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ABSTRACT

Each year, millions of state and federal education funds are spent on career development interventions for America's teenagers. However, no uniform nomenclature, definition, and organization of these interventions exists in the professional literature. This hampers communication among and between practitioners, policymakers, and researchers. The lack of a comprehensive organization of these interventions makes quality research and program evaluation very difficult. To help remedy the problems of naming, defining, and organizing in the field of career development interventions, a study was conducted to: (1) identify comprehensive lists of career development interventions that occur in America's secondary schools; and (2) create a taxonomy of the identified interventions. Through consultation with career guidance practitioners and scholars across the country, as well as through examination of research articles, grant reports, and program manuals, a comprehensive list containing 44 interventions was established. These 44 interventions were then rated on five variables (time, mode, control, place, and size) by a random sample of the membership of the Guidance Division of the Association for Career and Technical Education. These ratings were then grouped empirically by means of cluster analysis, producing a four-cluster solution. The four clusters of career development interventions were titled work-based interventions; advising interventions; introductory interventions; and curriculum-based interventions. (Contains 44 references.) (KC)

A Taxonomy of Career Development Interventions That Occur In U.S. Secondary Schools

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Executive Summary

Each year, millions of state and Federal education dollars are spent on career development interventions for America's teenagers. However, no uniform nomenclature, definition, and organization of these interventions exists in the professional literature. This hampers communication among and between practitioners, policymakers, and researchers. The lack of a comprehensive organization of these interventions makes quality research and program evaluation very difficult.

To help remedy the nomenclatural, definitional, and organizational problems extant in the field of career development interventions, researchers from the National Research Center for Career and Technical Education conducted a study with the aims to (a) identify a comprehensive list of career development interventions that occur in America's secondary schools, and (b) create a taxonomy of the identified interventions. Through consultation with career guidance practitioners and scholars across the country, as well as through examination of research articles, grant reports, and program manuals, a comprehensive list containing 44 interventions was established. These 44 interventions were then rated on 5 variables (i.e., Time, Mode, Control, Place, & Size) by a random sample of the membership of the Guidance Division of the Association for Career and Technical Education. These ratings were then grouped empirically by means of cluster analysis, producing a four-cluster solution. The four clusters of career development interventions were titled: (a) Work-Based Interventions; (b) Advising Interventions; (c) Introductory Interventions; and (d) Curriculum-Based Interventions.

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NEED FOR A TAXONOMIC STUDY IN CAREER DEVELOPMENT

Introduction

Each year, large sums of state and Federal dollars are spent on career development interventions in America's public schools. The annual Federal expenditure alone on career and technical education exceeds one billion dollars (Carl D. Perkins Vocational and Technical Education Act of 1998). Such expenditures are seen as a sound investment, for it is believed that they increase the relevance of education for America's youth (Herr & Cramer, 1996). As will be discussed later, strong, albeit dated, research evidence supports these developmental efforts as beneficial. However, despite these benefits, researchers have not attempted to define the actual structure of career development interventions that occur in America's secondary schools. Without the knowledge of such a structure, real progress in career-development-interventions research and practice will be either severely circumscribed or absent.

This report details an empirical classification study of career development interventions that occur in America's secondary schools. The methods used to accomplish this study are common to the biological sciences, but not to education. Thus, for the sake of clarity, a glossary of definitions for specialized terms that appear in this report has been included as Appendix A.

Goal of Research Project

This taxonomic research project was undertaken in order to develop a taxonomy of career development interventions that occur in U.S. secondary schools. In his monograph on typologies and taxonomies in the social sciences, Bailey (1994) commented that "without classification, there could be no advanced conceptualization, reasoning, language, data analysis, or for that matter social science research" (p. 1).

Operational Definition of Career Development

The operational definition of career development used in this study is the most recent definition adopted by the National Career Development Association (NCDA). The NCDA (1993) defines career development as "the total constellation of psychological, sociological, educational, physical, economic, and chance factors that combine to influence the nature and significance of work in the total lifespan of any given individual" (p. 1). The NCDA (1993) defines work as "sustained, conscious paid and/or unpaid effort, other than that having as its primary purpose either coping or relaxation, aimed at producing societally acceptable benefits for oneself and/or for oneself and others" (p. 1).

Benefits of a Taxonomic Study

The production of a career development interventions taxonomy has benefits for both researchers and practitioners. First of all, a taxonomy would bring a standardized nomenclature in terms of content and structure to this area of classifying interventions. With this standardization, different initiatives then can be accurately compared and contrasted (Brickell et al., 1974). One of the major problems noted in the reviews of early-career-development research was the lack of definition of the treatment. Because of this lack of definition, the reviewers found it difficult to draw an accurate conclusion about the relationship between career development

interventions and important outcomes such as student achievement (Bhaerman, 1977; Bonnet, 1977; Evans & Burck, 1992; Hoyt, 1980).

When a field lacks a taxonomy, it is difficult to compare the efficacy of certain types of interventions against other sets of interventions (e.g., guidance curriculum vs. experience-based learning). This lack of comparative research leaves Career and Technical Education (CTE) practitioners with no alternative other than employing an inefficient and expensive "shotgun" approach to career development for America's youth.

Brickell et al. (1974) held that since taxonomies can be used to generate a set of distinctive choices, they can help frame the debate about what choices to make. Thus, policymakers at all levels can draw useful guidance from them. With a taxonomy, CTE researchers can explore systematically and comprehensively questions about the relationship between career development interventions and desired student outcomes. For example, outcome questions such as "Does the sequencing of career development interventions interact with a successful transition to post-secondary education?" might be asked. Another important question that the production of a taxonomy would open up for study is: "For students of color, which career development interventions most leverage academic achievement?"

A taxonomy can also help with other formative evaluation questions. For example, a taxonomy of career development interventions would give a director of guidance a parsimonious framework within which to examine if there are areas of career development where her or his district is underdeveloped (Bailey, 1994). Moreover, the director could use this taxonomy to map programmatic progress (Brickell et al., 1974). For instance, with a taxonomy as a guide, a school district CTE director could identify an under-programmed area of interventions and monitor the district's progress in addressing this weakness.

REVIEW OF CAREER-RELATED TAXONOMIC STUDIES

While a career-development-intervention taxonomy is absent from the professional literature, other career-related typologies and taxonomies have appeared. In this section, we will review these studies and their implications for the present taxonomic research project.

Career Development Intervention Typologies

While a taxonomy of the universe of secondary-school career interventions does not exist in the literature, a conceptual typology was published in 1974 by Brickell et al. They referred to their work as a taxonomy; however, it was in reality a conceptual typology. They posited four major career development types, which they labeled School District, Career Education Project, Career Education Instructional Program, and Evaluation. Thus, this typology contains elements of resources, demographics, pedagogy, and curriculum. Brickell et al. did not specify how they developed this typology, but did note that they considered it an initial effort rather than a finished product.

