Career Information System for At-Risk Youth

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Phase I Final Report
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A. General Scientific and Technological Aims

The aim of the project in Phase I was to develop and evaluate the first of four proposed components of Career Spins, a specialized career development program for at-risk youth. The program, deliverable on either CD-ROM or the Web, used an animated teen story to guide viewers through an interactive process of identifying their work-related preferences, and then generated a matching list of potential career occupations. Overall, the component was intended to empower teens to make career choices by giving them an organized, visual, and fun way of examining their work-related interests and career possibilities.

B. Phase I Research Activities

Product Development

The Career Spins program was based on CIS, a nationally recognized resource on career development for high school students, produced through the College of Education at the University of Oregon. Our premise was to take CIS's well-defined approach and powerful software engine and adapt it for a more diverse audience.

Phase I development centered on a career discovery activity called the OccSort, or Occupation Sort. In this activity, users respond to 20 items that describe a variety of work-related preferences. The program creates a list of occupations that matches users' choices. Users see the number of occupations their choices generate and can review their list at any time.

The CIS version of the OccSort can readily produce meaningful information about career possibilities for the typical student, but for the at-risk youth it presents several disadvantages. The most of important of these is the program's inherent complexity. The presentation is almost entirely text-based, and the reading level is well beyond that of the typical at-risk teen. Also, many of the items use complex inclusion and exclusion criteria to set up user choices. Although the program provides useful explanatory statements and descriptions, these are optional features that are not well-integrated into the process, and they are also entirely text-based.

Another potential problem for the at-risk teen is CIS's open-ended structure. The program has an implied sequence, but it does not explicitly set up, explain, or constrain the steps the user can take to complete the process. For some students, this feature may promote a sense of discovery or expedience, but the absence of clear and supportive scaffolding could easily confuse the at-risk teen.

Finally, the program does not convey an overall sense about the meaning or practical significance of the activity. Rather, it presumes a certain level of understanding, motivation, and interest that may not be developed.

In Phase I we produced a complete adaptation of the OccSort for Career Spins (a copy of the program on CD-ROM is attached in Appendix A). In response to the limitations described above, our development process was guided by the following key principles:

- Make the context for instruction socially relevant for all teens.
- Simplify the language.
- Enhance the graphical presentation to accommodate the visual learner.
- Model each step in the decision-making process.
- Use interactivity to involve users and regulate the learning process.
- Provide extensive support.

The following descriptions of the Career Spins program demonstrate how these principles were operationalized. The program consisted of three sections. The first presented an animated teen story that set up a meaningful context for teens to understand the career discovery process. In the second, users responded to 20 work-related preference items. The last section involved reviewing the list of occupations.

Program Content

Section 1: Jobie's Way

Story Synopsis: Jobie's Way is a four-part animated story about a group of skateboarders, Jobie, Boarder, Paa, and BX. After doing a run, Jobie tells his buds that he's got "the plan" – like how he's going to make a ton of money doing what he wants to do and buy himself a big house like the one they skated by on the hill. He says he's going to own his own factory that manufactures skate gear. But his boarder buds don't really have a clue what he's talking about; they think he's just dreaming and start raggin' on him. Still. . . they can't figure out how Jobie does it – like how he got that job at Dave's Cave, the local skateboard shop. Jobie keeps his cool and on the bus ride home he starts to explain how he played "the game" to figure out what he really wanted to do. But, he says, that meant going through some hoops. He tells them about the dude at the employment office who showed him this computer program that helped him figure out how to get started on a career. That's when Jobie turns it over to the viewers and invites them to do the career program for themselves.

Notable Features: The story uses animated peers to give meaning to and model the career development process for the viewer. The characters – their circumstances, language, interests, and sensibilities – are intended to resonate with the at-risk teen.

Section 2: Spins

Synopsis: This section is delivered in three parts (Spins I, II, and III), each containing a set of work-related preference items. The three parts use "spin" metaphors for the visual themes: a record player, a CD player, and an orbiting satellite. Individual items are delivered audiovisually via a photographic montage, audio narration, background music, and text overlays. The presentation culminates with a question and a set of interactive buttons representing response choices.

In Spin I, items relate to the nature of work and involve yes/no responses to the

following items: routine work, precise work, working with people, persuading people, making decisions, directing, being artistic, and change. In Spin II, items relate to abilities and involve responding using a three-point rating scale (very much, it's ok, very little) to rate job interests such as: checking accuracy, using words, using numbers, catching onto things, seeing in detail, eye-hand coordination, and working with your fingers. Items in Spin III relate to miscellaneous labor market characteristics: physical activity, education and training, expected wages, work setting, and community size.

