

A Feature Analysis of Career Information Delivery Systems (CIDS): Technical Report Number 40

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Abstract

Career information delivery systems (CIDS) have evolved from a rare technological innovation to a common resource in the delivery of career services. The problem is that most information in texts, training materials, and marketing materials from CIDS developers describe the features of a single system. No current aggregate data is available that examines the features of CIDS to provide a state-of-the-art perspective on system design. The general purpose of this study was to provide an aggregate description of the features of CIDS in order to identify the current strengths and weaknesses of this technology. In particular, practitioners, CIDS developers, researchers, and policy makers can make specific use of data from this study. A Total of ? Internet-based CIDS were included in the study. Each CIDS was analyzed according to ? features in the four categories of 1) site content, 2) user friendly features, 3) support resources, and 4) access policy. Data were gathered by actual CIDS use and the review of support materials provided on-line. Results are presented in a checklist format along with a listing of the CIDS that were analyzed in the study. A general conclusion follows a discussion of the results.

Background

Computer applications designed to assist individuals to make informed career decisions have existed since 1966 (Harris-Bowlsbey & Sampson, 2001). These computer applications deliver a *single function*, such as career assessment, or an *integrated* function, such as assessing personal characteristics, linking these characteristics with potentially appropriate occupations, and delivering related information. Watts (1996) identified single function applications as *Mini* systems and integrated applications as *Maxi* systems. He noted that by standardizing concepts and language with an integrated design, the Maxi system helped users to move easily between different system features and to use information from one part of the system in another part of the system. The 2002 standards of the Association of Computer-based Systems for Career Information (ACSCI) stated “Computerized career information and services range from comprehensive systems to highly specific components aimed at a single career function. Comprehensive career information delivery systems provide work-related and educational information in an environment characterized by multiple audiences, accountability, user support, and training” (p. 4). Systems included in this analysis can be characterized as integrated, maxi, or comprehensive.

Over time, integrative computer applications have been known as computer-assisted career guidance systems, computer-assisted career planning systems, computer-based career planning systems, and career information delivery systems. The most widely used term at present for integrated applications is career information delivery system (CIDS). The delivery of CIDS has paralleled the evolution of computing, from mainframes to personal computers to the Internet. Given the current migration of CIDS from personal computers to the Internet, only Internet-based CIDS were included in this study.

For the purposes of this feature analysis study, a career information delivery system (CIDS) will be defined as

A system of integrated assessment, generation of alternatives, and information dissemination subsystems, used on a self-help basis or coupled with a career intervention provided by a practitioner, that are designed to assist individuals in making informed career decisions.

The core elements, or subsystems, of a CIDS, *assessment*, *search for options*, and *information* (Sampson, 1997), are described as follows.

The *assessment* features of a CIDS assess psychological constructs such as values, interests, or skills, or employment preferences such as the preference for indoor work and employment outlook. The intended outcome of completing an assessment is that adolescents or adults are potentially more aware of factors that are important to them in making an informed career decision, as well as providing a starting point for identifying occupational and educational options.

The *search for options* feature of a CIDS indicates where a fit, or match, occurs between the values, interests, skills, or employment preferences of the user and the related characteristics of occupations or educational options. The intended outcome of using the search for options feature is that adolescents or adults are able to identify options that are appropriate for further exploration. For adolescents and adults considering many potential alternatives, the search feature helps to focus their attention on a reasonable number of options. For users with a very limited number of options they are considering, the search feature helps them understand that there are a variety of potential options that may be worth considering.

The *information* feature of a CIDS provides an opportunity for adolescents and adults to learn more about the occupational, educational, or employment options they are considering. The intended outcome of using the information feature is that adolescents and adults are able to narrow their options to a tentative choice, ultimately taking action to implement their choice by obtaining the education or training they need or by seeking employment (Sampson, 1997). This paper continues with the statement of the problem, the purposes of the study, the methodology, results, discussion, and conclusion.

Statement of the Problem

At one time CIDS were considered a rare innovation in the delivery of career services. CIDS are now commonly available in educational and organizational settings (ACSCI, 2003) or on the Internet as a self-help resource. Career counselors (National Career Development Association, 1997) and Global Career Development Facilitators (Center for Credentialing & Education, 1998) are expected to be familiar with the design and use of computer applications as one element of competent practice. Educational and training resources routinely include information on the design of CIDS. The problem is that most information in educational texts, training materials, and marketing materials from CIDS developers describe the features of a single system. No current aggregate data is available that examines the features of CIDS to provide a state-of-the-art perspective on system design. Also, no data-based commentary is available that relates system features to national standards for CIDS.

