

An analysis of the design and use of information and communication technology in career guidance from 1990 to 2009

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Introduction

The use of information and communication technology (ICT) in career guidance is an important element in the provision of career resources and services offered face-to-face or at a distance (Harris-Bowlsbey & Sampson, 2005; Offer & Chiru, 2005; Offer, Sampson, & Watts, 2001; Sampson, 2008; Vuorinen, 2006). The professional literature on the design and use of ICT in career guidance is at least a partial reflection of the applications available in schools, agencies, and organizations, as well as applications available on a self-help basis. Given the widespread use of ICT in career guidance, it is important to periodically evaluate the current state-of-the-art as indicated in the professional literature. By conducting a content analysis of the literature on ICT and career guidance it will be possible to examine the nature of applications available, how the applications are used, issues with the technology, the extent to which the effectiveness of the technology has been evaluated. Implications for the future design and use of ICT in career guidance can then be drawn from the analysis.

Information and communication technology integrates the *delivery of information* via the Internet with the capability of users to *communicate* with guidance professionals and each other for assistance in locating, understanding, and using the information they need. The goal of using ICT-based career guidance resources and services is to help young people and adults to make informed and careful occupational, educational, training, and employment decisions (Sampson, 2008). *Information* delivered via ICT facilitates the clarification of self-knowledge or knowledge of options for the person seeking assistance in solving problems and making decisions. Completing practitioner-assisted or self-help career assessments via ICT provides a resource for clarifying self-knowledge about values, interests, skills, aptitudes, and employment preferences. Using occupational, educational, training, and employment information provides a resource for enhancing knowledge of options. *Communication* among and between career guidance practitioners and individuals served provides opportunities to facilitate use of the overwhelming amount of information that is now available.

Several types of ICT applications in career guidance currently exist. These applications include a) self assessment or awareness-raising exercises and psychometric tests; b) facilities to retrieve information

about training and work opportunities relevant to the user; c) decision aids; d) training/distance-learning materials for job seekers; e) CV and resume writing programs or templates; f) matching systems relating the user's input to work and/or learning opportunities; g) dedicated experience-exchange mechanisms, such as email lists, chat rooms and discussion forums; h) gateways or portals providing signposting to resources for work and learning; and i) dedicated authoring systems, including blogging and web page creation software (Offer, 1997; 2001).

This paper begins with a description of the methodology used in the content analysis. After the results are described and discussed, implications are presented for the future.

Methodology

A content analysis was used to identify key elements presented in the literature on the design and use of ICT in career guidance. A similar method of content analysis was used by Loveland, Buboltz, & Gibson (2006) to examine the content of articles appearing in the *Career Development Quarterly*. The process used to conduct the analysis included the following five steps.

The first step in the analysis was to select a time period for the review. Given the substantial change in ICT because of the Internet, the period from 1990 to 2009 was selected to balance established practice with the recent evolution of the design and use of ICT in the provision of career guidance resources and services.

The second step was to select the type of publications that would be used in the analysis. Nine types of publications were identified as typically providing information on the design and use of ICT in career guidance. These publications included: 1) refereed print journals, 2) refereed Internet journals, 3) Internet documents, 4) professional association documents, 5) conference, symposium, and workshop papers, 6) technical reports available in print, 7) technical reports available on the Internet, 8) books available in print, and 9) book chapters available in print. These publications vary considerably in the amount of scrutiny they receive before publication. Articles published in refereed journals are anonymously reviewed by at least two qualified professionals and are not necessarily accepted for publication. Professional association documents are typically reviewed by two or more qualified

professionals, although reviews are typically not anonymous. Books and book chapters may have an anonymous review prior to publication. Conference, symposium, and workshop papers, Internet documents, and technical reports may or may not be independently reviewed prior to publication and the decision to publish may be made a single individual, including the author.

The third step involved developing content categories for the data analysis by reviewing 40 randomly selected publications across the nine types of publications described above. Seven distinct themes in the design and use of ICT in career guidance became the content categories used in the investigation. Subcategories were also identified for six of the content categories. Loveland, Buboltz, Schwartz, and Gibson (2006) used fourteen categories to guide their content analysis.

In the fourth step, a literature search was conducted to identify publications for inclusion in the analysis using the seven content categories developed in the prior step. Following the identification of the content categories, appropriate print or Internet-based publications were identified. Publications included in the analysis had to deal with at least one aspect of the design or use of ICT in career guidance, such as the delivery of labor-market information on the Internet. Reference databases such as PsychInfo and ERIC, as well as the library at the Center for the Study of Technology in Counseling and Career Development at Florida State University, were used to identify the publications for review. The reference sections of these publications were then used as a guide to identify additional publications.