For each item, users can opt to see additional photographs that provide a greater variety of examples of the characteristic of interest or they can replay the presentation. Making a choice triggers the next item to play.

Notable Features: First-time users had to view the items in sequence. Although the three parts were based on CIS's underlying organization, CIS does not present items in distinct sets. Career Spins made this organization explicit in order to add clarity and cohesion to the response formats, as well as to the themes of the item sets (nature of work, abilities, labor market characteristics). This organization also allowed the 20 items to be delivered in briefer sets. All items were completely reworded to a more basic reading level reflecting teen language. In addition, items were translated into audiovisual descriptions within a metaphorical framework meant to appeal to teens. Users indicated their choices interactively with simple-to-use on-screen buttons. Users always had the choice of skipping an item, but they had to at least view the item the first time through. At the end of each section, viewers could re-think their choices by seeing a thumbnail summary with direct links to individual items for replay. The instructions for these sections were delivered by Jobie, the star of Career Spins.

Section 3: Results

Synopsis: In this section, users see the occupations their preference choices generated and hone the list to as many as 10 personal favorites, which will serve as their launching point for gathering more specific information about the careers and related job opportunities.

The section is delivered in three parts. First, Jobie models, via animation, how the activity works. In the second part, users work with their own results. Users see their own "Result" list, which shows the occupations that match their choices. They have several options at this point. They can review the Result list and move up to 10 occupations to their "Favorites" list. Or, they can click on a tab to review and modify choices they made previously. Any changes users make automatically generate a new Result list. The last part gives users strategies and resources for following up on their search results. Although this part provides a useful close for the activity, it is a placeholder until more in-depth information is developed in Phase II.

Notable Features: Users can instantly see the total number of occupations on their Result list. If user preferences generate a Result with no occupations (a logical possibility), the event triggers an image of the employment office dude, who tells the user this is okay and to reconsider some of his/her choices. When users roll their mouse over an occupation title, a pop-up box appears with a one-sentence description and an image.

There is a series of functional buttons that allow users to undo their most recent change, save or print their choices and results. If a user already had a specific occupation in mind, but the occupation did not appear on the Result list, the user can click on a button to temporarily display all occupations in the Result list and, from there, drag the occupation to the Favorites list.

Remote Control

The program is embedded in a graphical player, with a remote control panel. The panel lists the program contents and allows users to move from one part of the program to another, as well as to pause and resume play.

Content Development

The materials were developed in several stages by the project team, which included Dr. Caesar Pacifici, the Principal Investigator; Lee White, Research Associate; Keith Qiao Jin, the lead programmer; Dan Erdmann, the career information advisor and director of CIS; Scot Deils, the cartoon animator; and Mike Novotny, the cartoon artist. The characters were developed and scripts written for the animated story; and scripts were subjected to an iterative review process by the team. The final draft of the script was converted into an animatic, which is a storyboard with rough hewn animation. This was reviewed until the script, audio, and visuals were finalized.

The items for the Spins section were reworded and reorganized. The animator, graphic artist, and programmer developed treatments of the graphical elements that the team reviewed.

The List section was conceptualized and then rendered by the animator, graphic artist, and programmer, and subjected to a similar process of review. CIS supplied the job descriptions and images for this section.

The graphic artist designed the player (graphical interface), and the programmer authored the media elements into a complete version of the program. These were then subjected to two stages of preliminary feedback from at-risk youth and career development experts.

Technical Development

Preproduction Planning and Animation: Each program segment was storyboarded by the Flash animators, in response to the script and rough audio tracks. The final audio was recorded, and the sound engineer cleaned, sweetened, filtered, and edited audio tracks in Cool Edit Pro 1.2a and Sound forge 5.0. The storyboard images were combined with the final audio in Flash MX to create an animatic, which combined storyboard images and recorded script to convey a preliminary version of the animation. This was used to test the overall flow and timing of the material. After the animatic was approved, the Flash artists created the final animations in Flash MX.

Web-Based Version: To achieve the level of interactive education and data tracking needed for this type of program, we used a collection of open source technologies on both the server and client side. To host our Web pages we have built and maintained

servers running Redhat Linux as our operating system and Apache Web Server as our Web server. We store data, retrieve data, and manage the user session on the server using Java technology developed by Sun Microsystems and Resin, and a servlet engine developed by Caucho Technology. As a data repository we use PostgreSQL database v. 7.1.3. Our server is hosted in-house and connected to the Internet via a one-megabit DSL connection, which provides us with enough bandwidth to handle multiple concurrent users interacting with course material or taking tests. We use Macromedia Flash 6.0 for our multimedia development purposes and clients can use Internet Explorer 5.5, Netscape 6.0, or later versions to view the materials. These browsers support Javascript 1.3, which is a client side scripting language used for menuing functionality and state management. We chose these technologies (described below) based on their reliability, robustness, and cost.

