Evaluation of Outcomes for Female Students Participating in Construction Career Day

Conducted by:

The Center for School Counseling Outcome Research

University of Massachusetts--Amherst

This evaluation was funded through The Carl D. Perkins Vocational & Applied Technology Education Act and with the support of the Massachusetts Department of Education.

We would like to thank the following individuals representing the University of Massachusetts Amherst, Boston College and the Boston Private Industry Council for their assistance in conducting and preparing this evaluation: David L. Blustein, Celeste Cianfrani, Uma Dam, Colby Fisher, Gina Franco, Timothy Poynton, William Rawlinson and Magaly Rivera.

Correspondence regarding this report should be directed to Karen DeCoster c/o the Department of Education, Career and Vocational Technical Education Unit, 350 Main Street, Malden, MA 02148, email: kdecoster@doe.mass.edu.

Executive Summary

This report summarizes the results of a comprehensive evaluation of outcomes for female students attending the 2005 Massachusetts Career Construction Day (MassCCD) held at the Laborers Training Center in Hopkinton, Massachusetts. The MassCCD is a career development intervention designed to help young people learn about occupations in the construction and engineering fields. As stated on the event's website, found at http://www.engineers.org/massccd/whatis.html:

> *This event is a great opportunity for juniors and seniors in high school to learn about the wide variety of career paths possible in the construction field. The event is a hands-on career exposure forum for high school students, with construction equipment for the students to try out, and skilled volunteers from many construction disciplines to talk to the students about their career, the skills they use every day and the technical knowledge and professionalism necessary to perform their job.*

In this evaluation report, we are interested in how female high school students react to a career development event that is heavily focused on a traditionally male-dominated field. It is important to note that an underlying belief of the organizers of this project is that both men and women can be equally skilled and successful in the construction and engineering fields.

This evaluation documents the experience that girls have when confronting a career exploration exhibit that counters gender-role expectations. In this vein, the data reported here might have relevance beyond the scope of the CCD. At the very least, the evaluation that follows furnishes program developers and sponsors of Construction Career Day with critical information about the impact of this intervention (including recruitment and preparation activities) on female high school students.

Despite the prevalence of programs like Construction Career Day (CCD), little is known about the effect of such broad-based exploration interventions. This evaluation represents an attempt to document, both qualitatively and quantitatively, the impact of a focused, time-limited program designed to help students learn about a select career cluster. **Like many promising practices in career development education, the impact of this program has not been systematically evaluated to date.**

This evaluation report hopes to initiate much needed dialogue on the use of empirically supported interventions in career development education.

The 1,061 students (912 males, 149 females) who attended the CCD represent a broad cross-section of the Commonwealth's high school youth, including urban schools, suburban schools, and vocational schools. Of the total of 593 students who completed an evaluation questionnaire, the overwhelming majority was male (N= 515), and the remaining 13% were female (N=78). We used both interviews and a questionnaire to obtain input from the female students regarding their perceptions of the CCD.

While many female students reported that they had chosen to attend the CCD out of interest and curiosity, a sizable proportion also indicated that they had received support and encouragement to do so from their technical teachers and others at school (e.g., academic teachers, guidance counselors). **The results from the evaluation reveal that the support of others is the facilitative factor in getting female students to attend at an event like Construction Career Day.** In short, the effectiveness of a structured career exploration event may be linked to the degree of adult support and assistance in preparing for and making sense of the exploratory experience.

A sizable proportion of the young women in attendance indicated that they planned to attend college, suggesting that they had received support and encouragement from adults in their lives to pursue post-secondary education. **Most noteworthy was that all female participants were uniformly prepared to argue against any gender-based stereotyping regarding the suitability of the construction field for girls and women.** Further highlights of our conclusions and recommendations are as follows:

- The Construction Career Day was successful in evoking interest in further career exploration for the girls attending, attesting to the value of this intervention in promoting student retention in careers non-traditional for their gender. However, responses from freshmen and sophomore girls suggest that the event may not be as suitable for facilitating career planning or exploration as it is for juniors and seniors.
- Female students reported a preference to live within Massachusetts, reflecting the importance of this event in promoting the development of a workforce here in our own state.

- Unlike the popular stereotype of students interested in construction trades, the majority of female participants expressed an interest in attending college.

- Future CCD events should feature prominent involvement of women in the construction and engineering trades in running exhibitions and demonstrations.

- Program coordinators should provide teachers, counselors and parents with considerable information about this event pre and post so that students can access and maintain instrumental and relational support for their career choice.

- Inclusion of a formal career assessment (e.g., opportunity to complete short career interest inventories between demonstrations or before or after the event) would help students to make a connection between their CCD experience and their evolving self-concepts.

- We recommend having school counselors and/or career specialists in exhibition areas as a means of helping students to process their career exploration experience and answer questions as they emerge.

Career development interventions like Construction Career Day have the potential to change gender-based beliefs that students have about the construction field, which in turn, will enhance the ability of Massachusetts to develop a first-rate workforce. **Perhaps more importantly, by expanding career options for young women in this way, we are able to help them find optimal matches in the world of work unconstrained by the social forces that reduce access for so many women.**

The Evaluation

In the current labor market, many fields are experiencing considerable shortages of qualified and talented workers, one such field is construction. A major factor in the episodic mismatch between available jobs and qualified applicants is that many girls and women do not consider careers in the construction industry. Consequently, employers are attempting to fill jobs against the inherent handicap of losing nearly half of the population of potential workers. This is due, in part, to the lack of exposure to this industry among girls and women and the dearth of opportunity for exploration where career interests may exist. While boys and men tend to avoid exploring many helping and nurturing occupations, girls and women tend to avoid exploring jobs that involve psychomotor skills, risks, and adventure (Gottfredson, 2002). In effect, the range of occupations that one considers is strongly affected by one's gender. **One way of changing this impediment is to develop interventions such as CCD that expose young women to the advantages of careers in construction and engineering. By doing so, educators can reduce the circumscription of career options that continues to be prevalent in our society.**

Despite the prevalence of programs like the Construction Career Day (CCD), little is known about the effect of such broad-based exploration interventions. This evaluation represents a cutting-edge attempt to document, both qualitatively and quantitatively, the impact of a focused, time-limited program designed, in part, to help female students learn about a career non-traditional for their gender.