Purposes of the Study

The general purpose of this study is to provide an aggregate description of the features of CIDS in order to identify the current strengths and weaknesses of this technology. In particular, practitioners, CIDS developers, researchers, and policy makers can make specific use of data from this study. *Practitioners* can use results from this study to relate the features of one or more CIDS to the current state-of-the-art in this technology as one element of making selection decisions, e.g., does one system have more or less features than would be typically found in a CIDS. *CIDS developers* can use results from this study to examine the features of their own systems in relation to the current state-of-the-art in this technology as one element of setting priorities for future system development, e.g. what features are necessary to maintain quality and competitiveness relative to the cost of developing each feature. *Researchers* can use results from this study to provide a context for the use of any one CIDS, or group of CIDS, in a research project, e.g., to what extent can the results of one study, using one or more systems, be generalized to other CIDS? *Policy makers* can use results from this study to evaluate the current state-of-the-art in system design, e.g. to what extent are professional standards reflected in the design of CIDS?

Methodology

The following methodology describes selection criteria for including Internet-based CIDS in this analysis, the establishment of features, procedures for collecting and analyzing the data, and limitations of the study.

Criteria for Selecting CIDS

For the purposes of this analysis, a CIDS is operationally defined as being integrated and include the following three core elements: 1) assessment, 2) search capability, 3) information delivery (occupational plus educational data), and these components must be integrated to assist the individual in using the information from one core element of the CIDS to complete another element of the CIDS. Examples of integration include using assessment results to search for occupations, or looking up educational programs for an occupation being researched. For inclusion in the analysis, the CIDS had to fit the above operational definition.

Four search methods were used to identify potential CIDS for inclusion in the analysis. The first method included systems from a previous feature-cost analysis of Internet-based CIDS (Sampson, Lumsden, Carr, & Rudd, 1999) that still met criteria for inclusion. The second method included state-based CIDS with Internet delivery that were identified by the Association of Computer-Based Systems for Career Information (ACSCI, 2003). The third method included Internet-based CIDS identified by state or developer in the Local, State, and National Career and Labor Market Information section of the Career Resource Library maintained by America's Career INFONET (2003). The final method included using "", "", "" as search terms in the Google and MSN search engines. Using the four methods described above, a total of ? systems were identified for potential inclusion in the analysis.

Establishment of Features

Features were established by building upon previous feature-cost analyses of computer-assisted career guidance systems beginning with PC-based features (Sampson, et al., 1998) and continuing with Internet-based features (Sampson, et al., 1999). As the CIDS were reviewed, features were added or removed to best reflect the existing features of the CIDS. Some features were added based on the 2002 ACSCI standards for CIDS. For the purposes of this analysis, main categories of features included 1) CIDS content, 2) user-friendly features, 3) support resources, and 4) access policy. Because this type of analysis is limited to features, which are known at the time the site was reviewed; the findings can be made available in a timely fashion. Specific features are identified in Table 1.

Procedures

A six-member research team was assembled to conduct this analysis. The research team met to review the purposes of the present research and then met as a group several times further inclusion criteria for features and to suggest the addition of new features or the deletion of previous features. Developers were contacted to ask if they were willing to participate in the study by providing a password (or similar control method). Of the ? CIDS who met the inclusion criteria, # or ?% agreed to participate in the study for a time limited period. Each developer's Web site was then reviewed, by on-line CIDS use and support materials provided on-line, according to the checklist in Table 1 by two members of the research team. Disagreements between team members over the presence or absence of specific features were resolved through group discussion and a second review of the site for the feature in question. If confusion still existed, the developer could be contacted to help resolve the question.

When different terminology was used by developers to represent similar features, a "/" mark was used to combine terms, e.g., earnings/wages. Also, in reviewing each CIDS, information was not considered to be part of the Web site if it originated from another site. Instead, this information was considered a link, e.g., occupational information had to be at least partially delivered via the CIDS as opposed to a simple link to national labor market information.

Limitations

One limitation involves the use of a "checklist" approach in collecting the data. In an effort to present feature data in a succinct manner, a dichotomous yes - no "checklist" comparison of sites was used, i.e. "Feature X: Does Site A have it? Does Site B?" This approach effectively simplified a massive amount of data. However, potential problems occur when this methodology oversimplifies and obscures subtle and complex differences among CIDS. Certain features cannot be adequately explained by this "yes" - "no" analysis. This type of analysis does not capture some of the true differences. For example, Internet-based CIDS may contain financial aid information for education institutions. However, there may be wide differences in the quantity and quality of information provided about financial aid. For example, there were no checks on the source validity and bias that may be inherent in occupational outlook information.