Description of Internet Technologies Used

Internet Connection	T3 connection via Willamette.net
Server Side	Operating System: Red Hat Linux 7.1 Web Server: Apache v. 1.3.12 Database Server: Postgres SQL v. 7.1 Development: Java 1.4 by Sun Microsystems, Resin, JSP/Servlet Engine by Caucho
Client Side	Browser Support: Netscape 6.2, Internet Explorer 5.5 (or later) Scripting: Javascript 1.3, utilizing HTML Specification 4.01, Cascade Style Sheet Specification Level 2, Document Object Model Specification Level 2, as defined by W3C, the World Wide Web Consortium.

CD-ROM Version: The Career Spins CD used the proprietary database module from CIS. The database module consisted of DLLs (Dynamic Linked Libraries) and data files in private formats. The Director Lingo part of the program interacted with the database module by sending the user data and receiving the career information results. The Lingo programmer imported the animations created by the Flash artist and buttons/interface designed by the graphic artist. Interactivity was programmed in Lingo to match the Web version. Once the authoring was done, we burned the final CD files, designed and created graphic labels and packing, and replicated the CD as a final product. Our CD-ROM products are developed using Macromedia Flash MX and Macromedia Director 8.5. These products are produced as stand-alone units that require minimal hardware and software support. CD products support Windows 95/98/Me, Windows 2000, and

Windows XP, and OS 9 or later for MacIntosh systems.

Alpha Test with At-Risk Youth

Six youth, 3 males and 3 females, from an alternative high school in Eugene, Oregon participated in the alpha test. The goal was to gather preliminary feedback on both the measures and the program. Participants completed a background information and two outcome measures – the Career Decision Making Difficulties Questionnaire and the Nowicki-Strickland Locus of Control Scale. They then used a prototype version of the Career Spins component. Immediately after, they completed the outcome measures again, as well as a measure of user satisfaction.

During the pre- and posttest, students were asked to report any difficulty they found with questionnaire items. Participants reported no comprehension problems with the questionnaire items; one student found a typo. Students took 8½ to 20 minutes to complete the set of questionnaires, for both the pre- and posttest.

The following summarizes the results of the pre/post testing. (The means for the outcome measures are reported in Appendix B, Table 1).

Career Decision Making Difficulties Questionnaire (CDDQ): The CDDQ consisted of 35 questions using a 9-point rating scale – 0 not at all to 8 totally. High scores indicated greater difficulty with making career decisions. Using a dependent samples *t*-test, we found that, on the average, participants' scores did decrease from pre to post, and that this decrease was marginally significant, $t(5) = 2.35$, $p = .07$.

Nowicki-Strickland Locus of Control Scale (N-SLCS): The N-SLCS consisted of 40 questions using a simple yes/no format. We expected decreases in scores from pre to post (less external, more internal locus of control). Again, using a paired samples *t*-test, we found no significant difference between the mean pre and post scores on this measure, $t(5) = 0.48$, $p = .65$, and individual scores reflected no clear pattern.

User Satisfaction (U-SAT): This measure had 12 items using a 3-point rating scale, with 3 being "best." Overall, user satisfaction ratings were favorable ($M = 2.31$, $SD = 0.51$) and ranged from 1.75 to 2.92.

Between the pre- and posttest, students used a prototype of the program on computers in their high school's computer room. The research director and lead programmer unobtrusively observed students as they used the program. Students were asked to immediately report any technical problems they found with the program. After students completed the program, they were immediately debriefed by the observers.

It took students15-20 minutes to complete the program. The teens seemed engaged throughout the program and, except for the "replay" option, used all functions of the program. Users had between 33 to 84 occupations on their Results list, and 4 to 10 occupations on their Favorites list. In general, students reported that they liked the program, found it easy to use, felt that the jobs on their Result list made sense to them, and found it gave them useful information. Students also provided feedback that led to the following changes in the program.

- An option to see All Jobs was added to the Result list in response to a student who

didn't see a job on his list that he already knew he wanted to consider.
- A periodic audiovisual prompt was added to the continue buttons in the activity segments to make sure teens understood further action required their input.
- Jobie's explanation of "the List" was changed because some teens thought Jobie was referring to their results.
- A contingent image of the job counselor was added that appeared if a user's total was zero. Using a dialogue bubble, the counselor reassured them and prompted them to take another look at their preferences and make some different choices.
- The female character was displayed more prominently in the user interface to counterbalance one student's comment that the program seemed to be more for guys.