In this report, we summarize the background of the 2005 Construction Career Day, review its major features, and evaluate its effect and effectiveness with regard to the female students who participated. We will also review some major concepts in career development education that inform a program like the CCD.

The high schools represented at the CCD event included urban schools (e.g., Boston Public Schools; Lawrence, Lowell), suburban schools (e.g., Framingham, Fitchburg, Andover), and vocational schools (e.g., Southshore, Diman, Shawsheen). Of the total 590 students who completed an evaluation

questionnaire, the overwhelming majority was male (N= 515) with only 13% females (N=75) completing our measures.

The use of structured programs like the CCD to help young people explore their options has a rich legacy in school and career counseling (Herr, Cramer, & Niles, 2004). Such a structured educational experiences can expose young people to new fields, new perspectives, and perhaps even different ways of experiencing their own gender (Blustein, 1997; Herr et al., 2004). The CCD represents an attempt to help young people consider occupations specifically in the construction industry. As stated in the event's website found at (http://www.engineers.org/massccd/whatis.html):

> *This event is a great opportunity for juniors and seniors in high school to learn about the wide variety of career paths possible in the construction field. The event is a hands-on career exposure forum for high school students, with construction equipment for the students to try out, and skilled volunteers from many construction disciplines to talk to the students about their career, the skills they use every day and the technical knowledge and professionalism necessary to perform their job*.

In this evaluation report, we are interested in how female high school students react to a career development event that is heavily focused on a traditionally male-dominated field. It is important to note that an underlying belief of the organizers of this project is that both men and women can be equally skilled and successful in the construction and engineering fields.

Forming the basis of the CCD are two related conceptual frameworks from the career development field. The first is from career exploration theory and practice (Flum & Blustein, 2001; Lapan, 2004). From this perspective, **students are thought to progress in their career decision making as a result of greater exposure to knowledge about themselves and the world of work (Blustein, 1997). An event like the Construction Career Day provides students with an opportunity to learn about the diverse career options in the construction and engineering fields**. As a result, students have a chance to consider their interests, talents, and values in light of the specific requirements of various occupations. The process of exploring occupations can also help students to understand themselves (eg., personality characteristics, strengths) systematically and thoughtfully (Flum & Blustein,

2001). In this context, the CCD represents a classic "best practice" within the realm of possible exploration interventions. **However, like many other "best practices" in education and counseling, the impact of the program has not been systematically evaluated to date. This evaluation attempts to address this gap and initiate a needed dialogue on the use of empirically-supported interventions in career development education.**

The second conceptual framework guiding the CCD is the perspective of gender role socialization in the career development process (Betz & Fitzgerald, 1997; Fassinger, 2000). Gender role socialization refers to the process by which boys and girls learn about the activities and interests that are generally associated with one or both of the sexes. The process of learning about what it means to be a boy or girl in our society is pervasive, often resulting in a circumscription of one's vocational interests (Gottfredson, 2002). **For example, by the time boys and girls enter elementary school, they typically have a clear idea of the kinds of jobs that would be appropriate for men and women, based largely on socialization**. **This results in a reduction of the "zone of alternatives" that people consider which may keep them from reaching their maximum level of satisfaction and productivity.**

The process of circumscribing one's interests has vast implications for our state and nation. Specifically, the shortage of engineers and other skilled workers has been noted in recent state reports and national forums (e.g., Friedman, 2005). By sustaining the effect of gender role socialization, we risk further shortages in selected skilled fields, which can constrain the state's economic competitiveness. **A program like the CCD has the potential to change gender-based beliefs that students have about the construction industry, which in turn, will enhance our ability to develop a first-rate workforce. In addition, by expanding horizons for young women in this way, we are able to help them find their optimal match in the world of work, unconstrained by the social forces that reduce access for so many women.**

Method

We used a structured interview (which is embedded in each of the tables in the Appendix) to evaluate the program's effectiveness. In addition, we used a questionnaire specifically designed to evaluate student reactions to the various aspects of the CCD event (see Appendix for a copy of the questionnaire). In the interview process, graduate students from the University of Massachusetts at Amherst sought out female students as they were participating in the CCD. The interview and the questionnaire were prepared by a team including David Blustein (Boston College), Timothy Poynton (University of Massachusetts—Amherst Center for School Counseling Outcome Research), Karen DeCoster, Keith Westrich, Martha Hass (Massachusetts Department of Education) and William Rawlinson (Boston Private Industry Council).

A total of 98 female students were interviewed at the completion of their tour of the CCD. (Note that the number of completed surveys obtained for the female students is less than the number of respondents to the interviews. The interview and questionnaire were conducted separately. The responses to the interviews were entered on copies of the interview protocol. These protocols were then condensed and collapsed into tables. A master table (Table 1) was constructed with all of the responses from the entire sample of students.

In the analyses that follow, we present the findings for each question on the interview protocol, beginning with the overall trends for the entire sample. We then identify specific trends for subgroups of the sample. The results section will be followed by a discussion of the findings, where we place our observations into a broader context.

Qualitative Results

Question 1: Why did you come to the Construction Day?

The trend for the full sample focused on the students' expressed interest in exploring the fields of engineering and construction. Additional themes that emerged related to the encouragement by a teacher or counselor. A third theme, which was less pronounced, indicated that some of the students sought to avoid school by volunteering for this field trip. A closer examination of this question within the subgroups used in the data analysis revealed the following: the freshmen and sophomores (who likely include many of the same students identified in 15-17 year old cohort) reported a greater interest in attending the CCD out of their own intrinsic motivation and curiosity. The juniors reported a mixed set of reasons for attending the CCD; many of these students reported an intrinsic interest in attending and a sizable proportion also indicated that they were encouraged by their instructor or that the program was compulsory. **The seniors reported a pervasive desire to attend the CCD to explore the occupations and their own career interests.** The two most common reasons selected for the seniors were "Learn more about machinery" and "Relates to interest."