A second limitation of this study involves the dynamic nature of the Internet. A strength of Internet-based CIDS is the ability to constantly update and add features and content. This strength poses a challenge to any study attempting to review these features and content. Any attempt to do so is simply a snapshot in time.

Results

The results of the analysis are provided in two Tables. [Table 1](#) provides aggregate data on the features of ? Internet-based CIDS. The table includes site content, user-friendly features, support resources, and access policy. [Table 2](#) lists those Internet-based CIDS who were analyzed in this research.

Discussion

In light of the results obtained in this study, the following section will discuss trends in funding and costs, user support and identification of user needs, information provided by sites on identity and qualifications of the developers, data provided on validity of assessments and information, use of various media and audio by sites, integration features and strategies for access, and reference to ACSCI standards.

The growth and development of these sites appears to have been supported by four funding mechanisms: 1) separate fees charged to organizations (e.g., schools) that in turn provide access to their members (e.g., students), 2) access is bundled with fees paid for PC-based systems, 3) access is free and granted to members of a certain group (e.g., an entire state) due to underwriting by a government agency, and 4) access is universal due to underwriting by a government agency. There is currently no evidence of an Internet CIDS that derives direct support from an individual, fee per service basis.

While these Internet-based CIDS are not directly supported by individual users, it is the individual who ultimately benefits from these sites. However, not all of these individuals have the capability to initiate or sustain the career exploration and decision-making process (Sampson, Peterson, Reardon, & Lenz, in press). Varying degrees of professional support for CIDS use may be necessary depending upon user needs (Sampson, 1997). None of the sites include a description of circumstances where users may need help applying the information to their specific needs. It would benefit these users if sites included contact information for local referral sources based upon user needs.

Basing the design of Web sites for career information delivery on a needs-based model, helps individuals to more quickly find information that meets their needs while understanding how to use the information they receive (Sampson, 1999). Traditionally, the user has been required to learn the navigation metaphors and "rules" of a particular Web site in order to find the information which they seek. In a needs-based design, CIDS features are categorized by commonly occurring user needs. For example, college graduates often need to conduct a job search and high school students often desire to explore their occupational interests. This approach requires user reflection and provides a framework with which users can match their needs to features available on the site.

A great deal of the information about site developers and site content is contained in separate Web sites about the developer or sponsoring organization. This information is not well integrated into the Internet CIDS themselves. Users may begin their search for career information at the Web site address for the Internet CIDS, thus missing the opportunity to find this valuable information. For example, while developers often identify themselves on their CIDS site, this identification may not be linked to the qualifications of the developer, which is posted on a different Web site. Therefore, consumers have less information with which to make informed choices about the quality of available sites. Although a qualified developer does not ensure the existence of a valid CIDS, it is one useful piece of information individuals may use in selecting quality sites.

Similarly, none of the sites provide information on validity of assessments. This information is necessary to allow practitioners to ethically discharge their responsibilities and users to determine if the assessment will meet their needs. Likewise, while original sources were cited in much of the information content, none of the sites provided a general statement about

information gathering and authoring procedures or quality control methods. Practitioners and users must have confidence that the information delivered is accurate and relevant to their needs.

Users may potentially benefit from exposure to "original source content" via links to other sites. While there is a natural desire to keep users on one's own Web site, experience with real world content may be a valuable aspect of the exploration process. For example, links to union or employer web pages offering apprenticeships would provide the learner with 1) evidence to validate information in the CIDS, 2) a chance to build a schema by comparing and contrasting options; and 3) information on which to take further action (e.g., information interview, job shadow, or application). The downside to providing users direct access to such content is that they can easily become lost and they may not be able to judge the variable quality of information presented.

The Internet offers a wide variety of media creation and integration tools to developers, however sites currently rely on text-based strategies for information presentation. This is most likely due to delivery issues that are associated with multimedia and the Internet (e.g., bandwidth, platform standards, and production costs). However, the user experience could be enhanced by presenting complex information (e.g., wage and Labor Market Information) in the form of simple charts delivered as graphics.

One form of information delivery offering rich possibility to developers is audio. None of the sites appear to use this presentation method, even though audio is a relatively bandwidth friendly form of multimedia. It can also be a relatively easy to produce and cost effective method of integrating "real world" content (e.g., vocational biographies). Audio offers additional benefits to those with visual disabilities or limited reading skills. It is also important for developers to consider other accessibility issues when designing and delivering their products. For example, all developers may wish to provide alternative means of navigation or text only versions of their Web sites for individuals with visual disabilities, who may depend on text-to-speech tools for navigating the World Wide Web.

