

Program Description

The School of Teacher Education and Leadership (TEAL) administers an interdepartmental program with the School of Applied Sciences, Technology and Education, leading to a doctoral degree (PhD) in Education specializing in Curriculum and Instruction with a concentration in Career and Technical Education. This degree is designed to prepare educators who wish to become:

- curriculum specialists
- coordinators and supervisors in public or private school systems
- leaders in state departments of public instruction
- instructors at the college or university level in K-12 teacher or administrator preparation
- educational researchers serving in various contexts

Degrees and Emphasis Options Offered

Program Delivery - Two Formats

- Logan-based Doctoral Program - Students attend in Logan where coursework is delivered primarily face-to-face in the late afternoon or evening to accommodate students' work schedules. Students proceed through the program flexibly. The deadline for application for the Logan program is February 1. (Coursework begins the following fall semester).
- The Distance Doctoral Program - A cohort program with all courses during the fall and spring semesters taught via broadcast. Students come to Logan for face-to-face coursework for two consecutive summers. Broadcast locations are based on the needs of the new cohort. The deadline application for the Distance Doctoral Cohort is February 1 every even-numbered year. (Coursework begins the following fall semester).

Program Mission

The mission of the Ph.D concentration in Career and Technical Education at Utah State University (USU) are to enhance the pedagogical and research skills of qualified individuals who are interested in furthering their education careers.

Alignment of Program Mission with Departmental Mission

The mission of the School of Applied Sciences, Technology and Education (ASTE) is to apply the Land Grant University philosophy to teaching & learning, discovery, research, and outreach. The School uses proven educational processes which include formal and informal instruction, experiential learning, leadership, and personal development at an under graduate, graduate, and community based level.

The Career and Technical Education program is housed in the School of Applied Sciences, Technology and Education (ASTE) and aligns very well with programs, especially those involved in training teachers in agriculture, technology and engineering, as well as family and consumer science.

Our mission also aligns closely with the mission of the School of Teacher Education and Leadership and we support their program learning goals and objectives. The mission of TEAL at USU is to “research, teach, lead, and serve in partnership with other stakeholders in the educational process and continually evaluate our research, teaching, leadership, and service to ensure their relevance and effectiveness.”

Program Goals

The program goals of the CTE PhD concentration align with the primary goals of USU’s School of Graduate Studies. The specific goals of the CTE PhD concentration program are as follows:

1. Graduate students will obtain focused and comprehensive knowledge in Career and Technical Education through classroom instruction, research, and other innovative educational experiences and venues.
2. Graduate students will be prepared to use original ideas and scholarly skills to contribute to the advancement of the field of Career and Technical Education.
3. Graduate students will have excellent opportunities to develop and practice professional skills so they can integrate and communicate effectively with the scholarly community in the field of Career and Technical Education.
4. Graduate students will be prepared to assume future leadership roles in disseminating and applying knowledge to address local and global educational societal needs.

Program Learning Objectives

After completing the PhD in Education with a concentration in Career and Technical Education at Utah State University, students will be able to:

1. Explore the interrelationship between education, schooling, and society.
2. Analyze the relationship among and between curriculum, teacher, students, and context.
3. Develop research skills using qualitative and quantitative methods.
4. Design and carry out research to examine a problem or issue in education.
5. Develop and implement contemporary curricula used in Career and Technical education.
6. Be able to discuss and debate contemporary issues and trends occurring in the field of Career and Technical Education.
7. Be able to effectively develop and use evaluation and assessment instruments to measure student learning and program effectiveness.

8. Describe common administrative and organizational structures used in the managing of Career and Technical Education classrooms and laboratories.
9. Describe a variety of learning strategies.
10. Demonstrate the ability to function effectively on teams.
11. Effectively communicate ideas, data through written and electronic means.
12. Recognize the need for, and an ability to engage in life-long learning.
13. Describe the foundational aspects of Career and Technical Education.
14. Develop grant proposals.

Plan for Measuring the Achievement of Degree and Program Objectives

Students' successful completion is measured by graded course work that has been aligned with learning objectives. Students must meet minimum requirements established as set by policies through the USU School of Graduate Studies. Important guidelines include the following:

- A 3.0 GPA is required for all graduate degrees.
- Up to 12 semester graduate-level credits may be transferred to a USU graduate degree from an accredited university if approved by the student's supervisory committee and the graduate school. These transfer credits should have grades of "B" or higher, should not exceed the 8 year limit from degree completion, and should not have been used for another degree.
- A maximum of 12 semester graduate credit hours may be earned before matriculation. Matriculation occurs when you have completed all the admission requirements and have been officially accepted into USU's graduate school and the TEE program. Credits taken beyond 12 semester credits cannot be used to fulfill degree requirements.

Progress towards completion of the doctoral program is completed through an annual review to determine if the student is making satisfactory progress in the program. A comprehensive exam is taken after completion of coursework which is scored by a minimum of three graders prior to beginning the dissertation. The dissertation committee, consisting of 5 members, including one from outside the department, oversees the quality and defense of dissertations. Prior to successful completion of the program, students are also required to present at a peer-reviewed conference and submit a manuscript to a peer-reviewed journal.

Data Outcomes

The Technology and Engineering Education doctoral concentration was modified in 2016 to reflect all Career and Technical Education programs in the School of Applied Sciences, Technology and Education. Prior to this program change 100% of TEE PhD students successfully complete the required coursework, comprehensive exam, and dissertation project. The following are abstracts of students' work.