Question #2: How did you hear about Construction Day?

The responses for the full sample indicated that the students' technical teachers were the primary source of information about the CCD. A second theme revolved around the input from guidance counselors. However, teachers were twice as likely to be named as the individual who provided information about the CCD.

The specific trends among the subgroups were as follows: The freshmen and sophomores **(N= 14)** as well as the juniors **(N = 22)** primarily heard about the CCD from their teachers. The seniors **(N = 21)** reported that they had learned about the CCD from their teachers and their guidance counselors.

Question #3: If you are currently interested in a career in the construction or engineering professions, do you feel supported by your…?

The responses from the entire sample were fairly equally distributed among parents and family, teachers, and friends. The responses among the subgroups replicated the trends found among the full sample.

Question #4: Did the Construction Career Day experience help you to think about your career plans? How?

The responses from the entire sample tended to affirm the hope that the CCD would in fact foster exploration. The three most common responses focused on the following two themes: "opened options for exploration," "furthered interest in field," and "provided experiences and discovery of career." However, the fourth most common response (which occurred in 10% of the responses) was "did not help in career plans". (Note: This response could indicate students' assuredness with their career plans before the event.)

The responses from the freshmen and sophomores also affirmed the role that the CCD played in evoking exploration; however, a notable proportion of these participants indicated that the program did not facilitate their career planning or exploration. The responses for the juniors and seniors tended to emphasize the career exploration function of the CCD.

Question #5: If someone were to tell you that construction and engineering professions are only for boys or men, how would you respond?

The responses from the entire sample to this critical question were quite revealing. In short, the response was overwhelmingly in favor of the position that construction and engineering professions are open to both men and women. This trend was found in each of the subgroups as well.

Question #6: If we wanted to attract more young women to this event next year, what should we do different?

The main trend among the entire sample was a recommendation that the organizers enhance the advertising for the event. A second trend in the data was to make the event more relevant to women and to include more women on the staff. The results for the freshmen and sophomores paralleled the

responses for the students aged 15-17. The juniors responded with an endorsement of the following themes: “advertise/publicize event more”, “don’t know” and “no need to do anything differently”. The seniors also tended to recommend more advertising.

Question #7: What examples of women in the construction and engineering trades did you see today?

The responses to this question underscored a theme that has emerged in previous questions related to the relative absence of women at the CCD event. The data from the full sample indicated that the participants primarily observed women operating machines, which was a positive aspect of the CCD. However, the data indicated that few other demonstrations included female operators. The other set of responses that appeared as frequently was the observation that women were hardly seen at the CCD. This response trend was evident in each of the subgroups as well.

Question #8: Have you learned anything new today?

The major trend among the full sample included responses that indicated considerable learning on the part of the participants. The most common response was “how to use machines”, with a smaller proportion of participants noting that they learned how to make a toolbox, how to weld, and how to pave streets. The responses for the freshmen and sophomores focused on the acquisition of knowledge about how to use machines. The juniors reported similar responses. The seniors indicated that they learned how to use machines and to a lesser extent how to make a tool box

Question 9: What do you think you will be doing in five years?

Item a: Where will you be working? For the most part, the entire sample indicated that they believed they would be working in the area of carpentry, engineering, and construction. A sizable group also reported that they would be going to college. Another notable trend underscored that the participants hoped to be working at a job and/or starting a business. The freshmen and sophomore cohort conveyed a more diverse set of expectations, with the most prominent theme being including “getting a college degree” followed by “working in the area of carpentry, engineering, and construction”. The juniors primarily reported that they would expect to work in the construction and engineering fields. However,

they indicated an interest in starting their own business, getting a college degree, and working in unrelated fields. The seniors reported that they expected to be working in the construction field and/or working in a job.

b. Where will you be living? For the most part, the participants indicated that they expected to be living in Massachusetts. A smaller, but notable proportion reported that they would be living outside the state.

c. What will you be doing for fun? The entire sample indicated a significant interest in socializing, with strong interests as well in sports, and to a lesser extent, artistic activities. The freshmen and sophomores, and juniors focused on socializing and sports. The seniors, in contrast, indicated a more pronounced interest in socializing, with a notable drop-off in sports and other areas of leisure.

Quantitative Results

A questionnaire was given to students on their bus ride to and from the CCD event. These questionnaires are found in Appendix 1, assessed student attitudes about the construction industry as well as their current occupational options and their attitudes about career exploration. The following summary provides an overview of the quantitative results:

Respondents. The respondents who completed both the pre and post measures included 78 female students with a distribution of 0% freshmen, 20.5% sophomores, 53.8% juniors, and 25.6% seniors. **In addition, 74.4% of the students who completed both the pre and post questionnaires reported that they were in a program, a pathway, an academy or course that relates to the construction field during the time in which they visited the CCD.** The specific fields within the construction and engineering areas that the students expressed interest in are summarized in Table 2.

Student reactions to CCD.

One important finding is that 42% of the female participants indicated that they were unclear about their career goals at pretest, but were clearer at posttest. Furthermore, 50% of the sample reported that they learned new information about construction and engineering. **Consistent with the qualitative**

analyses, the female respondents reported that they strongly disagreed with the premise that the construction field is primarily for men.

The analysis of female students' career preferences revealed considerable insights into the impact of CCD. **Of the 68 young women who provided pre and posttest data on career preferences, 52% listed a new first choice for the career they are interested in pursuing, and 60% listed a new field in one of their three choices. The most popular "new" categories listed at posttest are (of 47 females listing new pursuit): Machine Operating (34%) and Carpentry (18%). In addition, 23% of the female respondents listed one of the 10 engineering fields at posttest, which were not listed in their pretest responses.**

From a developmental perspective, we observed an interesting spike in the juniors' self-reported interest in further exploration of the construction field as reflected in the bar graph in the Appendix (Figure 1). The graph in Figure 2 also indicates that as the grade level increases, so too does goal clarity, which is consistent with developmental expectations. The graph found in Figure 3 suggests that the seniors were more likely to indicate a new career option in the posttest in comparison to the sophomores and juniors.