Taxonomy of Institutional-Sponsored Work-Experience Objectives

Heinemann and Wilson (1995) developed a taxonomy of college-level, institutional-sponsored work-experience program objectives. Heinemann and Wilson subjected these program objectives to a factor analysis and discovered that a six-factor solution best fit the data. They titled these factors: Cognitive Skills; Communication Skills; Job-Seeking Skills; Personal Development; Career Development; and Work Socialization. Heinemann and Wilson reported that they found little evidence of association between program titles and program objectives. This suggests that there is an overlapping nomenclature for this type of intervention at the college level.

Career Decision Making

Gati, Krausz, and Osipow (1996) produced a taxonomy of difficulties in career decision making. The participants in the study were drawn from two groups: members of the Israeli military; and Midwestern college students. Using cluster analysis, they found an underlying three-part structure to these difficulties. They labeled these clusters: Lack of Readiness; Lack of Information; and Inconsistent Information.

Recently, Gati and Saka (2001) reported on the results of their three empirical studies on the application of this taxonomy with Israeli adolescents. Gati and Saka found that the structures of adolescents' decision-making difficulties in the three studies were compatible with this taxonomy. They went on to point out this taxonomy could be a useful needs assessment tool for school counselors. Specifically, Gati and Saka suggested that assessment instruments based upon this taxonomy could "facilitate the identification of groups of students who have difficulties related to one of the three major categories and who may benefit from the same intervention" (p. 339).

Adult Career Problems

Campbell and Cellini (1981) presented a taxonomy of adult career problems. This taxonomy was similar to the one reported in the Brickell et al. (1974) study in that it was called a taxonomy but was in reality a conceptual typology. Campbell and Cellini posited that adult career problems had a four-part underlying structure. The types were: (a) problems in career decision making; (b) problems in implementing career plans; (c) problems in organization/institutional performance; and (d) problems in organization/institutional adaptation. Also like Brickell et al., Campbell and Cellini stated that they saw their work as a preliminary step.

Adolescent Career Development

Both Crites (1978) and Super (1974) have posited typologies of adolescent career development. Both of these typologies are well-known and influential. Crites' model had four parts which were: Consistency of Career Choices; Realism of Career Choices; Choice Competencies; and Career Choice Attitudes. Super maintained a five-part typology that had the following as its parts: Decision Making; Information; Cognitive Resources; Planfulness and Exploration; and Reality Orientation. Jepsen and Prediger (1981) established a taxonomy of adolescent career development. They completed this taxonomic study by assessing 237 11^{th}-graders on 19 different career development scales, including ones that employ Crites' and Super's typologies. Using factor analysis, they discovered four dimensions of adolescent career development: Cognitive Resources for Decision Making; Decision Making Style; Systematic Involvement in Career Decision Making; and Decision Making Stage/Certainty. While Jepsen and Prediger found some similarity between their findings and the models posited by Crites and Super, neither of the well-known typologies was affirmed empirically.

Career Interests

Career interests have been another area where career related taxonomic studies have occurred. The most well-known of these typologies is Holland's hexagon (Holland, 1973). Extensive research has validated the utility of this typology with high school youth (Prediger, Swaney, & Mau, 1993; Wall & Baker, 1997). Extensive research has also established that two work-task dimensions undergird this typology. These two dimensions are (a) working with data versus working with ideas, and (b) working with things versus working with people (Prediger, 1982; Prediger et al., 1993). Independent of the Holland approach to the study of career interests, Jackson has completed extensive taxonomic work on career interests (Jackson & Williams, 1975). For example, Jackson established a numeric taxonomy of academic majors (Jackson, Holden, Locklin, & Marks, 1984). Jackson et al. presented a clear case for the utility of classification research on career-related issues. They stated:

> First of all, it is parsimonious. The traditional approach has been to develop a separate empirical score for each separate male and female educational or occupational group. In the present instance, this would have resulted in 131 distinct scores. Such a number is unwieldy to analyze and report, and is likely to be confusing to a counselee. (p. 272)

In contrast to the state of career-interests research, the lack of a classification structure for career interventions calls for a taxonomic study. Such a study would bring clarity, parsimony, and structure to a presently inchoate set of interventions.

Student Career Competencies

In addition to explicit career-related taxonomies and typologies, noteworthy implicit typologies of student career development competencies exist. In a study of career development interventions, it is important to note these theoretical structures, for they are how career development professionals organize the end-products of career development interventions.

These noteworthy typologies include the SCANS competency standards (U.S. Department of Labor, Secretary's Commission on Achieving Necessary Skills, 1991), the National Career Development Guidelines (National Occupational Information Coordinating Committee, 1989), and the National Standards for School Counseling Programs (Campbell & Dahir, 1997). These standards have divided student competencies in a variety of ways. The SCANS standards have two parts. These parts are Foundational Skills (e.g., thinking skills) and Workplace Competencies (e.g., technology). The National Career Development Guidelines have a tripartite structure: Self-knowledge; Educational and Occupational Exploration; and Career Planning. The National Standards for School Counseling Programs has a similar structure to that of the National Career Development Guidelines. Its tripartite structure includes the taxa: Academic Development; Career Development; and Personal/Social Development. In the Career Development part, three competency standards are listed. These standards are as follows:

Standard A. Students will acquire the skills to investigate the world of work in relation to knowledge of self, and to make informed career decisions.

Standard B. Students will employ strategies to achieve future career success and satisfaction.

Standard C. Students will understand the relationship between personal qualities, education and training, and the world of work.

In the *National Standards for School Counseling Programs* document, these standards are further broken down into specific student competencies and performance indicators.

Gysbers and Henderson's (1999) model for school guidance programs contains an implicit typology that includes career-related interventions. Their four-part typology includes Student Competencies, Structural Components, Program Components and Resources. Under the Program Components sections are listed nine interventions, all of which extend beyond career-related concerns.

The four implicit typologies discussed above all exert tremendous influence over career development practices in America's secondary schools (Dahir, 2000; Gray & Herr, 1998; Gray & Herr, 2000; Lapan, Gysbers, & Petroski, 2001). However, while influential, they all bear the same two faults. First, none comes close to addressing with clarity the full scope of career development interventions that occur at the secondary school level. Second, no empirical support exists upon which to assert that they accurately represent reality.

