Navigating the Career Development of Students with Disabilities in STEM

The VRTAC-QE National Symposium on Rehabilitation Counseling

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Learning Objectives

Upon completion of this session, participants will be able to:

• Identify challenges faced by transition-age youth with disabilities in engaging in STEM education and careers.

• Develop greater insight into the effect of engagement in career activity, career decision-making self-efficacy, outcome expectations, and goals on the quality of life of college students with disabilities in STEM.

• Discuss some strategies and practices associated with advocating for transition-age youth, promoting career development and decision toward the STEM field, and expanding access to STEM education and opportunities for transition-age youth with disabilities.
Introduction: Background

• Decrease in people pursuing STEM jobs → Increase in the demand for trained workers

• COVID-19 → Decrease in undergraduate enrollment in the STEM majors

• Despite the same enrollment rates (28%) in STEM majors between students with disabilities and those without disabilities, the former comprises only about 1/3 of the population (8.6 - 10%)
  • Unemployment: 5.49% (employees with disabilities) vs. 1.87% (overall)

• Less exposure, support, and/or access to STEM fields for students with disabilities

(National Center for Science and Engineering Statistics, 2021)
Introduction: Background

Why are students with disabilities so invisible in STEM education and occupation?

Role Models in STEM (Lee, 2011)

Exposure to a structured and unstructured STEM field activities (Eriksson et al., 2007)

Informational Support (Alston et al., 2002)

Accessibility (Alston et al., 2002)

Governmental Support to afford STEM education (Hawley et al., 2013)

Accommodations (Bargerhuff et al., 2010; Kise et al., 2017)

Disability Disclosure

Expectations (Alston & Hampton, 2000)
Introduction: Background

- Delays in career development due to:
  - Attitudinal barriers
  - Lack of knowledge & use of their rights under the ADA
  - Lack of work experience & accommodations
  - Transportation problems
  - Disability-specific barriers

- Result in poor transition outcomes for transition-age youth with disabilities

(Fabian et al., 2021; Goodall et al., 2022; Noel et al., 2017)
Introduction: Background

• College students' QoL and health are intricately correlated.
  • Health-related QoL of students with disabilities is lower than peers.
• Lack of studies investigated the population of students with disabilities in STEM fields.
Introduction: Purposes of the Study

To understand process aspects of career development and its impact on well-being

• To examine the effect of engagement in –
  • Career development activity
  • Career decision self-efficacy
  • Outcome expectations
  • Goals

Quality of Life of college students with disabilities in STEM
Method: Participants

- **Participants**
  - Inclusion criteria: 18 years of age or older; enrolled in 2 or 4-year institutions; enrolled as STEM majors
  - 182 college students with disabilities (age: $M = 21.42$, $SD = 4.81$)
  - 27.5% seniors, 25.3% juniors, 22.5% sophomores, 18.1% first-year; 3.8% 1st year in community college and 2.2% 2nd year in community college
  - 79.7% White/Caucasian, 5.5% Asian, 3.8% Hispanic/Latino(x), 3.3% African American/Black, 2.2% Multiracial, 0.5% Native American/American Indian; 4.9% preferred not to respond
Method: Procedure & Measurements

- **Procedure**
  - Disability service centers at the 2-year and 4-year institutions in Midwest
  - Use of listserv of the disability service centers
  - Data was collected via Qualtrics.

- **Measurements**
  - **Career Activity**
    (researcher developed; 1-item)
  - **Career Decision Self-Efficacy**
    (Career Decision Self Efficacy-Short Form; 25-item; Betz et al., 1996; Betz & Taylor, 2001)
  - **Career Decision-Making Outcome Expectations**
    (Career Decision Making Outcome Expectation; CDMOE; 9-item; Betz & Voyten, 1997)
  - **Goals**
    (Goal Setting Scale; 19-item; Howard et al., 2009)
  - **Quality of Life**
    (Quality of Life Inventory; QOLI; 32-item; Frisch, 1994)
Methods: Data Analysis

- Descriptive Analysis using SPSS 26.0
- Path Analysis with Bootstrapping ($n = 5,000$) using AMOS 18.0
  - Examining model fit and path coefficients
  - Goodness of fit indices
    - $1 < \chi^2/df < 3$
    - Comparative fit index (CFI) $> .90$
    - Tucker-Lewis Index (TLI) $> .90$
    - Bentler and Bonett’s normed fit index (NFI) $> .90$
    - Root mean square error of approximation (RMSEA) $< .06$
Results: Preliminary Analysis