Discussion

To organize the discussion of the results, we begin first by examining the female students' expectations for the event, followed by their impressions of the Construction Career Day. We also weave comments on the quantitative results, which serve to enhance the richness of this evaluation report. The discussion concludes with suggestions, based on the data, about the meaning and implications of the CCD for female high school students who attended and participated in the event.

For the most part, the young women reported that they chose to attend the CCD out of their own interest and curiosity. However, a sizable proportion indicated that they received support and encouragement by their teachers and others at their schools (e.g., guidance counselors). **It is quite encouraging for the CCD program designers that so many of the female respondents described an**

interest in exploring the construction field, suggesting that some of the traditional stereotypes about girls and work may be shifting. The support of active and engaged teachers and counselors also seemed to be quite important.

The theme related to the importance of relational support in encouraging female students to explore non-traditional occupations emerged in the early set of questions. This finding, which is consistent with the emerging relational perspectives in career development education (e.g., Blustein, 2001; Flum, 2001; Schultheiss, 2003), suggests that adults can do a great deal to motivate and engage students by being both emotionally and instrumentally supportive. (An example of instrumental support is the encouragement that parents, teachers, and friends provide to female students who may be considering exploring construction and engineering professions). **It may be that the support of others is the facilitative factor in getting female students to attend an event like Construction Career Day. This is a critically important finding, one that is relevant not just to the CCD, but to other programs like it. In short, the effectiveness of a structured career exploration event may be linked to the degree of adult support and assistance in making sense of their exploratory experience.**

Once the young women entered the exhibit space of the CCD, their experiences became a bit more diverse and differentiated. As indicated in the responses from the full sample to question #4, the students seemed to react to the exhibit by considering new career options in construction and engineering. From a developmental perspective, the data indicated that the juniors and seniors were more likely to engage in exploration as opposed to the freshmen or sophomores, who had more mixed reactions. This finding is consistent with previous research, which has stated that students tend to explore more as they face imminent decisions or transition points (Flum & Blustein, 2000).

The quantitative findings also revealed important developmental trends that merit attention. **Specifically, juniors seemed to express a greater interest in exploring after their participation in the CCD as compared to their peers in the other grades. This observation may be due to the influence of an intervention like CCD in stimulating a sense of immanence about impending decision-making**

tasks. The seniors may have already felt as if they had explored their career options and may be more prone to achieving a sense of closure on their choices. This observation is further supported by the response to the quantitative question that asked the students about their goal clarity; the responses to this question indicated that the seniors were more likely to report gains in the clarity of their career goals.

The next set of questions in the survey provided insight about gender issues inherent in the CCD program. One important finding that emerged in the analysis of question #5 is that the participants were uniformly prepared to argue against any gender-based stereotyping regarding the suitability of construction and engineering fields for girls and women. In addition, the participants indicated that the CCD would have benefited from greater participation by women in the actual demonstrations. This is a critical point that we will return to shortly in the recommendations.

The participants indicated that they did learn new skills during their involvement in the CCD. **An interesting observation about the responses to this question is that the students tended to report more concrete skills rather than learning about themselves in relation to their career development. It might be useful to explore setting up a career development education booth at future CCDs where students can learn more about the processes of making career decisions and about the impact of gender-role socialization.**

A number of informative trends emerged in the analysis of the question that asked students to map their five-year plans in terms of their preferred work plans, location, and leisure. For the most part, the female students reported that their career plans involve the construction field; certainly, this finding is related to the self-selection of the sample, in that the young women who attended the CCD probably had some interests in construction and engineering in the first place.

Interestingly, a sizable proportion of these students indicated plans to attend college. From a developmental perspective, the interest in working, per se, became more prominent among the older students, underscoring the impact of the impending high school graduation on the participants.

The students reported that they would prefer to live within Massachusetts, which reflects the importance of this event in promoting the development of a workforce here in our own state. The students who attended this event are probably quite rooted in their communities and may be less likely to leave the state. The leisure interests of the participants were quite diverse, ranging from sports to socializing. Based on the responses to this question, it seems that the sample was diverse and represents a cross-section of adolescents with fairly traditional leisure interests.

When taken together, a number of themes and recommendations emerge from this analysis. We list the major conclusions and recommendations that we believe are suggested by these data below:

1. The CCD seems to be quite successful in evoking exploration. In the career development education literature, the main goal of many career-based interventions in adolescence is to stimulate exploration. Based on the reports of the students in the sample used in this study, we can state with some confidence that the CCD is effective in generating exploration and self-reflection. This is particularly noteworthy given that we interviewed only female participants. That the girls who attended seemed intent on exploring these fields further attests to the power of exposure in promoting interests in non-traditional careers. This is an important observation and may in fact be worth sharing at a national level in a presentation or journal article.
2. One of the most important recommendations to emerge from this analysis is the need for more women in the booths and in the demonstrations. The career development literature is very clear that people learn via role models (Lent, Brown, & Hackett, 2002) along with many other influences. In the realm of promoting the interests of women, the use of role models can be very effective. The students who attended were aware of this perhaps on an intuitive level and appropriately recommended more involvement from women in the construction and engineering fields. This is actually a critically important recommendation and we strongly urge the CCD planners to think creatively about ways of involving women in this important event.

3. As we suggested earlier in the Discussion, we think that we would be wise to include some more formal means of helping the students to learn how to connect their tour of the CCD with their own evolving self-concepts and identities. The students who attend this event are very much open to learning about themselves and the world of work. In the current approach, the CCD does a great job; however, the impact of the event may be enhanced by providing some formal career development curriculum before, during, and/or after the event. For example, giving the students a brief interest inventory at some point may evoke further exploration, which is consistent with the results from empirical literature on these assessments (Blustein & Flum, 1999). By giving an interest inventory right before the CCD, we may be able to help students do a great deal of internal processing of their interest results, which may produce very prominent gains in the student's career development education.
4. A related recommendation is that the CCD might benefit from having school counselors or career specialists on the premises, perhaps in their own booth or as chaperones, as a means of helping the students to understand and process their experiences while they are attending the CCD.
5. One of the most important observations from our results is the importance that the adults and other relational supports played in helping the students to become interested in attending the CCD. Moreover, the support that the students experienced from their parents, teachers, and counselors was evident throughout the evaluation. We believe that counselors and other school leaders would be wise to provide teachers and parents with considerable information about this event so that the students will be able to access both instrumental support as well as relational support from the adults in their communities.
6. Unlike the popular stereotype of students interested in construction and engineering, many of the participants expressed an interest in attending college. The fact that the CCD included some college booths is a positive feature of the program that may actually be expanded in future such events.