Preliminary Review by Expert Panel

Concomitant with the alpha test, a group of six career development experts reviewed the program. The panel members included:
- Cheryl Buhl, Director, Oregon CIS, University of Oregon;
- Scott Gillie, Director, Indiana Career and Postsecondary Advancement Center (ICPAC), Indiana University – Bloomington Campus;
- Terry Hamm, Director, Minnesota CIS, Minnesota Department of Children, Families & Learning;
- Les Janis, Director, Georgia Career Information Center, Georgia State University;
- Chuck Mollerup, Director, Idaho CIS, Idaho Department of Education;
- Dr. LeeAnn Roth, Director, Nebraska CIS, University of Nebraska.

Each panelist was asked to fully explore the prototype program on a development Web site and then complete a comprehensive review questionnaire (see Appendix C). The questionnaire organized feedback into five segments: the overall program, the animated story, the preference items, the results, and the way the program compares to others. For each segment, reviewers rated program features using a 10-point Likert scale (1, unsatisfactory to 10, outstanding). Reviewers could also provide open-ended comments.

Ratings by the reviewers were generally moderate to high (see Appendix B, Table 2). Notable weaknesses were with the Web site performance and in some functional aspects of the Results section. For several of the reviewers, load time for program segments was slow over the Web because of slower speed Internet connections. The many comments offered by reviewers tended to substantiate the relevance of the approach, the use of story animation, and the spin metaphor.

Reviewers also had many minor suggestions for the production, which were considered and led to several changes. For example, the preference item on wages was changed to show monthly rather than hourly rates, because it would be more intuitive for youth. We added a "More Pics" click-through feature for each preference item that gave the user a broader array of examples of occupations. We also added a contingent

message in the Results section that provided support and a strategy in the event the Results list had zero occupations. One reviewer felt the story was a little too slanted toward males. This will be balanced in the follow-up of the story proposed for Phase II. A particular strength was the high rating for Career Spins in comparison to other programs. Reviewers felt that the program would appeal to a wide array of kids and that it would be an especially effective activity on our Web site, Vstreet.com (a virtual world for teens that focuses on learning life skills).

Project Evaluation

The purpose of this analysis was to evaluate the Career Spins curriculum for individuals enrolled in the Job Corps of America. The two outcome measures were the (a) Career Decision Making Difficulties Questionnaire and the (b) Nowicki-Strickland Locus of Control Scale. The results are presented according to two types of data: descriptive information on operational aspects of the program and demographic characteristics of the sample, and inferential data on group differences in career decision making difficulties, locus of control, and user satisfaction.

Participants

Participants included 120 trainees, 16-26 years old, enrolled in educational and vocational training at a Job Corps (JC) center in the Pacific Northwest. The Job Corps provides comprehensive services to over 70,000 economically disadvantaged youth, annually, in 118 residential settings (U.S. Department of Labor, 2002). This JC center had a total of 230 trainees.

The study sample consisted predominantly of male trainees (19% female). The ethnic breakdown of participants was 9.9% Hispanic, 75.7% Not Hispanic, and 14.4% unknown or multiethnic. Racially, the majority of the sample was White (70.1%), with the second largest racial group consisting of participants in the Multiracial category (14.5%). (See Appendix B, Table 3 for further description of the sample.)

Participation in the study was voluntary. All participants received $10 for participating: $5 for completing each of the two assessments.

Procedure

To control for extraneous sources of variability as well as threats to internal validity, we randomly assigned trainees who agreed to participate to either an experimental condition, a comparison condition, or a wait-list control group. In the final sample there were 41 trainees in the Career Spins treatment condition, 39 in the CIS comparison condition, and 40 in the wait-list control group.

The entire study took place over a period of one week. During the first 2-3 days of the study, trainees in all three conditions completed a background information questionnaire and the two main outcome measures. Over the rest of the week, participants in the two intervention conditions met in small groups (no more than 15) and viewed the Occupational Sort component of either the Career Spins curriculum or the

CIS program. Immediately following these sessions, participants again completed outcome measures and a user satisfaction questionnaire. Participants in the wait-list condition took the posttest assessments over the same time interval as those in the other two groups, but they did not complete the user satisfaction questionnaire.

Measures

Copies of all measures are included in Appendix D.