METHOD

Participants

The participants for this study were drawn from a random sample of 12% (n = 194) of the membership of the Guidance Division of the Association for Career and Technical Education (ACTE). The following were excluded from the sample: (a) members of the research team (n = 1), (b) surveys returned by the postal service with no forwarding address (n = 7), and (c) surveys returned by potential respondents claiming lack of ability or desire to complete the instrument (n = 6). Thus, the final sample size was 180. Of the 180, a total of 101 surveys were returned, for a 56% return rate. This return rate is a strong one, given the length of the survey, which contained 220 items. The participants in this study were highly educated and had extensive professional experience in the career development field. The vast majority (88%) possessed a master's degree or higher. The average was 15 years of professional experience with career development activities. The majority were female (71%). Persons of color represented 16% of respondents. A little more than three-quarters of the participants worked in K-12 settings (76%). Approximately one-half of the participants worked as counselors (55%). The professions of the other respondents were teacher (13%), administrator (14%), paraprofessional (1%), and other (13%).

Instrument

Development of interventions list. Research articles, grant reports, and program manuals were reviewed in order to develop a comprehensive list of career development interventions that commonly occur in American secondary schools. Drafts of this list were circulated to career development professors and practitioners around the country for feedback. These career development professionals were asked to recommend additions and subtractions to the list, as well any nomenclature revisions. Using this feedback, a final list of 44 interventions was set. An alphabetized listing of these interventions can be found in Table 1. This list formed the foundation for the survey sent to the participants.

Determination of rating variables. Developing a comprehensive listing of interventions was only the first step in the creation of a taxonomy of interventions. The next key step was selecting the variables upon which to cluster the interventions. Thirteen variables that might be used to describe school-directed programming were considered. The potential variables are listed alphabetically in Table 2, along with their title and binomial categories. The reason for binomial categorization of the variables will be discussed in the next paragraph.

If all 13 variables were used to rate the 44 interventions, the subsequent survey would have contained 572 items. In his classic text on mail survey research, Dillman (1978) noted that response rate reductions can be expected in surveys that exceed 125 items. Thus, it was decided to limit the number and cognitive complexity of the ratings in the hope of securing an acceptable return rate. The limits set were: (a) 5 variables times 44 interventions in terms of length, and (b) binomial ratings in terms of cognitive complexity. These limits resulted in a survey with a total number of items slightly under twice the number of Dillman's reduced response-rate cut point.

Table I

List of Career Development Interventions

1. Academic Planning Counseling
2. Career Cluster/Pathway/Major
3. Career/Technical Education Course
4. Career Information Infused Into Curriculum
5. Career Academy/Career Magnet School
6. Career Passport/Skill Certificate
7. Career Field Trip
8. Career Day/Career Fair
9. Career Aptitude Assessment
10. Career Library/Career Resource Center
11. Career Skills Infused Into Curriculum
12. Career Maturity Assessment
13. Career Focused Parent/Student Conference
14. Career Peer Advising/Tutoring
15. Career Map
16. Career Counseling
17. Career Interests Assessment
18. College Admissions Testing
19. Community Members Teach In Classroom
20. Computer-Assisted Career Guidance
21. Cooperative/Dual Enrollment
22. Cooperative Education/Structured Work Experience
23. Guidance Lessons on Academic Planning
24. Guidance Lessons on Career Development
25. Guidance Lessons on Personal/Social Development
26. Information Interviewing
27. Internship
28. Job-Hunting Preparation
29. Job Coaching
30. Job Placement
31. Job Shadowing
32. Mentorship Programs
33. Personal/Social Counseling
34. Portfolio/Individual Career Plan
35. Recruiting
36. Referral to External Counseling/Assessment
37. Referral to External Training Programs
38. School-Based Enterprise
39. Service Learning/Volunteer Programs
40. Student Clubs/Activities
41. Tech Prep/2+2 Curriculum
42. Work-Based Learning Project
43. Work Study
44. Youth Apprenticeships

Table II

List of Potential Variables, Including Title and Binomial Categories

1. Control of Application (Control–Adult vs. Youth)
2. Delivery Structure (Structure–Fixed vs. Flexible)
3. Duration (Time–Short vs. Long)
4. Evaluation (Grade–Graded vs. Non-Graded)
5. Goal (Goal–Skills vs. Knowledge)
6. High School Credit Provision (Credit–Yes vs. No)
7. Location (Place–Community vs. School)
8. Pedagogical Style (Mode–Active vs. Passive)
9. Sequence of Delivery (Sequence–Jr/Sr vs. Fr/Soph)
10. Size of the Intervention Group (Size–Individual vs. Group)
11. Student Access (Access–Open vs. Restricted)
12. Theoretical Base (Base–Cognitive/Behavior vs. Humanistic/Developmental)
13. Training Level of Provider (Train–Professional vs. Classified)

Once a limit of five variables was set, the question of which five variables to use then emerged. Fortunately, there exists a quality continuum for variables used to perform a cluster analysis. On one end of the continuum are the most *robust* variables, and on the other end are the most *noisy* variables. By robust, we mean variables that lead to the most homogeneous clusters possible (Carmone, Kara, & Maxwell, 1999). By noisy we mean variables that mask the clear structure portrayed by the other variables, and yield less homogeneous clusters (Carmone et al., 1999).

To determine which 5 variables to employ, the 13 variables were placed along the quality continuum described in the previous paragraph. This placement was done conceptually and was guided by Saylor and Alexander's (1966) influential text on curriculum planning. In particular, the researchers of this study were influenced by Saylor and Alexander's six-level model of factors that influence "the actual experiences provided pupils by the school." (p. 273) Those variables that occurred on the factor level that Saylor and Alexander held as most closely linked to actual student experiences were rated as most robust. Figure 1 contains the results of the conceptually-derived variable placement activity.