It is important to place these recommendations in the context of the limitations of the evaluation process. The nature of the qualitative data is inherently subjective as the students shared their views with interviewers, who then transcribed the responses onto structured interview forms. The quantitative data also has limitations as the survey instrument was new and did not have clear evidence of validity and reliability. However, the items that were used on both surveys were developed by a design team that is well versed in career development education and evaluation. With these limitations in mind, it is useful to note that the CCD seems to be a viable exploration program for female high school students. By helping to break down gender-based stereotypes, the CCD program is serving the students as well as the construction and engineering fields by providing a source of information and inspiration, hopefully leading to a more satisfied, diverse, and competitive workforce for the state of Massachusetts.

References

Betz, N. & Fitzgerald, L. (1997). *The career psychology of women*. Orlando, Florida: Academic Press, Inc.

Blustein, D. L. (1997). A context-rich perspective of career exploration across the life roles. *Career Development Quarterly, 45*, 260-274.

Blustein, D. L. (2001). The interface of work and relationships: A critical knowledge base for 21st century psychology. *The Counseling Psychologist, 29*, 179-192.

Blustein, D. L., & Flum, H. (1999). A self-determination perspective of exploration and interests in career development. In M.L. Savickas & A. Spokane (Eds.), *Vocational interests: Their meaning, measurement, and use in counseling*, Palo Alto, CA: Davies-Black Publishing.

Fassinger, R. E. (2000). Gender and sexuality in human development: Implications for prevention and advocacy in counseling psychology. In S.D. Brown & R. W. Lent (eds.), *Handbook of counseling psychology* (3rd. Ed., pp. 345-378). NY: Wiley.

Flum, H. (2001). Relational dimensions in career development. *Journal of Vocational Behavior, 59*, 1-16.

Flum, H., & Blustein, D. L. (2000). Reinvigorating the study of exploration: A conceptual framework for research. *Journal of Vocational Behavior, 56*, 380-404.

Friedman, T. L. (2005). *The world is flat: A brief history of the 21st century*. NY: Farrar, Straus and Giroux.

Gottfredson, L. S. (2002). Gottfredson's theory of circumscription and compromise. In D. Brown (Ed.), *Career choice and development* (4th ed.). San Francisco, CA: Jossey-Bass.

Herr, E.L., Cramer, S. H. & Niles, S. G. (2004). *Career guidance and counseling through the lifespan: Systematic approaches* (6th ed.). Needham Heights, MA: Allyn & Bacon.

Lapan, R. T. (2004). *Career development across the K-16 years: Bridging the present to satisfying and successful futures.* Alexandria, VA: American Counseling Association.

Lent, R. W., Brown, S. D., & Hackett, G. (2002). Social cognitive career theory. In D. Brown (Eds.). *Career choice and development* (pp. 255-311). San Francisco, CA: Jossey-Bass.

Schultheiss, D.E.P. (2003). A relational approach to career counseling: Theoretical integration and practical application. *Journal of Counseling and Development, 81*, 301-310.

Appendix A:
Table 1

Summary of Qualitative Results

Please note that the numbers in the frequency column represent the number of times each response appeared in the data analysis.

1. Why did you come to the Construction Day?

No.	General listing of themes	Frequency
1.	Learn more e.g. about machinery	16
2.	Takes a relevant class	15
3.	Relates to interest	24
4.	Avoidance of school/ Field trip	12
5.	Meet new people	1
6.	Curiosity/Explore future options in different fields	18
7.	Recommended by guidance counselor/career specialist	15
8.	Admiration for people working in field	1
9.	Challenged by guys to show that she can “do it”	2
10.	Family member in field?	3
11.	To have fun	5
12.	Don’t know	1
13.	Media	2
14.	Practical training	4
15.	Encouragement or compulsory assignment by teacher	21
16.	Good experience with event last year by self or others	6
17.	Accompanied friends	1

2. How did you hear about Construction Day

<table>
<tr><th>No.</th><th>General listing of themes</th><th>Frequency</th></tr>
<tr><td>a.</td><td>Teacher
<table>
<tr><td>Landscaping</td><td>1</td></tr>
<tr><td>Math</td><td>1</td></tr>
<tr><td>Decorating</td><td>1</td></tr>
<tr><td>Arbor</td><td>1</td></tr>
<tr><td>Electricity</td><td>1</td></tr>
<tr><td>Technology</td><td>1</td></tr>
<tr><td>Art</td><td>1</td></tr>
<tr><td>Carpentry</td><td>5</td></tr>
<tr><td>Media</td><td>1</td></tr>
<tr><td>Shop</td><td>13</td></tr>
<tr><td>Drafting</td><td>2</td></tr>
<tr><td>Physics</td><td>1</td></tr>
<tr><td>Engineer</td><td>3</td></tr>
<tr><td>Computer</td><td>1</td></tr>
<tr><td>Painting</td><td>2</td></tr>
<tr><td>Automotive</td><td>3</td></tr>
<tr><td>masonry</td><td>2</td></tr>
<tr><td>English</td><td>1</td></tr>
<tr><td>Plumbing and electrician</td><td>2</td></tr>
<tr><td>NCRR</td><td>1</td></tr>
<tr><td>Interior design</td><td>1</td></tr>
<tr><td>Architecture</td><td>1</td></tr>
<tr><td>photography</td><td>1</td></tr>
</table></td><td>60</td></tr>
<tr><td>b.</td><td>Bulletin Board</td><td>1</td></tr>
<tr><td>c.</td><td>Friends</td><td>1</td></tr>
<tr><td>d.</td><td>Announcement at school</td><td>1</td></tr>
<tr><td>e.</td><td>Other:
<table>
<tr><td>Guidance counselor</td><td>24</td></tr>
<tr><td>Guy from administration office</td><td>2</td></tr>
<tr><td>“Public schools media guy”</td><td>2</td></tr>
<tr><td>Tech prep</td><td>6</td></tr>
<tr><td>‘Shriver Job Corp’</td><td>1</td></tr>
<tr><td>Interest from last year’s review</td><td>2</td></tr>
</table></td><td>38</td></tr>
</table>