- Career Decision Making Difficulties (CDDQ):

The CDDQ (Gati, Krausz & Osipow, 1996) is a 34-item rating scale that assesses level of difficulty related to making career decisions. High scores on this measure indicate three types of difficulties: lack of readiness, lack of information, and information inconsistency. Based on reliability information obtained during the Phase I evaluation, we decided to use only the total score for this measure. Not only was the total score more reliable, but it also most closely matched the goals of the career decision-making activity. The CDDQ uses a 9-point, Likert-type scale designed for use with high school populations. Respondents read a brief statement and then rate how well it describes them. The CDDQ is often used for evaluating the effectiveness of career interventions. The authors report internal consistency reliabilities from .88 -.96 (mean = .93) and test-retest reliabilities ranging from .79 -.80 (Lancaster, Rudolph, Perkins, & Patten, 1999; Osipow & Gati, 1998). The CDDQ also displays moderate construct validity, correlating approximately .77 with standardized measures of career decision making behavior and .49 with guidance counselors' judgments of student career capabilities.

- Nowicki-Strickland Locus of Control Scale (N-SLCS):

The N-SLCS (Nowicki & Strickland, 1973) is a 40-item rating scale that assesses individuals' internal or external control over reinforcement. Individuals respond to 40 yes/no questions. Lower scores on this measure are desirable and indicate a sense of control that is more internalized. Research has demonstrated that this measure has high discriminant validity (Nowicki & Strickland, 1973). Since 1984, 270 published research articles have used the N-SLCS to evaluate the effectiveness of various types of therapy and interventions (PsycINFO, 2001). The full scale demonstrates satisfactory internal consistency reliabilities, from .74 to .81 for students in grades 6 to 12, and test-retest reliabilities--reported as .66 for 7th grade students and .71 for 10th grade students (Nowicki & Strickland, 1973). The N-SLCS displays low construct validity and correlates approximately .20 with occupational level and .24 with other achievement test scores (Nowicki & Strickland, 1973). Duke and Nowicki (1974) found the N-SLCS to correlate highly with a student's GPA (.39-.50).

- Background Information:

A brief demographics questionnaire that includes age, race, gender, education, and time with the JC.

- User Satisfaction:

Measures teens' feedback on the appeal, clarity, and value of the site's features and functions.

Results

Following a statement of our hypotheses, the results are summarized in two sections: preliminary analyses and final outcome analyses.

Hypotheses

A .05 alpha level was used to determine significance in all statistical tests. Empirical questions within each hypothesis imply a priori planned comparisons.

- We anticipate a differential effect of our intervention based on an individual's locus of control status. Both the Career Spins and the CIS interventions will affect posttest scores of the CDDQ differently, depending on one's locus of control status. Specifically,
  a) Individuals with an external locus of control will demonstrate greater benefits from both of the interventions, either Career Spins or CIS.
  b) Individuals with an external locus of control will benefit more from the Career Spins intervention compared with the CIS intervention.

If none of the hypothesized interaction effects is significant, we will move on to test a main effects model.

- Controlling for pretest differences, we anticipate a main effect of group. Specifically,
  a) On average, the two treatment groups will outperform the no treatment group on the CDDQ.
  b) Irrespective of the wait-list control condition, individuals in the Career Spins condition will outperform those in the CIS condition.

Finally, we will test for differences between the two intervention groups on their user satisfaction scores.

- We anticipate that user satisfaction ratings will be significantly more favorable for the Career Spins group compared to the CIS group.

Preliminary Analyses

We conducted independent samples *t*-tests on all demographic information from the Background Information questionnaire to detect any systematic differences between the three groups. We found no significant difference between the groups. Given the relatively small number of participants who either dropped out or had missing data (less than 5% of the original sample), analyses of differences between those who dropped out of the study and those who did not were not statistically meaningful.

Assumptions of ANCOVA. Our study used a multiple treatment design with a control group and pretests. Because we also used random assignment to groups, this experimental design was able to adequately control for all main threats to internal validity (Shadish, Cook, & Campbell, 2001) and allow for more powerful statistical analyses through the use of covariates. Given the power of our experimental design, we were able to address our research questions using multiple, between subjects, analyses of covariance (ANCOVAs). ANCOVA has superior power for detecting differences on a single dependent variable within a study. In this design, group served as one independent variable with three levels: intervention, comparison, and control. Locus of control status was the second independent variable with two levels: internal locus of control and external locus of control. Quantitative pretest scores on the CDDQ were used as the covariate, and posttest scores on this same measure were used as the dependent variable.

Given our choice of experimental design, many of the theoretical assumptions of ANCOVA were met, primarily that we demonstrated an adequate control of sources of extraneous variability. However, before proceeding, we also needed to evaluate the statistical assumptions of this procedure: (a) univariate normality, (b) equality of variance-covariance matrices (homoscedasticity), (c) linear relations between all quantitative measures, (d) homogeneous regression of all covariates and dependent variables, and (e) reliable covariates. The results of these tests are summarized below.

Using visual analysis of histograms, we found “ceiling” effects in pre- and posttest scores on the CDDQ, with the distributions of pre- and posttest scores having a positive skew (high scores on this measure indicate more difficulty with finding a career) for many of the group pairs.