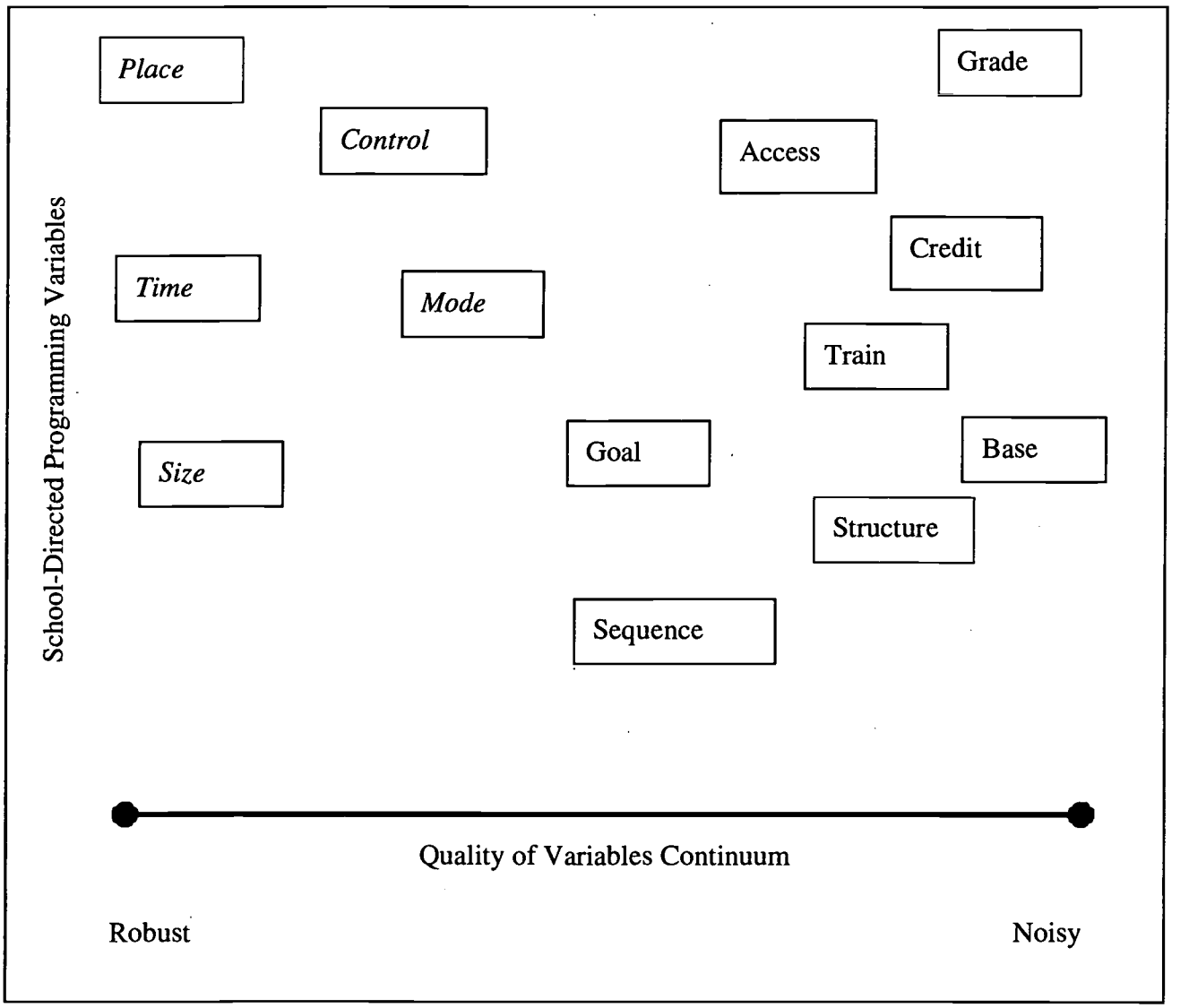

Figure 1. School-directed programming variables by quality of variables continuum.

Note. Variables used in the taxonomic study are italicized.

The five variables placed closest to the Robust pole were selected for use in the study. The selected variables were: Time–duration of the intervention; Mode–pedagogical style; Place–location of intervention; Size–size of the intervention group; and Control–control of the intervention's application.

Intervention rating procedures. On the survey itself, participants were asked to select the binomial descriptor that *best* represented an intervention. Brief definitions were provided for each descriptor. Specifically, for the Time variable, the participant could circle S for Short (1 hour to 2 weeks) or L for Long (greater than 2 weeks). For the Mode variable, the participant could circle P for Passive (listening, reading, viewing) or A for Active (hands-on). For the Place variable, the participant could circle S for School-Based (on campus) or C for Community-Based (off campus). For the Size variable, the participant could circle G for Group (small group and above) or I for Individual (a student). Finally, for the Control variable, the participant could circle Y for Youth-Directed (control over time/scope/location) or A for Adult-Directed (control over time/scope/location). In total, each participant made 220 ratings.

Survey versions. The survey had three different versions, each of which differed only in terms of the ordering of interventions. Each version was sent out randomly to a third of the participants, in order to attenuate any potential response set bias. A copy of Version A of the survey can be found in Appendix B.

Data Analysis

Dummy Coding. Each variable rating was dummy coded *0* if the descriptor selected appeared on the left side of the rating sheet, or *1* if it appeared on the right side. For example, if a respondent identified Time as Short Term it was coded 0; if Long Term it was coded 1. In order to cluster the interventions by the five variables, we aggregated individual respondent ratings by first computing what percentage of respondents endorsed the 0 descriptor for each variable on each intervention. For example, for the Time variable on the Job Shadowing intervention, 78% of the respondents endorsed the 0 descriptor (i.e., Short Term). These endorsement percentages were then transformed into quintile rank scores and it was these scores that were used in the cluster analysis.

Cluster analysis. Bailey (1994) noted that the most common technique to establish taxonomies in the social sciences is cluster analysis. In their article on the uses of cluster analysis in counseling psychology research, Borgen and Barnett (1987) stated that clustering could be an especially powerful technique for simplifying complex data sets. They noted that "it can be used to group the objects when use of human judgement would be tedious, subjective, or practically impossible" (p. 461). At its most basic level, cluster analysis is the application of a set of rules (i.e., algorithm) for dividing up a proximity matrix in order to form groups of similar objects (Borgen & Barnett, 1987). In this definition, the term *proximity matrix* refers to a matrix of similarities or dissimilarities between objects. For the reader interested in more information on the application of cluster analysis to psychological phenomena, we recommend two well-written introductory articles—Borgen and Barnett (1987) and Milligan and Cooper (1987). The cluster analysis conducted in this study was accomplished by means of the ClustanGraphics software program (Wishart, 1999). This program is highly regarded in the taxonomy research community (Bailey, 1994).

When cluster analysis is performed using ratings from scales utilizing different metrics, raw scale scores are converted to a standard score. In the present study, such a transformation was not performed because the five variable ratings all used the same metric. Concerning the particular data set of this study, Wishart (personal communication, May 9, 2000) recommended that cluster analysis be conducted by first computing proximities via the Euclidean Sum of Squares method.

Then he recommended that the proximities be clustered by the Increase Sum of Squares method. These recommendations were followed exactly. In addition to Wishart's recommendation, a large body of literature reports the Increase Sum of Squares method as the preferred method of clustering (Borgen & Barnett, 1987; Milligan & Cooper, 1987).

To answer the question of how many taxons are present in the data, we employed the best cut procedure available in the ClustanGraphics program. This procedure uses significance tests based on the fusion values. We used the default Upper Tail test of significance set at the .05 level.