3. If you are currently interested in a career in the construction or engineering professions, do you feel supported by your:

Careers of choice: Construction, civil engineering, teaching, day care, dental hygiene, urban planner, engineering.

No.	General listing of themes	Frequency	
		Yes	No
a.	Parents and family	91	2
b.	Teachers	93	
c.	Friends	90	4
d.	Not interested	8	

4. Did the Construction Career Day experience help you to think about your career plans? How?

No.	General listing of themes	Frequency
	Opened options for exploration	29
	Furthered interest in field	13
	New experiences/discovery of career	12
	Received encouragement and information	1
	Was not sure	10
	Enjoyed herself	8
	Increased confidence in abilities and choices as a woman	6
	Afraid to work with heavy machinery	2
	Did not help in career plans	12
	Found out more about family profession	2
	Narrowed down focus to more specific career interest	5
	Assisted in present unrelated career	1
	Learnt more about different machines	6
	This career option requires hard work	1
	New experiences/discovery of career	11
	Liked particular aspects of career and not others	2
	Social networking	1

5. If someone were to tell you that the construction and engineering professions are only for boys or men, how would you respond?

No.	General listing of themes	Frequency
	Women are excelling in all fields	13
	Equality in all fields between men and women	18
	Would prove statement wrong through effort	16
	Give own example as interest of woman in field	2
	Would disagree	14
	Protest actively	13
	Nothing to do with gender- only to do with interest & abilities	4
	Become angry/agitated	21
	Would not care- used to sexism	4
	Would claim discrimination	3
	Would be respectful to others opinions	1
	Demonstrate by actively encouraging women	2
	Some women may just not enjoy this career	1
	Depends on power differential in relationship	1

6. If we wanted to attract more young women to this event next year, what should we different?

No.	General listing of themes	Frequency
	Educate people about this field/create awareness	4
	Increase the confidence in abilities of women	4
	Advertise/publicize event more	22
	Make events more relevant to the interests of women.	11
	Demonstrate an increased interest in field by women	6
	Recommendations by previous attendees.	1
	Include more women on staff	7
	Have more events	1
	The profession itself should change	1
	No need to do anything differently	8
	Increase more practical training	2
	Show more interest in having women attend	2
	Make events more relevant to the interests of women.	11
	Have a separate event for women	2
	Women will attend if they are interested	5
	Challenge women more through the event	3
	Have more supportive teachers	3
	Have women in field advertise	2
	Don’t know	18

7. What examples of women in the construction and engineering trades did you see today?

No.	General listing of themes	Frequency
	Operating machines	25
	Tool boxes	5
	Booths	3
	Working (general)	1
	With chemical suits	5
	Asbestos station	4
	Climbing	8
	None	34
	Building stuff	1
	Hazmat	1
	With white hard hats	1
	Construction	1
	Carpentry	3
	Electricity Station	2
	As staff	2
	Hardly any women seen	9
	Army suit	1

8. Have you learned anything new today?

No.	General listing of themes	Frequency
	How to make a tool box	12
	Boys don't take time to understand directions	1
	Climbing a tree	6
	That I like heights	3
	How to weld and pave streets	8
	How to wear chemical training suits	2
	Increased interest in field	1
	New skills	6
	Construction	1
	Observation	1
	Good remuneration in field	1
	Certification is important	1
	How to use machines	49
	Good to be aware of one's own limitations in this field	1
	Mason trade union	1
	Patience	1
	One can do anything if she has determination	2
	Professionals in field are still attending school to further their learning	1
	Work is not as difficult as it seems	1
	Asbestos station	1
	Work is difficult	7
	There are many things women are doing	1
	Nothing new	10

9. What do you think you will be doing in five years?

a. Where will you be working?

Completing a graduate degree	4
Working in the area of carpentry, engineering, construction etc	34
Working with family member	3
Majoring in a science subject	1
Working in a job	16
Getting married	1
Don't know	9
In the medical field	1
Getting college degree	24
Start own business/enterprise	10
Working in unrelated field	4
Be a professional	2

b. Where will you be living?

MA	52
Don't know	4
Still with mom	1
Puerto Rico	1
Outside MA	31
In an urban area	2
Near a college chosen/dorm	2

c. What will you be doing for fun?

Going to church	1
Socializing	45
Sports	29
Organizing events	1
Don't know	8
Entertainment	6
Working	5
Relaxation	1
Activism	1
Artistic activities	10
Traveling	8
Teaching/tutoring	1
Spend money	5
Any new experience	1
Get Married	2

d. Other?