The fifth step involved reading and coding each publication by type and category. One, or multiple content categories, could be identified for a single publication. During the analysis, it became apparent that the seven content categories were not adequately identifying the range of content included in the publications. As a result, the categories, "Perceived benefits and limitations" and "Technology trends influencing ICT-based career guidance resources and services" were added. All publications previously examined were reanalyzed. The final schema for this study included nine content categories that were further divided into twenty-nine related subcategories.

Results

A total of 189 publications on the design and use of ICT in career guidance were examined for this content analysis. Citations for these publications are presented in Appendix A. The frequencies and percentages for the nine different types of publications that were reviewed are presented in Table 1. The most to least common type of publication was as follows: Internet documents, articles in refereed print journals, articles in refereed Internet journals, technical

reports in print, book chapters in print, technical reports on the Internet, print standards on the Internet, books in print, and papers presented at conferences, symposia, and workshops.

Table 1

Type of Publications on the Topic of ICT-Based Career Guidance

| Type of Publication | N | % |
|---|----|----|
| Refereed Journal article available in print | 49 | 26 |
| Refereed Journal article available on the Internet | 21 | 11 |
| Document available on the Internet | 66 | 35 |
| Professional standards available on the Internet | 5 | 3 |
| Conference, symposium, and workshop paper available on the Internet | 2 | 1 |
| Technical report available in print | 19 | 10 |
| Technical report available on the Internet | 12 | 6 |
| Book available in print | 4 | 2 |
| Book chapter available in print | 11 | 6 |

Table 2 presents the frequencies and percentages of publications according to the nine content categories and twenty-nine subcategories. Because each publication could be coded according to multiple content categories, the percentages add up to more than 100.

Table 2

Content categories for publications on the design and use of ICT in career guidance

| Content category | N | % |
|---|----|----|
| <i>Design of ICT-based career guidance applications</i> | | |
| Conceptual design of the resource | | |
| Content | 5 | 3 |
| Career theory | 3 | 2 |
| Total for conceptual design of the application | 8 | 4 |
| <i>Technological design of the application</i> | | |
| Features | 12 | 6 |
| Process of development | 4 | 2 |
| Usability analyses (formative evaluation) | 8 | 4 |
| Total for technological design of the application | 23 | 12 |

| | | |
|---|-----|----|
| Type of technology used in the application | | |
| Web-site-based | 79 | 42 |
| Personal Computer-based | 19 | 10 |
| E-Mail-based | 11 | 6 |
| Telephone-based | 6 | 3 |
| Videoconference-based | 3 | 2 |
| <i>Total for type of technology used in the application</i> | 118 | 62 |
| <i>Total for design of ICT-based career guidance application</i> | 149 | 79 |
| ICT-based assessment and information resources | | |
| Content of ICT-based assessments (Values, interests, skills, and aptitudes) | 7 | 4 |
| Validity of ICT-Based Assessment | 5 | 3 |
| Content of ICT-Based Information (Occupational, Educational, Training, and Employment) | 61 | 32 |
| Validity of ICT-Based Information | 4 | 2 |
| <i>Total for ICT-Based Assessment and Information Resources</i> | 76 | 40 |
| Services using ICT-based career guidance applications | | |
| Individual Counseling | 25 | 13 |
| Brief Counseling | 8 | 4 |
| Workshops | 2 | 1 |
| <i>Total for services using ICT</i> | 35 | 19 |
| Implementation of ICT-based career guidance resources and services | | |
| Recommendations for implementation | 36 | 19 |
| Example of implementing ICT-based resources | 9 | 5 |
| Practitioner training as part of implementation | 31 | 17 |
| <i>Total Publications on Implementation</i> | 76 | 40 |
| Efficacy of ICT-based career guidance resources and services | | |
| Evaluation of ICT-based career guidance services (summative evaluation) | 16 | 8 |
| Perceived benefits and limitations of resources | 26 | 14 |
| <i>Total Publications on Efficacy</i> | 42 | 22 |
| Ethical issues in designing and using ICT-based career guidance resources and services | | |
| | 23 | 12 |
| Professional standards that include the design and use of ICT-based career guidance resources and services | | |
| Ethics | 24 | 13 |
| Practitioner Competencies and Training | 39 | 21 |
| Design | 8 | 4 |
| Service Delivery | 38 | 20 |
| Evaluation | 18 | 9 |
| <i>Total Publications on Professional Standards</i> | 125 | 66 |

| | | |
|--|----|----|
| Public policy and ICT-based career guidance resources and services | 6 | 3 |
| Technology trends influencing ICT-based career resources and services | 70 | 37 |

