Too Many Jobs and Too Few IS Students: *i*-STEM to the Rescue

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Abstract

This project addresses the widespread problem of filling positions that require advanced technical skills (e.g. programming, data management).

DEFINITION: For the purposes of this study, *i*-STEM (*interdisciplinary* Science, Technology, Engineering, and Mathematics) encompasses academic disciplines that integrate technical and nontechnical skills within an applied career trajectory.

The definition is intentionally broad and refers to a hybrid condition, combining mutually exclusive capabilities within an industry context. Based on the analysis of survey results, a comprehensive taxonomy of *i*-STEM alternatives will be developed that will proactively address this employment crisis and contribute to self-efficacy and self-categorization theoretical foundations. Implications for career counseling and academic intervention will be presented that will serve to improve decision making of both high school and college students. This study focuses primarily on underrepresented employee classes, specifically attracting women to STEM fields. Additionally, the research will focus on broadening computational skills building in a variety of academic disciplines.

Introduction

- ❑ Insufficient talent and skills flowing through conventional academic pipelines (Tennant, 2103)
- ❑ National Science Foundation opportunities for broadening participation in computing education (NSF, 2013)
- ❑ Process of how students choose their majors (Croasdell, McLeod, & Simkin, 2011)
- ❑ Fundamental reasons given by females for avoiding computer science, for example, are (1) they want to help people, and (2) they want to solve problems (Denning, 2004; Denning & McGettrick, 2005)
- ❑ Persistent workforce issues and balancing work-family (Quesenberry, Trauth & Morgan, 2006)

Purpose & Research Questions

❑ **Purpose**
- Broaden the definition of STEM to be more inclusive:
  - Include interdisciplinary fields
  - Attract under-represented target populations
  - Address salient gender issues and increase awareness

❑ **Research Questions**
- Will under-represented populations be more attracted to interdisciplinary STEM fields than to traditional STEM fields?
- Can *i*-STEM help to alleviate the problem of unfilled technical positions in the USA, thereby eliminating the employment crisis?

Proposed Method

- ❑ Conduct a pilot survey (online) to determine gaps and areas of misunderstanding related to STEM fields
- ❑ Measure subjects' level of understanding of STEM occupations in a broad perspective
- ❑ Develop taxonomy of technology-related career opportunities to increase awareness of high school and college students

Assumptions

- ❑ Negative stereotypes persist regarding STEM fields
- ❑ Gender is an important determinant in choosing a STEM major in college
- ❑ Choice of major is influenced by career opportunities
- ❑ Students do not generally think of STEM within a specific context (e.g. industry context)

Career Path Implications

HEALTHCARE

From radiology to surgery, nursing to administration, the industry is saturated with technical innovations (e.g. Heathfield, Pitty & Hanka, 1998). Evidence-based health practices require large data sets to inform medical decision making activities (Rodrigues, 2000). Familiarity with IT and computing concepts, combined with domain knowledge from a specific industry, will lead to novel opportunities and imaginative career paths.

Career Possibilities:
- Hospital Administrator
- Health Records Data Analyst
- Patient Advocate
- Radiologist
- Physician with technical background
- Nurse with technical background

PUBLIC SAFETY

Incident reports, arrest notifications, and data collected during investigations all require IT skills to collect, store, analyze, and disseminate timely and accurate information throughout the law enforcement community (Rebstock Williams & Aasheim, 2005). And, mobile computing increases the complexity of communications, while increasing both efficiency and effectiveness.

Career Possibilities:
- Database Analyst
- Detective
- Private Investigator
- Computer Fraud Specialist
- Crime Scene Analyst
- Criminal Profiler

ENTERTAINMENT INDUSTRY

Some universities have developed curricula that integrate technology with stage production. One example is a bachelor's degree in audio production and technology. The coursework includes a foundation in electrical engineering technology, combined with a specialization in computer science. Other possibilities include degree programs in theater and entertainment technology, sound design, and graphic artistry. A strong technical foundation will launch careers in this innovative space.

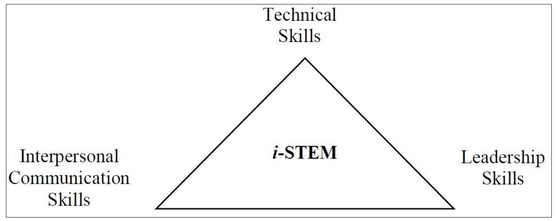
Career Possibilities:
- Sound and Audio Technician
- Videographer
- Sound Design Specialist
- Graphics Designer
- Animation Specialist
- Technical Director

BIG DATA IN BUSINESS

Big Data is the latest headline in business circles. Corporations are capturing and storing vast amounts of transaction level data, sentiment data from social networking sites, and unstructured feedback from consumers. This data is in addition to the structured data collected from automated sensors and ongoing performance metrics. Companies need qualified individuals that are able to process, analyze, and report the findings in ways that add value.

Career Possibilities:
- Data Scientist
- Database/Data Warehouse Analyst
- Data Manager
- Business Analyst
- Information Security Specialist
- Business/Competitive Intelligence Specialist

Conceptual Model



- •Integration of three unique sets of skills
- •Weighted balance will depend on the specific job requirements

Future Research

- ❑ Use results of the pilot survey to modify instrument
- ❑ Gather survey data and perform content analysis
- ❑ Conduct follow-up interviews to probe for details
- ❑ Use results to develop taxonomy of *i*-STEM career paths
- ❑ Create reports and disseminate findings
- ❑ Conduct a follow-up assessment to determine impact of research
- ❑ Develop a longitudinal research plan to track changes over time

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