10. Have you learned anything new today?

_____

_____

_____

_____

Table 2

Fields of Interest Expressed by the Participants

% of 72	CONSTRUCTION TRADES
0	❒ 1 Asbestos Working
1.3	❒ 2 Boilermaking
6.4	❒ 3 Bricklaying
11.5	❒ 4 Carpentry
7.7	❒ 5 Electrical
0	❒ 6 Elevator Constructing
0	❒ 7 Floorcovering
3.8	❒ 8 Ironworking
1.4	❒ 9 Laboring
7.7	❒ 10 Machine Operating
0	❒ 11 Mill & Machine Installing
10.3	❒ 12 Painting
0	❒ 13 Pile Driving
1.4	❒ 14 Plasterers & Cement Masonry
1.3	❒ 15 Plumbing & Pipefitting
0	❒ 16 Refrigeration, Air Conditioning & Oil Burner Working
2.6	❒ 17 Roofing
2.6	❒ 18 Sheetmetal Working
0	❒ 19 Sprinklerfitting
2.6	❒ 20 Telecommunication
2.6	❒ 21 Other

% of 72	ENGINEERING FIELDS
11.5	❒ 22 Architectural Engineering
2.6	❒ 23 Auto CAD Designer and Auto CAD Technician
3.8	❒ 24 Civil Engineering
1.3	❒ 25 Drafting
6.4	❒ 26 Electrical Engineering
1.3	❒ 27 Environmental Engineering
1.3	❒ 28 Fire Protection Engineering
1.3	❒ 29 Mechanical Engineering
0	❒ 30 Surveying
2.6	❒ 31 Other

Appendix B

(Pre-Survey) - Construction Career Day

The questions below provide a way to evaluate your experience at Construction Career Day. Please respond honestly because your answers will help us to improve the program for students attending this event in future years.

A. Name: _____ **B.** Sex: Male Female
(Circle one)

C. School: _____

D. Grade: Freshman Sophomore Junior Senior Other _____
(Circle one)

E. At the school you are currently attending, are you in a program, a pathway, an academy or course that relates to the construction trades or engineering field? **Yes No**
(Circle one)

If "Yes", check the appropriate box(es) below:

CONSTRUCTION TRADES

- ❒ Asbestos Working
- ❒ Boilermaking
- ❒ Bricklaying
- ❒ Carpentry
- ❒ Electrical
- ❒ Elevator Constructing
- ❒ Floorcovering
- ❒ Ironworking
- ❒ Laboring
- ❒ Machine Operating
- ❒ Mill & Machine Installing
- ❒ Painting
- ❒ Pile Driving
- ❒ Plasterers & Cement Masonry
- ❒ Plumbing & Pipefitting
- ❒ Refrigeration, Air Conditioning & Oil Burner Working
- ❒ Roofing
- ❒ Sheetmetal Working
- ❒ Sprinklerfitting
- ❒ Telecommunication
- ❒ Other

ENGINEERING FIELDS

- ❒ Architectural Engineering
- ❒ Auto CAD Designer and Auto CAD Technician
- ❒ Civil Engineering
- ❒ Drafting
- ❒ Electrical Engineering
- ❒ Environmental Engineering
- ❒ Fire Protection Engineering
- ❒ Mechanical Engineering
- ❒ Surveying
- ❒ Other

F. What construction trade or engineering field are you most interested in finding out about during your participation in Construction Career Day? (Please select from the list above)

_____

G. I am interested in pursuing the following construction trades or engineering fields. (Please select from the list on the first page and place in order of preference):

1. _____

2. _____

3. _____

In the statements that follow, please circle Agree or Disagree after each statement.

I am interested in exploring various careers. Agree Disagree

I am not sure about my career goals. Agree Disagree

I know a lot about careers in the construction trades and engineering fields.

Agree Disagree

I believe that the construction trades and engineering fields are primarily for males and not for females.
Agree Disagree

Appendix C

(Post-Survey) - Construction Career Day

A. Name: _____

B. After Construction Career Day, I am now interested in pursuing the following construction trades or engineering fields. (Please choose from the list below and place in order of preference):

1._____

2. _____

3. _____

CONSTRUCTION TRADES

- ❒ Asbestos Working
- ❒ Boilermaking
- ❒ Bricklaying
- ❒ Carpentry
- ❒ Electrical
- ❒ Elevator Constructing
- ❒ Floorcovering
- ❒ Ironworking
- ❒ Laboring
- ❒ Machine Operating
- ❒ Mill & Machine Installing
- ❒ Painting
- ❒ Pile Driving
- ❒ Plasterers & Cement Masonry
- ❒ Plumbing & Pipefitting
- ❒ Refrigeration, Air Conditioning & Oil Burner Working
- ❒ Roofing
- ❒ Sheetmetal Working
- ❒ Sprinklerfitting
- ❒ Telecommunication
- ❒ Other

ENGINEERING FIELDS

- ❒ Architectural Engineering
- ❒ Auto CAD Designer and Auto CAD Technician
- ❒ Civil Engineering
- ❒ Drafting
- ❒ Electrical Engineering
- ❒ Environmental Engineering
- ❒ Fire Protection Engineering
- ❒ Mechanical Engineering
- ❒ Surveying
- ❒ Other

In the statements that follow, please circle Agree or Disagree after each statement.

I am now interested in further exploring my career options. Agree Disagree

I am clearer about my career goals. Agree Disagree

I now know a lot about careers in the construction trades and engineering fields.
Agree Disagree

I believe that the construction trades and engineering fields are primarily for males and not for females.
Agree Disagree

Please feel free to share any other comments about the Career Construction Day:

_____

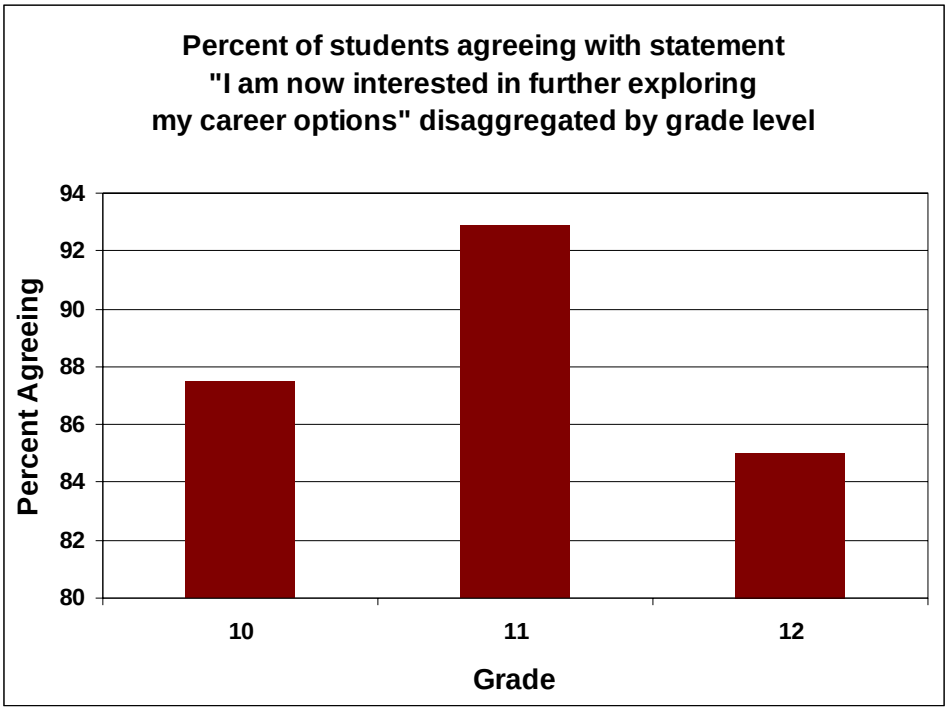
_____

_____

_____

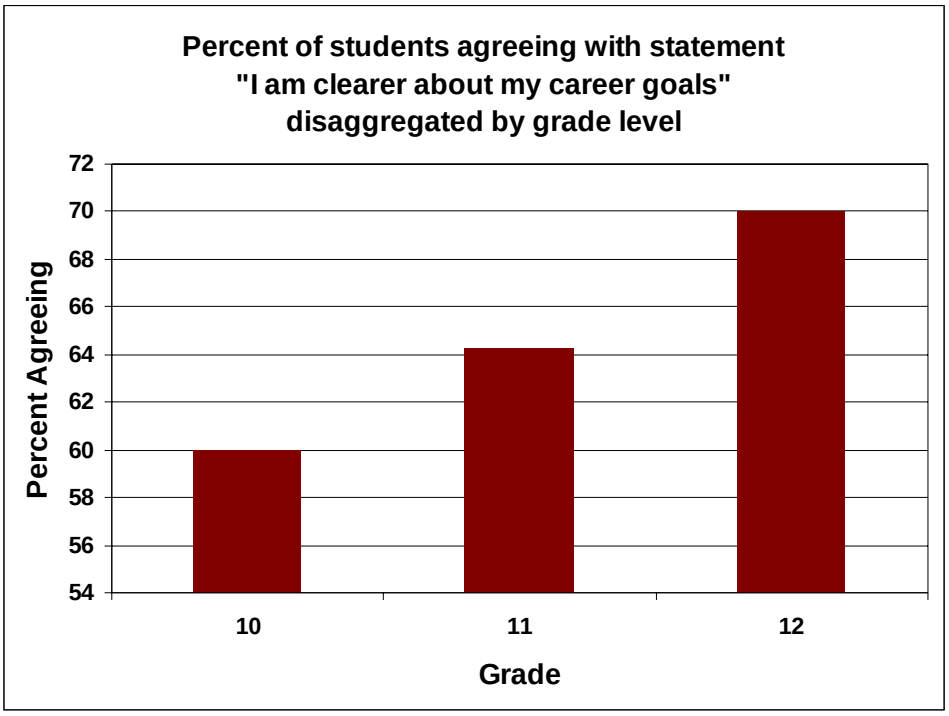
_____

Figure 1



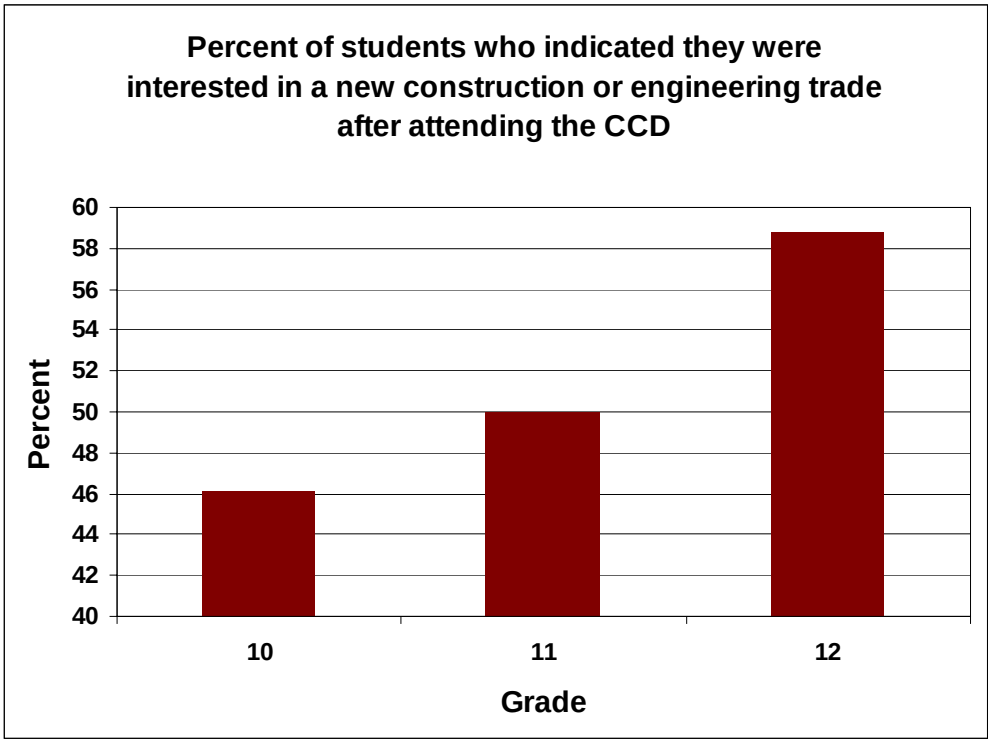
Female student responses to question "I am now interested in further exploring my career options" disaggregated by grade level. Question was asked on the posttest survey.

Figure 2



Female student responses to question "I am clearer about my career goals" disaggregated by grade level. Question was asked on the posttest survey.

Figure 3



Percent of female students by grade level who indicated at least one construction or engineering trade they were interested in at posttest that was not among their pretest responses.