• Normality assumption
  • $-2 < \text{Skewness} < 2$
  • $-7 < \text{Kurtosis} < 7$
    • Skewness and Kurtosis within the ranges for all variables

• Multicollinearity assumption
  • Correlation coefficients < .7
    • Correlation coefficient between self-efficacy and goal setting $r = .71$
  • Variation Inflation Factor (VIF) < 5
    • No multicollinearity among the research variables
Results: Path Analysis

• Research Model
  • Good model fit ($\chi^2/df = 1.46$, CFI = .99, TLI = .98, NFI = .98, RMSEA = .05)
# Results: Path Analysis (2)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Self-efficacy</th>
<th>Outcome Expectancy</th>
<th>Goal Setting</th>
<th>QoL-Self</th>
<th>QoL-Other</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Direct</td>
<td>Indirect</td>
<td>Total</td>
<td>Direct</td>
<td>Indirect</td>
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<td>.206**</td>
<td>-.172**</td>
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<tr>
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<td>-</td>
<td>.553***</td>
<td>.637***</td>
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<tr>
<td>Outcome expectancy</td>
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<td>-</td>
<td>.148*</td>
<td>-</td>
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<tr>
<td>Goal setting</td>
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<td></td>
<td>.621***</td>
<td>-</td>
<td>.621***</td>
</tr>
</tbody>
</table>

- *p < .05
- **p < .01
- ***p < .001
Discussion

Extension of Social Cognitive Career theory (SCCT) to students with disabilities in STEM

• The model predicts both self-oriented and other-oriented QoL from a combination of engagement in the career development activity, career decision self-efficacy, career decision-making outcome expectations, and goals.
Engaging students with disabilities in STEM career development activities to build self-efficacy

- **However, 11%** of the students with disabilities in STEM have **not engaged in any services for their career development and job-related supports**.
- Underutilization of career services and students with disabilities graduating with minimal work experience of college students with disabilities (Pillette, 2019).

What are the career development activities or supports students in STEM engaged in or received?

- Career counseling (5.5%) & Internships or job fairs (4.9%)
- Less use of job search (1.1%) or professional networking experiences/mentoring relationships (1.1%)
- Consider the nature of STEM occupations and rapid changes in skills required
Discussion (cont'd)

Negative impacts of career development activities on outcome expectations

• Barriers to participate in STEM education and careers (e.g., social stigma, limited access to quality education and services, etc.)

• These barriers can limit the formation of outcome expectations and discourage pursuing careers in STEM fields.
Discussion

The influence of social cognitive variables on the academic and career goals of students with disabilities in STEM

• Self-exploration (e.g., self-assessment, reflection, analysis) and environmental exploration (e.g., informational interviews, attending networking events) through their engagement in the career development and exploration activities (Blustein, 1922)

• Career decision self-efficacy and career decision-making outcome expectations can be seen as promoting goals related to pursuing one’s academic and career success.
Discussion

Linking career development activities, self-efficacy, outcome expectations, and goals to quality of life

• Linking goal setting and resource pursuit to improved quality of life for students with disabilities in STEM

• The critical role of career guidance, support services, and social engagement in enhancing quality of life for students with disabilities (Gillies & Pedlar, 2003; Gillies, 2012).

• The positive impact of STEM career-based learning experiences and training programs or support on career prospects and well-being
Implications for Practice

How can STEM education and work environments be made more inclusive, and what steps can be taken to ensure equal opportunities for students with disabilities?

- Strengthen partnerships on and off college campuses for career exploration
  - States' partnerships with institutions of higher education and industry (e.g., career pathways)
- Create opportunities for engagement and experiences
- Provision of a career plan and decisional support
- Help students find mentors
- Train college staff, instructors, and employers on inclusive practices and accommodations
- Assist students to develop goals
Implications for Research

• Studies that focus on the impact of mentoring
• Longitudinal studies investigating experience of STEM majors' attrition and retention
• Investigations into the intersections of students with disabilities, STEM majors, STEM careers, and QoL
• Intervention studies assessing goal-based approaches and their influence on career growth and QoL
Limitations

- Self-report measures
- Convenience sample
- Study population characteristics
Conclusions

• Career Decision self-efficacy, career decision-making outcome expectation, and engagement in career development activities directly and indirectly influence STEM students' career goals.

• Proactive engagement in career development and exploration facilitates career decision self-efficacy which leads to attainable goals, and ultimately to improving overall well-being.

• Structured pathways are needed.
References


References (2)


Thank you for your participation.

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