Besides clustering, the ClustanGraphics program also notes the case (i.e., career development intervention) that statistically most exemplifies each taxon. Taxon exemplars are the cases which have the minimum within-cluster average dissimilarity.

Modal rank score computation. In addition to the cluster analysis, the modal quintile rank score for each variable on each taxon was computed. In order to facilitate across taxon comparisons, conceptual descriptors were assigned to each quintile rank score (e.g., 1st) on each variable (e.g., Time). For instance, on the Time variable the descriptor assigned to the first 1st quintile (i.e., a 0 endorsement rate of 81%-100% and a 1 endorsement of 1%–20%) was *Strong Short*. The descriptors for the other quintiles of the Time variable were *Short* (2nd quintile), *Mixed* (3rd quintile), *Long* (4th quintile), and *Strong Long* (5th quintile).

RESULTS

Cluster Analysis

The ClustanGraphics best cut procedure reported a significant four taxon solution. This 4 taxon solution was significant at .05 on an Upper Tail Test with 43 degrees of freedom (Realized Deviates = 1.54, t-statistic = 10.07). The variable by taxon means, standard deviations, skewness, kurtosis, minimum scores, maximum scores, and modal scores can be found in Table 3. Table 4 contains a list of the 44 interventions by taxon. The member interventions for each taxon are listed alphabetically below the taxon titles. An asterisk designates the exemplars for each taxon in Table 4.

As with factor analysis, naming taxa can be as much an art as it is a science. Many names were considered for each taxon. In the end, we chose to apply nomenclature that we believe reflected the taxon exemplar. The first taxon's exemplar was Youth Apprenticeship. This taxon contained 10 interventions. This intervention occurs at work sites in community settings, rather than in school settings. Thus, we chose the taxon name *Work-Based Interventions*. The second taxon was named *Advising Interventions* by drawing upon the taxon exemplar Career Peer Advising/Tutoring. This taxon contained 20 interventions. The third taxon contained the exemplar Career Day/Career Fair. Thus, we named this taxon *Introductory Interventions*. This taxon contained 7 interventions. The final taxon had Tech Prep/2+2 Curriculum as its exemplar. Thus, we labeled this taxon *Curriculum-based Interventions*, given the structural and instructional nature of the exemplar. This taxon also contained 7 interventions. We view these taxon labels as provisional, and invite the reader to forward any suggestions they have about taxon nomenclature to us.

Table III

Variable By Taxon Statistics

Taxon/ Variable	Mean	*SD*	Skewness	Kurtosis	Min-Max	Modal
Work-Based Interventions						
Control	3.30	.67	-.434	-.283	2-4	3
Mode	4.90	.32	-3.162	10.000	4-5	5
Place	3.80	.63	.132	.179	3-5	4
Size	4.50	.71	-1.179	.571	3-5	5
Time	4.10	.88	-1.465	3.613	2-5	4
Advising Interventions						
Control	3.45	.69	-.887	-.240	2-4	4
Mode	3.70	.73	.553	-.834	3-5	3
Place	1.45	.69	1.283	.542	1-3	1
Size	3.90	.79	.186	-1.308	3-5	4
Time	3.10	1.17	.231	-.799	1-5	2/3
Introductory Interventions						
Control	4.14	.38	2.646	7.000	4-5	4
Mode	3.57	.98	-.277	2.156	2-5	4
Place	1.57	1.13	2.156	4.580	1-4	1
Size	1.14	.38	2.646	7.000	1-2	1
Time	1.86	1.07	.374	-2.800	1-3	1
Curriculum-Based Interventions						
Control	3.86	1.07	-.772	.263	2-5	4
Mode	4.14	.69	-.174	.336	3-5	4
Place	3.80	.00	--	--	1-1	1
Size	1.43	.53	.374	-2.800	1-2	1
Time	4.71	.49	-1.230	-.840	4-5	5

Note:
Control: 1 = Strong Youth; 2 = Youth; 3 = Mixed; 4 = Adult; 5 = Strong Adult.
Mode: 1 = Strong Passive; 2 = Passive; 3 = Mixed; 4 = Active; 5 = Strong Active.
Place: 1 = Strong School; 2 = School; 3 = Mixed; 4 = Community; 5 = Strong Community.
Size: 1 = Strong Group; 2 = Group; 3 = Mixed; 4 = Individual; 5 = Strong Individual.
Time: 1 = Strong Short; 2 = Short; 3 = Mixed; 4 = Long; 5 = Strong Long.

Table IV

Interventions by Taxon

Taxon Title and Career Development Intervention
Work-Based Interventions
Cooperative Education
Internship
Job Shadowing
Job Coaching
Job Placement
Mentorship Programs
Service Learning/Volunteer Programs
Work-Based Learning Project
Work Study
Youth Apprenticeships*
Advising Interventions
Academic Planning Counseling
Career Focused Parent/Student Conference
Career Peer Advising/Tutoring*
Career Map
Career Maturity Assessment
Career Counseling
Career Interests Assessment
Career Library/Career Resource Center
Career Cluster/Pathway/Major
Career Passport/Skill Certificate
College Admissions Testing
Computer-Assisted Career Guidance
Cooperative/Dual Enrollment
Information Interviewing
Job-Hunting Preparation
Personal/Social Counseling
Portfolio/Individual Career Plan
Recruiting
Referral to External Training Programs
Referral to External Counseling/Assessment
Introductory Interventions
Career Day/Career Fair*
Career Field Trip
Career Aptitude Assessment
Community Members Teach In Classroom
Guidance Lessons on Personal/Social Development
Guidance Lessons on Career Development
Guidance Lessons on Academic Planning

Table IV *continued*

Taxon Title and Career Development Intervention
Curriculum-Based Interventions
Career Information Infused into Curriculum
Career/Technical Education Course
Career Skills Infused into Curriculum
Career Academy/Career Magnet School
School-Based Enterprise
Student Clubs/Activities
Tech Prep/2+2 Curriculum*

Note. Asterisk designates taxon exemplar.

Modal Rank Scores

Computation of a modal quintile rank score for each variable on each taxon was completed. The results of these computations appear in Figure 2.

DISCUSSION

This study produced the first taxonomy of the career development interventions that occur in American secondary schools. The results suggest that there is an underlying four-part structure to this universe of interventions. The four intervention taxa were denoted Work-Based Interventions, Advising Interventions, Introductory Interventions, and Curriculum-Based Interventions. In this section we will (a) provide a detailed description of each taxon, (b) present the potential implications of the study, and (c) describe the limitations of the study.

