment	28.0
	IT 512 Instructional Materials Workshop	21.3
Media	IT 519 Light, Sound, Space and Motion	9.3
	IT 513 Computer Programmed Multi-Image Presentations	6.7

Track 4	IT 613 Individualizing Instruction	50.7%
School-Oreinted	IT 616 Management of Instruction	44.0
	IT 511 Educational Technology	42.7
	IT 512 Instructional Materials Workshop	21.3

Appendix E

On-the-Job Use of IT Skills

Table 11

Competency Categories Ranked in Terms of Frequency
Of Use on the Job

Competency Category	Average Ranking of Competencies
1. Design	8.9
2. Analysis	16.2
3. Assessment & Evaluation	23.8
4. Communication	25.2
5. Management	39.8
6. Development	45.3

Table 12

IT Competencies Ranked in Order of Frequency of Use on the Job

Rank	Competency	Average Competency
1.	Define your goals	4.7
2.	Write behavioral objectives	4.7
3.	Select Appropriate Media	4.5
4.	Sequence Content	4.6
5.	Evaluate instructional materials	4.5
6.	Sequence Learning Activities	4.5
7.	Design group instruction	4.5
8.	Design lessons	4.6
9.	Design programs	4.3
10.	Analyze & evaluate existing instructional systems	4.2
47.	Write role play, case study, sim.	3.6
48.	Write a funding proposal	3.4
49.	Develop learning games	3.6
50.	Write workbooks	4.1
51.	Produce mediated instruction	3.3
52.	Design computer-managed instruction	3.3
53.	Write sound-slide scripts	3.2
54.	Write audioscripts	3.1
55.	Write multi-image scripts	2.8
56.	Write videodisk scripts	2.7