Overall, Internet-based CIDS appear to be in an early stage of development in comparison with their older, PC-based siblings. While the core information contents of Internet-based and PC-based CIDS are almost identical, tools that users can use to integrate this information in the decision-making process appear less developed. For example, none of the sites offer the capability to compare two education providers or two occupations, a common feature of standalone CIDS. This situation will probably improve over time, as developers are more able to apply their past experience with CACG systems to an Internet environment that is more responsive and fully featured.

Similarly, only two CIDS currently offer an online portfolio and keep a user record through an individualized access strategy (i.e., users receive their own username and password). While group access strategies are easier to deliver and manage, they may possibly provide a less powerful experience for the user. By users having their own unique records, tools for portfolio development (e.g., resumes, assessment records, and education) and information management (e.g., individual learning plans and histories of past site utilization) become possible. One possible disadvantage the individual access strategy presents is a potential learning barrier or concern about confidentiality that users may choose to avoid. Such barriers and concerns may decrease site utilization.

Currently, there is no reference to ACSCI standards on any of the Internet-based CIDS. These standards represent a powerful tool for educating users and practitioners about what they should expect from providers in terms of quality and use of career information. Rather than failing to meet standards, it may be that in the rush to make sites available, time was not allocated for showing adherence to standards.

Conclusion

While tremendous progress has been made over the past two years in the development and delivery of Internet-based CIDS, this career resource is still young. Similar to the original transition from mainframe minicomputer-based career information delivery systems to PC platforms, CIDS have begun the transition from PCs to those that leverage the full potential of the Internet. Based upon a feature-cost analysis of seven existing Internet-based CIDS, it appears that practitioners, site developers, policy makers, and researchers may wish to focus their thinking about the future of Internet-based CIDS around five key activities. These include: 1) providing information to users about developer qualifications, information validity, and assessment validity, 2) including needs-based information access strategies for users, 3) integrating multiple media formats and original source material into each site, 4) developing tools which assist users in integrating site information into their individual career decision-making processes, and 5) educating users about standards of practice in career information delivery. The rapid pace of Internet technology development will most likely bring an accelerated rate of change to career information delivery systems and their features and costs. Furthermore, it is possible that we will see the development of CIDS that base their cost recovery on a fee per service basis. Both of these eventualities will require ongoing analysis and discussion among practitioners, site developers, policy makers, and researchers to ensure that users find and use the information they need to make effective career decisions.

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Feature Comparison of Internet-Based Career Information Delivery Systems

Table 1

	EC ¹	CIS	ES	GA	IL	IN	WA
SITE CONTENT							
Web Site Introduction							
Identification of developers	Y	Y	Y	Y	Y	Y	Y
Information on the qualifications of developer	N	Y	N	Y	Y	Y	Y
Information on validity of assessments	N	N	N	N	N	N	N
Information on validity of the information	N	N	N	N	N	N	N
Description of circumstances where user may need professional assistance	N	N	N	N	N	N	N
Description of limits of confidentiality of user data input on the Web site	Y	N	Y	N	N	N	N
Recommendation on use of site based on identified user needs	N	N	Y	N	N ²	Y	N
Notice of how to obtain local assistance with career problem solving	N	N	N	N	N	Y	N
Notice of voluntary adherence to ACSCI standards	N	N	N	N	N	N	N
Indication of how ACSCI standards are met	N	N	N	N	N	N	N
Assessment							
Standardized tests administered on-line	Y	N	N	N	N	N	N
Allows input of other assessment results	Y	N	Y	Y	N	Y	Y
Sort based on self-assessment of variables	Y	Y	Y	N	Y	Y	Y
Search Occupational Information							
by assessment results (on-line or off-line)	Y	N	Y	Y	N	Y	Y
by sort based on self-assessment of variables	Y	Y	Y	N	Y	Y	Y
by title (e.g., SOC or alpha listing)	Y	Y	Y	Y	Y	Y	Y
by key word or string	Y	N	Y	N	N ²	Y	Y
Search Educational Information							
by title (e.g., CIP, or alpha listing)	Y	Y	Y	Y	Y	Y	Y
by key word or string	Y	N	Y	N	N ²	Y	Y
by level of program	Y	Y	Y	N	Y	N	Y
Occupational Information							
Nature of the work/work activities	Y	Y	Y	Y	Y	Y	Y
Working conditions/settings	Y	Y	Y	Y	Y	Y	Y
Employment statistics	Y	Y	Y	Y	Y	Y	Y
Education/training, other qualifications	Y	Y	Y	Y	Y	Y	Y
Advancement	Y	N	N	Y	Y	N	Y
Job outlook	Y	Y	Y	Y	Y	Y	Y
Earnings/wages	Y	Y	Y	Y	Y	Y	Y
Licensing/certification	Y	Y	Y	Y	Y	Y	Y
Related occupations	Y	Y	Y	Y	Y	Y	Y
Sources of additional information	Y	Y	Y	Y	Y	Y	Y