The nine content categories on the design and use of ICT in career guidance can be placed into four distinct groups according to frequency. "Professional standards that include the design and use of ICT-based career guidance resources and services" was included in 69% of the publications. In the second group, "The design of ICT-based applications," "ICT-based assessment and information resources," "Implementation of ICT-based career resources and services," and "Technology trends influencing ICT-based career guidance resources and services" was dealt with in 56%, 41%, 40%, and 39% of the publications. For the third group, the percentage frequency for content categories was 23% for "Efficacy of ICT-based career guidance resources and services," 20% for "Services using ICT-based applications," and 12% for "Ethical issues in designing and using ICT-based career guidance resources and services" "Public policy and ICT-based career guidance resources and services" was only included in 3% of the publications.

The most frequent content (15% or more) in subcategories was the use of Web based technology in application design (44%), information content in ICT applications (32%), standards related to practitioner competencies and training (23%), standards related to service delivery (23%), recommendations for implementation (19%), practitioner training as part of implementation (17%), and evidence of the perceived benefits of and limitations of resources (15%). Content infrequently included (3% or less) was conceptual design in terms of content (3%), process of designing the application (2%), use of telephone-based technology in the application (3%), conceptual design in terms of career theory (2%), use of videoconference-based technology in the application (2%), and use of workshops in ICT-based career guidance (1%).

The frequency of research and evaluation content was not equal across type of publication. Twenty-three percent of the publications presented research or evaluation data. The percentage of total publications that included data-based research and evaluation was as follows: 17 (10%) in refereed print journals, 5 (3%) in refereed Internet journals, 4 (2%) in Internet documents, 2 (1%) in conference, symposia, and workshop papers, and 14 (8%) in technical reports.

In examining the data, there was a clear trend in the technology used to deliver career guidance applications. As one might expect, the number of publications across content categories has shifted substantially from personal computer applications to Internet-based applications.

Discussion

Information on the design and use of ICT in career guidance is available from a wide variety of publications. The availability of refereed publications helps to ensure that the observations and conclusions contained in a document are appropriate for the content and the data presented. It is encouraging that a large portion of data-based research and evaluation studies were published in refereed journals. The common use of technical reports for dissemination of studies provides a good opportunity for in-depth analysis and interpretation of data. The availability of publications on the Internet increases the likelihood that publications will be accessed and used. However, it is surprising how few documents from conferences, symposia, and workshops are available on the Internet. The failure to make these documents public is a missed opportunity for disseminating knowledge. There are few books available on ICT applications in career guidance. This is unfortunate in that books provide an opportunity for in-depth exploration of content that is not possible with shorter publications. Edited books, categorized as book chapters in this analysis, do provide a breadth of topic coverage and integration of content. However, books still provide more of an opportunity to analyze a topic in detail.

Publications focusing on the technological aspects of ICT applications in career guidance have the problem of becoming quickly out-of-date. Publications focusing on counseling and implementation strategies for ICT applications, as well as ethical issues, are less likely to be dated quickly. The lower costs associated with Internet publishing, in comparison with print publications, may encourage more frequent revision of publications on ICT applications in career guidance.

The content of publications on ICT applications in career guidance is both diverse and important. It is encouraging that a substantial percentage of publications in this study included content on professional standards. Professionals appear to be concerned about potential problems in the design and use of ICT applications and are willing to be proactive in maximizing success and minimizing problems with this technology. The content of information available in ICT applications was often described, potentially helping readers to better understand how this technology might be used in practice.

Not all of the findings in this study are encouraging. Little attention in publications was paid to the theoretical basis of applications. Even if a pragmatic approach was taken and no formal theory was used for development of an application, explicit or implicit concepts are still part of the design process and need to be described. This type of conceptual information is needed to effectively design interventions, implement applications, and create resources for evaluation and research. In addition, there was little mention of the "communication" aspect of ICT in the design or use of applications. Initial experience in providing

career information and services to individuals at a distance has been positive (Malone, 2007; Watts & Dent, 2006). Publications need to explore how guidance interventions can be provided to young people and adults while they are using a Web site.

The lack of attention in publications to the validity of information is troubling. Invalid information can lead to serious consequences given the magnitude of the occupational, educational, training, and employment choices made by users. The lack of interest in information validity is incongruous given the emphasis in professional standards on the need to demonstrate evidence of information validity. Also, the discussion of content dealt with the topics that were included in the application, with little attention as to how the information was presented. Good information is useless when presented in a way that is difficult to understand. This issue is especially important when the application is intended to be used by a wide variety of individuals with diverse learning styles and capabilities.