Regarding the assumption of homoscedasticity, Levene’s test of Equality of Error Variances was nonsignificant (Interaction model $F(5, 114) = 0.85$, $p > .05$; Main effects model $F(2, 117) = 1.28$, $p > .05$), indicating that the assumption of equal variance-covariance matrices was tenable. We also used visual analysis of scatterplots to examine linearity of relations between and among dependent variables, covariates, and dependent variable/covariate pairs. All scatterplots indicated moderate linear relations. The covariate was highly correlated with the dependent variable, $r = .81$, $p < .05$.

When assessing the reliability of our covariate, we found moderate alternate form reliabilities for the CDDQ (equal length Spearman-Brown coefficient = .86), as well as moderate to high test-retest reliabilities for this measure (alpha = .91). (Internal consistency and test-retest reliability coefficients for both the CDDQ and N-SLCS are reported in Appendix B, Table 4.) Convinced that our statistical analysis was appropriate, we began the model selection procedure to choose the most appropriate analysis for dependant measures.

Selecting Appropriate ANCOVA Model. Because we conducted an analysis using a covariate, we considered multiple models and accepted the most parsimonious. The first model, unequal slopes and unequal intercepts, was abandoned in both the interaction

effects model and the main effects model, because the differences in slopes across the groups were neither significant (Interaction effects: $F(5, 108) = 1.82$, $p = .12$; Main effects: $F(2, 114) = 1.10$, $p = .34$) nor important (Interaction effects: $ç^2 = .08$; Main effects: $ç^2 = .02$).

We found the majority of slopes in both intervention and control groups in both models were significantly different from zero. We therefore chose to analyze our data using the second model, assuming equal slopes and unequal intercepts. All output listed below is based on an equal slopes ANCOVA model.

Outcome Analyses

Differential Effectiveness. Given the brevity of our intervention, it seemed unlikely that the scores on the locus of control measure would demonstrate change from pre- to posttesting. We therefore decided to use the results of this measure at pretest as an independent variable. We performed a median split and formed two groups; those below the median became the internal locus of control group, and those at or above the median were the external locus of control group. Our first test was to determine if the intervention was differentially effective based on locus of control status.

Prior to beginning the study, we posed two specific planned comparisons. The first was that there would be significant differences between the two intervention conditions and the wait-list control condition, and that this difference would vary depending on locus of control status. The second planned comparison was that regardless of the control condition, the Career Spins intervention would outperform the CIS condition. This difference was also expected to vary depending on locus of control status. Further examination revealed that neither of these contrasts approached significance, $F(1, 113) = 1.98$, $p = .16$; $F(1, 113) = 0.24$, $p = .62$, respectively.

Main Effects Model. Based on the results of the test for differential effectiveness, it appeared that any effects of our intervention would be best interpreted within a main effects model. We also had two specific planned comparisons for the main effects. First, that both of the intervention conditions would outperform the control condition. This effect was significant $F(1, 116) = 6.94$, $p = .01$, $ç^2 = .06$ and indicated that scores were, on the average, lower for those students who had participated in the intervention (see Appendix B, Table 5 for group means on the CDDQ at posttest, and see Appendix B, Table 6 for a summary of the ANCOVA results). Our second planned comparison was that regardless of the control group, those in the Career Spins group would outperform those in the CIS group. This difference was not significant, $F(1,116) = 0.68$, $p = .41$, $ç^2 = .01$. In general, the main effect of group was significant in this model, $F(2, 116) = 3.79$, $p = .03$, $ç^2 = .06$. However, follow-up analyses using the Bonferroni procedure to control for Type I error revealed no further differences between the groups.

User Satisfaction. Our final analyses examined the user satisfaction data to evaluate the differences in mean satisfaction ratings between the two intervention groups (see Appendix B, Table 5 for group means on the average and overall user satisfaction ratings, and see Appendix B, Table 7 for group means on the individual user satisfaction items). Using a one-way, between subjects, multivariate analysis of variance (MANOVA) we found significant differences between the groups, $F(2, 77) = 5.05$, $p = .01$. Further analyses revealed that, although groups were not different on the one overall question (Overall, how much did you like this program?), the Career Spins group reported higher levels of average satisfaction based on the eight questions common to both groups $F(1, 78) = 3.73$, $p < .00$.

Discussion

From the standpoint of product development, we successfully replicated all functional aspects of CIS's Occupation Sort for Career Spins and embedded it in an interactive multimedia environment especially designed for at-risk youth. The adaptation fulfilled all the proposed functional and design criteria. The program provided youth with a visual learning experience that had rich and relevant social contexts. All instructional aspects were carefully modeled and structured, and the language was simplified to maximize clarity and meaning. We produced complete versions of the Career Spins program for delivery on both the Web and CD-ROM. All performance criteria for both delivery systems were fully met after exhaustive testing.