Taxon	Variable				
	Time	**Mode**	**Place**	**Size**	**Control**
Work-Based	Long	Strong Active	Community	Strong Individual	Mixed
Advising	*	Mixed	Strong School	Individual	Adult
Introductory	Strong Short	Active	Strong School	Strong Group	Adult
Curriculum	Strong Long	Active	Strong School	Strong Group	Adult

Figure 2. Modal quintile rank descriptors by taxon and variable.

Note. Asterisk designates a tie between the modal categories of Short and Mixed.

Taxon Descriptions

Work-based interventions. This taxon can be defined as follows: "The class of interventions designed to promote both career and academic self-efficacy and motivation through sustained and meaningful interactions with work sites in the community." This taxon was the only one with a Community modal descriptor for the Place variable. It was also the only taxon with a Strong Active descriptor for Mode.

Advising interventions. This taxon can be defined as follows: "The class of interventions designed to provide direction, resolve impediments, or sustain planfulness in students about their goals for the future." Super and Overstreet (1960) felt that planfulness was a core element to successful career development in adolescence. This taxon was the only one of the school-based taxa described as delivered on an individual basis.

Introductory interventions. This taxon can be defined as follows: "The class of interventions designed to awaken a student's interest in their own personal and professional growth." This taxon was similar to the fourth taxon with one exception. The modal Time variable descriptor for this taxon was Strong Short and the modal Time descriptor for the fourth taxon was Strong Long. This temporal difference emphasizes the introductory and preparatory nature of this class of interventions.

Curriculum-based interventions. This taxon can be defined as follows: "The class of interventions designed to promote career and academic knowledge and skills through means and content relevant to the world of work." As noted in the previous section, the distinguishing characteristic of this taxon of interventions versus the other school based taxa is its long-term nature. The interventions contained in this taxon represent the school-based complements to the interventions that are part of the Work-Based Interventions taxon.

Implications

We felt that four implications for CTE practitioners and researchers emerged from this taxonomic study. These implications were: (a) improved communication among CTE professionals; (b) improved formative evaluation of career development interventions; (c) improved summative evaluation of career development interventions; and (d) improved research of career development interventions. A discussion of each of these implications follows.

Improved communication. A uniform nomenclature and definition are critical to adequate communication among all professionals. Without such a nomenclature and definition, misunderstanding and confusion are commonplace. For example, a regional CTE director suggests that a school district institute a practicum program. The district CTE director does some research online and finds multiple definitions of this term. Also, some definitions sound the same as the work-based learning project program and the internship program the district already has in place. Given this blurring of program titles and activities, the district director becomes confused about what to do next, and thus decides to set aside the regional director's suggestion.

Another example of confusion concerns the school counselor who goes to a state convention and learns about the advantages of starting a career majors program. The school counselor wonders how this program is similar to the career pathways program the school counselor had

read about in a recent publication. The school counselor is unsure where to turn, and his (or her) enthusiasm wanes.

The taxonomy produced by this study also helps CTE professionals engage in richer program planning. The number of distinct interventions we discovered in our research exceeded 40. A number this high presents a level of complexity that may inhibit reflection on, and organization of, professional practice. By their very nature, taxonomies accurately "chunk" large sets of interventions. Thus, with the taxonomy developed in this study, school counselors planning a state convention do not have to wade though an endless set of disconnected interventions in order to develop a convention theme and program. Instead, they can select to focus on building capacity in a certain role in a certain area, e.g., building consulting capacity with the interventions of the curriculum taxon.

Improved formative evaluation. By the term formative evaluation, we mean evaluation undertaken to find ways to improve, redesign or fine-tune a program (Vogt, 1993). As noted earlier, the universe of career development interventions is presently disconnected and ill-defined. As such, it is difficult for school districts to answer comprehensively and in detail questions such as "In terms of career development interventions, where is my district over-programmed and where is my district under-programmed?" However, with the taxonomy reported in this study, along with its associated nomenclature and definitions, a CTE director gains a language with which to ask answerable questions. For example, you might ask a question such as "Compared to similar districts in my state, is my district under-programmed in reference to work-based interventions?"

In addition to creating the space for intelligible programming questions, the creation of this taxonomy gives CTE personnel the tools to evaluate whether gaps exist between theory and practice. For instance, the placement of the guidance lesson interventions in the Introductory Interventions taxon was unexpected, in terms of present school counseling theory. Influential texts on school counseling (Campbell & Dahir, 1997; Gysbers & Henderson, 1999) recommend that these interventions be seamlessly woven into the curriculum, and thus be long-term. Thus, on a theoretical level, the three guidance lesson interventions should have been found in the fourth taxon. Instead, the random national sample of guidance professionals used in this study reported viewing these interventions as short-term. This description suggests that in practice, guidance lessons are still delivered by school counselors in an intermittent and time-limited fashion. Thus, the results of this taxonomic study suggest critical gaps may exist between best practice and actual practice in the career development arena.

Improved summative evaluation. By the term summative evaluation, we mean evaluation undertaken to assess the impact of a program or to determine how well a program has met its goals (Vogt, 1983). A full description of program components is foundational to quality summative evaluation (Wholey, Hatry, & Newcomer, 1994). Unfortunately, such description has not been the tradition in the summative evaluation of career development intervention programming. For example, reviewers of the Career Education (CE) program evaluation literature noted many methodological problems (Bhaerman, 1977; Bonnet, 1977; Datta, 1977; Hoyt, 1980). One of the key problems cited was the poor definition of the *treatment* in these evaluations. Concerning CE as treatment, Bhaerman (1977) commented that:

> As with the length of the data collection period, it is difficult to generalize since, as stated before, it was not always possible to ascertain-from the printed reports–the degree of the "delivery of program components." (One researcher, M. F. Smith, spoke of this as "the nebulous variable"–and it was.) I wish it were possible to illustrate clearly and simply the direct relationship between scope and intensity of the CE treatment and the results. But, because of the nature of the reports, a one-to-one relationship cannot be easily drawn. (p. 52)

In the end, the shortcomings of the CE summative evaluations were the result of the investigators' failure to adequately define the treatment. However, poor summative evaluation execution on this question was not limited to CE evaluators.

The only large-scale, post-CE summative evaluation concerning the impact of career development interventions on academic achievement was Lapan, Gysbers, and Sun (1997). Lapan, et al. found that academic achievement (as measured by self-reported grades) was positively related to level of guidance program implementation. However, this study contained the conceptual and methodological problems present in the CE studies. Namely, that the *treatment* in this research lacked the needed specificity. In the case of Lapan et al., the sole independent variable was the Missouri Comprehensive Guidance Program in toto. However, in reality, this variable is multifaceted and contains many non-career development interventions, as well.