In the literature, individual counseling was the dominant service delivery option for young people and adults who used ICT applications. Given the need to provide cost-effective resources and services to the large number of young people and adults who need career guidance (Sampson, 2009), the limited number of descriptions of brief counseling, group counseling, workshops, and courses is problematic. Also, the use of ICT applications as a self-help resource was rarely mentioned. While the efficacy of ICT applications was emphasized in the literature, most publications used staff perceptions as the source of data rather than quantitative or qualitative data obtained from young persons or adults actually using the applications. More systematic studies are needed to verify the efficacy of applications and to identify factors that influence the effectiveness of applications. Finally, there was little discussion in the literature on the public policy that is needed to place the design and use of ICT applications within the context of facilitating education and employment, as well as promoting economic development and social welfare.

Limitations

It is impossible in any content analysis of a large body of literature to identify all possible publications, especially papers and presentations at conferences. Dissertations and theses that are not subsequently published or presented pose similar problems. Any omission of relevant literature in this study was inadvertent. However, we believe the sample of publications obtained is large enough to adequately reflect the current ICT literature in career guidance. A second limitation is that by focusing on a wide range of content topics, an in-depth exploration of the nature of content in subcategories was not possible. A more in-depth exploration could lead to a more detailed discussion of the results and more explicit

recommendations. Third, only English language publications were included in this study. Important content on this topic has been written in other languages. It is possible that the nature and frequency of content in publications is influenced by differences among countries in guidance resources and services, as well as differences in public policy. Fourth, it was not possible to determine the refereed status of some of the documents, including: a) Internet documents, b) conference, symposia, and workshop papers, c) books, or d) book chapters. It might be that the proportion of refereed publications was greater than presented in this analysis.

Implications

A variety of implications can be drawn from this study. These include implications for practice, ICT development, research, and public policy.

Implications for practice

Practitioners need to make informed and careful choices in selecting and using ICT applications in career guidance. One strategy is for practitioners to use the purchasing power they have before they select an application. The willingness of developers to provide the information necessary to effectively select and use their applications can be strongly influenced by the conditions practitioners set for purchase. This of course assumes that practitioners have a choice in applications, which may not be the case. It is important as well that practitioners develop and document cost-effective group and self-help interventions. In addition, practitioners need to take the time necessary to publish documents from conferences, symposia, and workshops where they are presenting. Finally, practitioners also need to use the information that is available in the literature in their work. Published information is ineffectual if it is not used.

Implications for ICT development

Developers have a responsibility to regularly document design improvements, validation of assessments and information, use of their application in practice, implementation strategies, and efficacy of the application. Special attention needs to be paid to validity of assessments and information, as well as the application of theory or conceptual models in the design and use of an application. The creation of text and multimedia-based resources for educating and training practitioners should also be a priority. Developers also need to indicate of how their application meets applicable professional standards. Indicating how their applications are congruent with education and employment policy, as well as initiatives to promote economic development and social welfare is also important. Finally, developers also need to put more effort toward utilizing the "communication" aspect of ICT in designing future systems.

Implications for research

Whenever possible, researchers need to submit their work for peer review before publication. Making documents readily available on the Internet should also be a priority. Researchers need to examine both the design and use of ICT applications in career guidance in order to influence future system development and innovative practice. Particular attention needs to be paid to identifying individual and organizational characteristics that influence the effectiveness of ICT applications in career guidance.

Implications for public policy

Policy makers in government can influence the design and use of ICT applications in career guidance by requiring developers to provide adequate supporting information to practitioners, researchers, educators, and trainers as part of the requirements to receive funding. Similar requirements should exist for practitioners. In order to receive funding for purchasing ICT applications and delivering ICT-based services, practitioners should be required to provide realistic plans for implementation. Policy makers should also establish and enforce clear standards for the design and use applications that are consistent across educational, training, and employment services. Professional associations need to develop standards for ICT design that includes stipulating the type of evidence necessary to establish that ICT applications are valid and appropriately designed.

Conclusion

Periodic review of the professional literature provides a useful perspective on the state-of-the-art in the design and use of ICT in career guidance. It is clear, however, that the literature examined in this study does not reflect the full range of content necessary to help practitioners, ICT developers, researchers, educators and trainers, and policy makers to achieve the full benefit of this technology in meeting the career guidance needs of young people and adults. All parties involved need to be proactive to help ensure that information on appropriate topics is easily available to the professionals who are involved in the design and use of ICT in career guidance.

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Appendix A

Publications used in the content analysis

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Note

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