Feedback from experts and at-risk youth, based on the preliminary qualitative and quantitative testing of the program, was generally very positive and brought to our attention a number of functional and content problems that we were able to address. Preliminary data from the alpha test with youth showed marked pre to post improvement on the CDDQ and moderate to high satisfaction ratings. Members of the expert panel, who were all involved in developing CIS, were, for the most part, very sanguine about the adaptation of their program. Most notable was the high rating they gave Career Spins when they compared it with CIS.

Findings of the feasibility study indicated that youth using either Career Spins or CIS significantly improved their career readiness, compared to youth in a no-treatment control group. Although it was somewhat disappointing that Career Spins did not produce greater benefits than CIS, the finding has to be understood in relation to the fact that Career Spins represents a major remodeling of a sophisticated and leading edge career development program for mainstream youth. In light of the complexity and challenge of this undertaking, it was impressive and gratifying that the highly adapted program we produced for at-risk teens achieved benefits comparable to those of CIS. Important justifications for producing such a program would include showing that it was not only as effective as the original, but was more appealing to its target audience of at-risk youth; that providers and youth alike would be more likely to recognize Career Spins as a more appropriate and relevant resource for at-risk youth than CIS, and that this would engender longer-term and more sustaining benefits for at-risk youth. The current

study provided initial justification for the development and production of Career Spins by showing that at-risk youth benefited as much from it as from CIS and were indeed more satisfied with the adapted program than the original.

There were two limitations in the study that can also help put our findings into perspective. First, the component developed in Phase I is only one portion of the overall program. Furthermore, the intervention period was very brief. In practice, youth will use the entire program to help them make sense of the results they obtain in this first component and will revisit all portions of the program over a longer period of time.

Another limitation of the study, which became apparent only after it was completed and we found ceiling effects for the CDDQ, was that many of the trainees in our JC sample had already been through at least some initial process of considering a career. At the very least, JC youth are in training centers that specialize in a subset of career areas, and soon after their arrival at a center they choose a vocation to pursue. This does not make Career Spins a superfluous intervention, because the career focus for these youth is still very much a work in progress. But it did perhaps limit the variability in the data and our capacity to detect differences. Our evaluation strategy in Phase II, therefore, will be modified to study an at-risk population that has not yet received substantive guidance on career development. Further, although the locus of control measure tapped into an abiding trait, it was not useful in detecting further differential effects and will also be dropped in Phase II.

APPENDIX A

CAREER SPINS CURRICULUM ON CD-ROM

APPENDIX B

TABLES

Table 1
Means and Standard Deviations for Outcome Measures, Pre- and Posttest

	Pretest			Posttest		
Measure	*M*	*SD*	*n*	*M*	*SD*	*n*
CDDQ	3.42	2.33	6	2.71	2.25	6
N-SLCS	11.67	5.09	6	11.50	5.65	6
U-SAT				2.31	0.51	6

Note. CDDQ = Career Decision Making Difficulties; N-SLCS = Nowicki-Strickland Locus of Control Scale; U-SAT = User Satisfaction.

Table 2
Means of Reviewer Ratings, by Segment and Item

Reviewer Ratings			
Question	*M*	Question	*M*
Overall	7.0	Preference	7.8
Program titles	7.6	Functioning	7.2
Navigation	6.8	Instructions	7.6
Approach	7.0	Appeal	8.4
Continuity	7.6	Media	8.3
Performance	6.0		
Story	7.8	Results	7.9
Relevance	7.2	Functioning	6.4
Setting up activity	7.4	Instructions	8.6
Script	8.8	Appeal	8.4
Media	7.8	Media	8.0
		Comparison	8.0