The taxonomy presented in this study fills the treatment specificity gap pointed out so long ago by Bhaerman (1977). This taxonomy and its associated nomenclature and definitions give CTE personnel the ability to conduct comprehensive evaluations of their career development intervention work. For example, an evaluation question such as the following: "Did the curriculum taxon interventions increase student interest in taking more advanced classes in math and science?"

Improved research. By the term research, we mean the systematic investigation of a subject aimed at uncovering new information (discovering data) and/or interpreting relations among a subject's parts (theorizing); Vogt, 1983. Research is similar to summative evaluation in that both focus on outcomes. However, research differs from program evaluation in that the end of research is generalizable, rather than local, knowledge. In terms of career development intervention research, the problem present in summative evaluation is also present here. Namely, the problem of ill-defined treatments. Thus, it is difficult to conclude from past research on school-based career development interventions *why* certain outcomes occurred.

Reviewers of career development intervention research have noted this problem. For example, Whiston and Sexton (1998) conducted a major review of the school counseling outcome literature published from 1988 to 1995. In this review, they noted that research methodology problems made it difficult to draw any definite conclusions about the relationship between guidance and academic achievement.

Like summative evaluation, the taxonomy presented in this study fills the treatment specificity gap. This taxonomy and its associated nomenclature and definitions give CTE researchers the foundational tools needed to study causal relationships between interventions and outcomes. For

example, one might research a question such as "What dosage of introductory interventions is sufficient to raise student career maturity?"

Limitations

The reader should note five potential limitations to this study. The first limitation involves the fact that the clustering done in this study was based upon the ratings made by members of the ACTE Guidance Division. Some other information-rich populations (e.g., school principals) could have potentially provided additional clarification to the taxonomic structure of career development interventions that operate in American secondary schools.

A second limitation concerns the variables selected to rate the interventions. As noted earlier, the survey reached its practical length limitation with the selection of five variables. However, one or more of the variables excluded because of this practical limitation may have aided in creating an even clearer taxonomic structure.

The particular placement of variables on the clustering variables quality continuum represents a third limitation. This placement was based upon a single curriculum theory. While Saylor and Alexander's (1966) theory is widely respected and used, it may not include elements that are important for rating career development interventions. In addition, the application of Saylor and Alexander's theory was conceptually driven, and thus was open to biases in a way that an empirically driven application would have not been.

The use of a binomial categorization system to rate the 44 interventions represents a fourth limitation. The potential exists that employing a binomial scale, rather than the Likert scale, attenuated meaningful differences between interventions.

The target setting of this study (i.e., American secondary schools) represents a fifth limitation. We asked the participants to rate interventions on different variables within the context of our target setting. These variable ratings may have differed if the context were the elementary school level or post-secondary level. Thus, extending this taxonomy beyond secondary schools should only be made with caution.

CONCLUSION

In the social sciences, taxonomic studies are rarely conducted as ends in themselves. These studies are completed in order to provide tools for researchers and practitioners. The problem with not having a career development intervention taxonomy becomes especially evident when one examines major research articles on the relationship between career development and important outcome variables such as academic achievement. Lapan et al. (1997) did find that the level of comprehensive school guidance program implementation was related to student achievement, as measured by self-reported grades. However, the question as to which specific career development interventions made the difference went unanswered. This methodological problem mirrors the methodological problems of the same research conducted in the 1970s and early 1980s as part of the Career Education movement. Namely, that *treatment* in this area of research lacked specificity.

This lack of specificity about interventions in the career development and academic achievement literature is a problem for educational leaders and policymakers in an era of limited resources. The nation's counselors, teachers, and administrators need concrete guidance on what career development activities can give them the most leverage in promoting student success. The taxonomy contained in this report brings needed clarity, specificity, and organization to the treatment side of career development intervention research projects. In addition, this taxonomy gives CTE practitioners and administrators the ability to comprehensively and systematically evaluate and monitor their career development work.

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APPENDIX A

Glossary of Specialized Terms

Case (in cluster analysis). The individual entities that are being grouped by cluster analysis (Lorr, 1983).

Cluster. A naturally occurring group (Wheeler & Kivlighan, 1995). In the present study, a synonym of taxon.

Cluster Analysis. Cluster analysis is a multivariate statistical technique used to determine naturally occurring groupings (Wheeler & Kivlighan, 1995).

Taxonomy. An empirically derived grouping (Bailey, 1994).

Taxonomies. The plural form of taxonomy.

Taxon. A unit of a taxonomy.

Taxonomic. The adjectival form of taxonomy.

Taxa. The plural form of taxon.

Typology. A conceptually derived grouping (Bailey, 1994).

Typologies. The plural form of typology.

Variable (in cluster analysis). The attributes of cases used to perform the cluster analysis (Lorr, 1983).

APPENDIX B

OR-Penn Career Development Interventions Inventory (Form A)

Overview: This packet contains a survey of career development interventions that occur with students in Grades 7-12.

Instructions. There are three steps to completing this survey packet:

Step One: Fill in the demographic information requested on this page.

Step Two: On Page 2, review the definitions of the five dimensions. Notice that each dimension is split into half. You will be asked to decide which half best characterizes a career intervention.

Step Three: Starting on Page 3, circle the letter for the half that best characterizes the interventions.

Demographic Information. *Please provide the following demographic information:*

Gender (circle one): Male Female

Highest Degree Obtained (circle one):

Associate Baccalaureate Master's Doctorate

Years of Professional Experience with Career Development Interventions: _____

Primary Work Location (circle one): K–12 Higher Education Other

Ethnicity (please specify):_____

Current Professional Role (check one box):

- ❑ Teacher (circle level: ES MS HS CC 4yearC)
- ❑ Counselor (circle level: ES MS HS CC 4yearC)
- ❑ Administrator (circle level: ES MS HS CC 4yearC)
- ❑ Paraprofessional (circle level: ES MS HS CC 4yearC)
- ❑ Other (please specify)_____

Definitions

Defined below are the five dimensions which you will be asked to use to assess career development interventions. Please familiarize yourself with these definitions before turning to Page 3.