DOT code	Y	Y	N	Y	Y	N	Y
O*NET/SOC code	Y	N	N	Y	N	N	N
State-specific data	Y	N	Y	Y	Y	Y	Y
Military information	Y	Y	N	Y	Y	N	Y
	EC¹	CIS	ES	GA	IL	IN	WA
Educational Information							
Contact information	Y	Y	Y	Y	Y	Y	Y
Type of school/setting	Y	Y	Y	Y	Y	Y	Y
Admissions information	Y	Y	Y	Y	Y	Y	Y
Costs	Y	Y	Y	Y	Y	Y	Y
Financial aid	Y	Y	Y	Y	Y	Y	Y
Programs of study	Y	Y	Y	Y	Y	Y	Y
Housing	Y	Y	Y	Y	Y	Y	Y
Services	Y	Y	Y	Y	Y	Y	Y
Activities/athletics	Y	Y	Y	Y	Y	N	Y
Accreditation	Y	Y	Y	Y	Y	N	Y
Student body	Y	Y	Y	Y	Y	Y	N
State-specific data	N	N	N	Y	Y	Y	Y
Apprenticeship information	Y	N	N	Y	Y	Y	Y
Instruction							
Employment planning (job hunt, resume, interview, etc.)	Y	Y	Y	Y	Y	Y	N
Career decision making	N	Y	Y	N	N	Y	N
Portfolio development	N	Y	N	Y	N	Y	N
Creation and Maintenance of Information in Portfolio	Y	N	Y	N	N	N	N
Links to Other Web Sites							
Occupational	Y	Y	Y	Y	Y	Y	Y
Education/training	Y	Y	Y	Y	Y	Y	Y
Financial aid	N	Y	Y	Y	Y	Y	Y
Licensure/certification	N	Y	N	N	Y	N	Y
Apprenticeships	N	N	N	N	N	N	N
Job listings	N	Y	N	Y	Y	Y	Y
Military	N	N	N	N	N	Y	N ²
Assessment	N	N	Y	N	Y	Y	Y
USER-FRIENDLY FEATURES							
On-Line Tutorial	Y	N	Y	N	N	N	N
Purpose of Each Component/Module Explained	Y	Y	Y	N	Y	N	Y
Information Presentation							
Tables	Y	N	Y	Y	Y	Y	N
Text	Y	Y	Y	Y	Y	Y	Y
Graphic presentation of numerical data	N	N	N	N	N	N	N

Photographs	Y	N	N	N	Y	Y	N
Video clips	N	Y	N	N	N	Y	Y
Audio clips	N	N	N	N	N	N	N
	EC¹	CIS	ES	GA	IL	IN	WA
Search							
Within a category/section	Y	Y	Y	Y	Y	Y	Y
The entire site	N	Y	Y	N	Y	Y	Y
Web Site Navigation							
Site map	Y	Y	Y	Y	Y	Y	Y
Return to home	Y	Y	Y	Y	Y	Y	Y
On-Line Help							
Text help	Y	Y	Y	N	Y	N	N
Video help	N	N	N	N	N	N	N
Audio help	N	N	N	N	N	N	N
Record Keeping							
Capability to store user data between sessions	Y	N	Y	N	N	N	N
Capability to indicate completed features	Y	N	N	N	N	N	N
SUPPORT RESOURCES FOR PRACTITIONERS							
Technical Support							
1-800 number	Y	Y	Y	N	Y	Y	Y
Email contact	Y	Y	Y	Y	Y	Y	Y
Materials for Curriculum Integration (on-line)	N	Y	Y	N	Y	N	Y
ACCESS POLICY							
Fee to access	Y	Y	Y	Y	N	N	Y ³
Password protected	Y	Y	Y	Y	Y	N	Y
Open	N	N	N	N	N	Y	N

1. EC (e-Choices), CIS (Career Information System - National Site), ES (Embark.com - Education and Career Opportunities System (ECOS)), GA (Georgia Career Information System), IL (Illinois Horizons), IN (Indiana Career and Postsecondary Advancement Center), WA (Washington Occupational Information System)
2. Similar feature can be found on organizational Web site.
3. Included in license fee for stand alone software product.

Internet-Based CIDS Participating in the Analysis

Table 2