Table 3
Sample Demographics

	Wait-List		CIS		Career Spins		Total sample	
Item	%	*n*	%	*n*	%	*n*	%	*N*
Gender								
Female	17.5	7	20.5	8	19.5	8	19.2	23
Male	82.5	33	79.5	31	80.5	33	80.8	97
Ethnicity								
Hispanic	8.1	3	19.4	7	2.6	1	9.9	11
Not Hispanic	67.6	25	77.8	28	81.6	31	75.7	84
Multiethnic	0.0	0	0.0	0	2.6	1	0.9	1
Unknown	24.3	9	2.8	1	13.2	5	13.5	15
Race								
White	71.8	28	68.4	26	70.0	28	70.1	82
Black or African American	2.6	1	7.9	3	0.0	0	3.4	4
American Indian/AK Native	5.1	2	0.0	0	2.5	1	2.6	3
Native Hawaiian/Other Pac Isl	5.1	2	2.6	1	2.5	1	3.4	4
Asian	0.0	0	5.3	2	2.5	1	2.6	3
Multiracial	10.3	4	15.8	6	17.5	7	14.5	17
Other/Unknown	5.1	2	0.0	0	5.0	2	3.4	4
Educational Status								
In high school/Taking GED	41.0	16	56.4	22	60.0	24	52.5	62
Completed HS/GED or in coll	59.0	23	43.6	17	40.0	16	47.5	56
Where spent most of upbringing								
Inner city	36.8	14	43.2	16	39.0	16	39.7	46
Suburbs	26.3	10	21.6	8	22.0	9	23.3	27
Rural area or town	36.8	14	29.7	11	36.6	15	34.5	40
Multiple areas	0.0	0	5.4	2	2.4	1	2.6	3
Residential Status								
Residential	97.3	36	100.0	37	92.3	36	96.5	109
Non-residential	2.7	1	0.0	0	7.7	3	3.5	4

Note. Group and total percentages are based on the valid number of cases for each variable. No significant differences were found between the three groups.

Table 4
Internal Consistency and Test-Retest Reliabilities for Questionnaires

	Reliability Coefficients	
Questionnaire	Internal Consistency	Test-Retest
Career Decision Making Difficulties	.86	.91
Nowicki-Strickland Locus of Control Scale	.62	.93

Note. Internal consistency reliability coefficients were calculated using equal length Spearman-Brown coefficients. Test-retest reliability coefficients were calculated using coefficient alpha.

Table 5
Descriptive Statistics for Measures at Posttest

	Wait List			CIS			Career Spins		
Measure	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*
CDDQ [a,b,c]	3.18	0.15	40	2.61	0.15	39	2.79	0.15	41
User Satisfaction									
Average Rating[*]				1.74	0.65	39	2.17	0.58	41
Overall Rating[†] (1-10 scale)				6.79	2.05	39	7.61	1.70	41

Note. Participants in the Wait-List condition did not complete measures of user satisfaction.
[a]Descriptive statistics for the CDDQ are reported as the average rating, on a scale from 0 to 8, of 32 questions on the total scale. Higher scores reflect *greater difficulty* with making career-related decisions.
[b]Significant differences ($p < .05$) were found between the average of CIS and Career Spins intervention conditions compared to the Wait-List condition.
[c]Estimated marginal means and standard errors are reported, as group differences for the CDDQ were evaluated at covariates appearing in the model.
[*]$p < .01$.
[†]marginally significant, $p < .10$.

Table 6
ANCOVA Summary

Effect	*df*	*F*	ç^2	*p*
Interaction Effect				
Group by LOC status	2, 114	0.52	.01	.60
Main Effect				
Group	2, 116	3.79*	.06	<.03
Contrast 1	1, 116	6.94**	.06	.01
Contrast 2	1, 116	0.68	.01	.41

Note. Model 2, equal slopes ANCOVA, was used for all analyses. Contrast 1 = Both intervention conditions v. wait-list control condition. Contrast 2 = CIS v. Career Spins.
*$p < .05$.
**$p < .01$.

Table 7
Means and Standard Deviations for Individual Items and Overall User Satisfaction

	CIS			Career Spins		
Item	*M*	*SD*	*n*	*M*	*SD*	*n*
Overall, I thought the intervention (CIS/Career Spins) was:						
Entertaining**	1.15	0.93	34	1.89	0.92	36
Cool*	1.24	0.92	34	1.72	1.00	36
Easy to understand	2.41	0.74	34	2.61	0.60	36
Useful for me	1.88	1.04	34	1.89	0.95	36
A program I would recommend to others	1.82	0.94	34	2.06	0.83	36
I liked[a]:						
The animations				2.05	0.95	41
The teen characters in the program				2.02	0.91	41
Learning about career choices with ‘toons				2.02	0.88	41
I thought:						
The audio was clear[a]				2.46	0.78	41
The career information was useful to me*	1.76	0.96	34	2.22	0.87	36
The program worked smoothly†	2.12	0.84	34	2.47	0.70	36
The instructions were easy to follow**	2.15	1.05	34	2.75	0.44	36
My overall opinion of the program, on a scale of 1 (the worst) to 10 (the best)†	6.79	2.05	39	7.61	1.70	41

[a]These questions unique to participants in the Career Spins condition.
*$p < .05$.
**$p < .01$.
†approaching significance, $p < .10$.

APPENDIX C

EXPERT REVIEW QUESTIONNAIRE

APPENDIX D

MEASURES