Dimension:

Time:	**S** Short Term *1 hour to 2 weeks*	**L** Long Term *greater than 2 weeks*
Mode:	**P** Passive *listening, reading, viewing*	**A** Active *hands on*
Place:	**S** School Based *on campus*	**C** Community Based *off campus*
Size:	**G** Group *small group & above*	**I** Individual *a student*
Control:	**Y** Youth Directed *control over time/scope/location*	**A** Adult Directed *control over time/scope/location*

Instructions: *For each of the five dimensions, circle the letter in each column that best characterizes the intervention.*

Intervention	Time		Mod		Place		Size		Control	
	Short-Long		*Pass-Act*		*Sch-Comm*		*Grp-Indv*		*Yth-Adult*	
Job Shadowing	S	L	P	A	S	C	G	I	Y	A
Career Interests Assessment	S	L	P	A	S	C	G	I	Y	A
Career Day/Career Fair	S	L	P	A	S	C	G	I	Y	A
Portfolio/Individual Career Plan	S	L	P	A	S	C	G	I	Y	A
Career Cluster/Pathway/Major	S	L	P	A	S	C	G	I	Y	A
Career/Technical Education Course	S	L	P	A	S	C	G	I	Y	A
Internship	S	L	P	A	S	C	G	I	Y	A
Career Passport/Skill Certificate	S	L	P	A	S	C	G	I	Y	A
Mentorship Programs (teacher/peer/comm.)	S	L	P	A	S	C	G	I	Y	A
Cooperative Ed./Structured Work Exper.)	S	L	P	A	S	C	G	I	Y	A
Service Learning/Volunteer Programs	S	L	P	A	S	C	G	I	Y	A
Guidance Lessons on Personal/Social Dev.	S	L	P	A	S	C	G	I	Y	A
Personal/Social Counseling	S	L	P	A	S	C	G	I	Y	A
Guidance Lessons on Career Development	S	L	P	A	S	C	G	I	Y	A
Student Clubs/Activities (e.g., DECA)	S	L	P	A	S	C	G	I	Y	A
Guidance Lessons on Academic Planning	S	L	P	A	S	C	G	I	Y	A
Recruiting (i.e., military, college admission)	S	L	P	A	S	C	G	I	Y	A
Information Interviewing	S	L	P	A	S	C	G	I	Y	A
Work-Based Learning Project	S	L	P	A	S	C	G	I	Y	A
Career Library/Career Resource Center	S	L	P	A	S	C	G	I	Y	A
Work Study	S	L	P	A	S	C	G	I	Y	A
Career Field Trip	S	L	P	A	S	C	G	I	Y	A
Community Members Teach In Classroom	S	L	P	A	S	C	G	I	Y	A
Career Skills Infused Into Curriculum	S	L	P	A	S	C	G	I	Y	A
Job-Hunting Prep. (e.g., mock interviews)	S	L	P	A	S	C	G	I	Y	A
Career Information Infused Into Curriculum	S	L	P	A	S	C	G	I	Y	A
Job Placement (by School/Job Service)	S	L	P	A	S	C	G	I	Y	A
Referral to External Counseling/Assessment	S	L	P	A	S	C	G	I	Y	A
Youth Apprenticeships	S	L	P	A	S	C	G	I	Y	A
Career Map	S	L	P	A	S	C	G	I	Y	A
Career Counseling	S	L	P	A	S	C	G	I	Y	A
Career Peer Advising/Tutoring	S	L	P	A	S	C	G	I	Y	A
Referral to External Train. Prg. (e.g., JTPA)	S	L	P	A	S	C	G	I	Y	A
Career Maturity Assessment	S	L	P	A	S	C	G	I	Y	A
College Admissions Testing (e.g., ACT)	S	L	P	A	S	C	G	I	Y	A
Career Aptitude Assessment (e.g., ASVAB)	S	L	P	A	S	C	G	I	Y	A
Tech Prep/2+2 Curriculum	S	L	P	A	S	C	G	I	Y	A
Academic Planning Counseling	S	L	P	A	S	C	G	I	Y	A
Computer-Assisted Career Guidance	S	L	P	A	S	C	G	I	Y	A
Job Coaching	S	L	P	A	S	C	G	I	Y	A
Cooperative/Dual Enroll. (e.g., HS & CC)	S	L	P	A	S	C	G	I	Y	A
Career Academy/Career Magnet School	S	L	P	A	S	C	G	I	Y	A
School-Based Enterprise	S	L	P	A	S	C	G	I	Y	A
Career Focused Parent/Student Conference	S	L	P	A	S	C	G	I	Y	A

APPENDIX C

Project Team Roster

Senior Principal Investigator: Dr. Edwin L. Herr received his EdD in Counseling and Student Personnel Administration from Teachers College, Columbia University. Dr. Herr is Distinguished Professor of Education, and Chair of the Department of Adult Education, Instructional Systems, and Workforce Education and Development at The Pennsylvania State University. Dr. Herr is the lead author of the influential text Career Guidance and Counseling Through the Lifespan (Herr & Cramer, 1996), and is an internationally respected scholar and leader in the areas of career counseling, counselor education, school counseling, and vocational education. Dr. Herr is a former editor of the *Journal of Counseling and Development* and *Counselor Education and Supervision*. Dr. Herr is also a former president of the following national professional associations: American Counseling Association; Association for Counselor Education and Supervision; and National Career Development Association.

Project Director, Principal Investigator, and Team Leader: Dr. Cass Dykeman received his PhD in Counselor Education from the University of Virginia. He is an Associate Professor of Counselor Education at Oregon State University. Dr. Dykeman is currently the President of the Western Association for Counselor Education and Supervision. Prior to doctoral studies, Dr. Dykeman served as a school counselor in Seattle, Washington. As a school counselor, Dr. Dykeman designed and implemented one of the first elementary school student assistance programs in his state. For this work, Dr. Dykeman was named "School Counselor of the Year." Dr. Dykeman served as principal investigator and project director for a Community Education Employment Center grant sponsored by the Office of Adult and Vocational Education (U.S. Department of Education Grant # V199G40042).

Co-Investigator: Dr. Michael Anthony Ingram received his doctorate in Counselor Education and Supervision from the University of Cincinnati. He is an Assistant Professor of Counselor Education at Oregon State University. Dr. Ingram coordinated the Recognizing Academic Progress (RAP) program in Cincinnati, OH. The student monetary incentive program funded by Fifth/Third Bank and the Jacob & Charlotte R. Schmidlapp Foundation was designed to increase academic achievement, decrease dropout rates and provide career exploration opportunities for 1,500 middle- and high-school students who attended three inner-city Cincinnati Public Schools. Dr. Ingram is also recognized internationally as a performance poet and cultural storyteller.

Co-Investigator: Dr. Dale Pehrsson received her EdD in Counselor Education and Counseling from Idaho State University. She is an Assistant Professor of Counselor Education at Oregon State University. Dr. Pehrsson directed and facilitated career outreach grants through the Center for New Directions in Pocatello, ID.

Senior Research Assistant: Mr. Chris Wood received a Master of Science in Psychology with a School Counseling emphasis from Eastern Washington University. Currently, Chris Wood is a doctoral candidate in Counselor Education at Oregon State University. Mr. Wood was a career

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