Bartholomew, S. (2016). *A mixed-method study of mobile devices and student self-directed learning and achievement during a middle school STEM activity*. Available from ProQuest Dissertations & Theses Global.

Abstract

With the increasingly ubiquitous nature of mobile devices among K-12 students, many argue for and against the inclusion of these devices in K-12 classrooms. Arguments in favor cite instant access to information and collaboration with others as positive affordances made possible through mobile devices. Self-directed learning, a process where individuals take charge of their learning and decide what they will learn, how they learn it, and how they assess their learning, has been identified as an increasingly important trait for K-12 students. The relationship between mobile device access in K-12 education settings and student self-directed learning has not been explored. This research used a mixed-method approach to learn more about the impacts of mobile devices on student achievement and self-directed learning during a Science, Technology, Engineering, & Mathematics (STEM) activity in a K-12 technology and engineering education classroom. In this study, 706 middle school students from 18 classes worked in groups of 2-3 to complete an open-ended engineering design challenge. Students completed design portfolios and constructed prototypes (products) in response to a provided engineering design challenge. Participating classes were divided with some receiving ubiquitous access to mobile devices during the study while others did not. Additionally, randomly assigned classes completed the design portfolio electronically while others completed their portfolios on paper. Final student portfolios and products were assessed and assigned a rank order using an innovative method of assessment called adaptive comparative judgment (ACJ). In ACJ judges view two artifacts (portfolios or products) electronically via a computer and choose the better of the two. Repeating this process, a number of times produced a rank-order for the artifacts. The rank order for student portfolios and products was used to represent student achievement. Statistical analyses of student access, portfolio type, student self-directed learning, and student achievement were conducted. In addition to the quantitative approach, 30 student interviews and 5 teacher interviews were conducted by the researcher following qualitative methodology. Interviewees were asked a variety of questions regarding mobile devices, self-directed learning, open-ended engineering design challenges, and their experience during the study. Responses from the interviews were transcribed and coded using causation and thematic coding techniques. The resulting themes from the interviews were compared with the quantitative findings. Findings from both the quantitative and qualitative analyses showed that student access to mobile devices was significantly correlated with higher scores on student design portfolios while student achievement on design products was independent of mobile device access. These findings suggest that mobile devices may improve student achievement in certain types of scenarios but not in others. Over the course of the study, student self-directed learning was independent of mobile device access. Students and teachers both commented that mobile devices may be

effective at increasing student self-directed learning or achievement but only through proper instruction and demonstrations.

Warcup, R. (2015). *Successful paths to becoming a lean organization in the construction industry*. Available from ProQuest Dissertations & Theses Global.

Abstract

Lean construction is considered a valuable solution for the declining productivity of the construction industry. This study seeks to answer the general research question: What does it take to become lean? The research explored the possible paths to becoming lean by examining the journeys of three successful lean construction firms in the U.S. The results are intended to assist other construction firms with their own transformations. This study is especially useful to executives and management because it describes the cultural transformation process of each participating company, the expectations of company employees, and the best practices that each company employed. A qualitative, multiple-case study methodology was used to find common patterns among all three firms as well as unique attributes. Eight research themes shaped the interview dialog that probed the participants' experiences and insights regarding lean--from the companies' initial discovery of lean to their implementation of tools and trainings. The themes further prompted responses regarding the roles that were critical to successful lean implementation as well as the barriers that inhibited lean adoption. Finally, interviews also sought out strategies to successfully promote and implement lean into the future. The research discusses the assertions and conclusions that emerged from the findings, which identify several successful paths to becoming lean. Findings show how people, the environment, and actions positively or negatively influence the adoption of a lean culture. The study concludes with recommendations for future firms regarding lean planning to transform the organization into a successful, top-performing, lean construction company. It emphasizes personalized application for each employee to create a positive environment for the new culture to develop. The conclusions also include five phases of lean saturation: discovery and learning, commitment, strategic planning, implementation, and training company partners in lean.

Boyles, R. E. (2014). *An investigation of the change in motivation of fifth-grade students on writing activities after being taught computer programming using similar teaching strategies*.

Abstract

Writing is a well-established content area in the elementary grade levels and computer programming is currently being introduced to the elementary grade levels. Both subject areas utilize similar organizational skills and teaching strategies. However, the students who are motivated to program may not represent the students who are motivated to write. The purpose of this study was to investigate the change in the dimensions of motivation, which are: challenge, choice, enjoyment, and interest of fifth-grade students to engage in an expository writing activity after being taught to develop computer programs with the same teaching strategies used in the writing activity. A quasi-experimental control-group design was conducted, with the use of the *My Class Activities Instrument*, to investigate the change in the dimensions of motivation. Control, treatment groups, and gender were investigated by comparing pretest and iv posttest data. The data were analyzed using a multivariate general linear model (MGLM) for

treatment/control groups and gender. The results of the MGLM showed no statistical significance for difference in the control, treatment groups, and gender; more analysis was conducted on individual students. Students were categorized into three levels (low, middle, and high) on motivation by the results of their pretest scores. Students were tracked based on who showed a motivational change from the pretest on both the science activity and the posttest. The individual students in the treatment and control groups were then compared by percentage of individual movement. The results of the analysis showed that the low treatment group, on all four dimensions of motivation, moved more positively than the control group that scored in the low group on the pretest. The results of this study suggest that the teaching of computer programming was not effective with the intention of motivating the masses of fifth-grade students to write. However, there appears to be supporting evidence that teaching computer programming to fifth-grade students may help some individual students who are not initially motivated to write.

Robinson, T. P. (2014). *The development of an instrument to measure the self-efficacy of students participating in VEX robotics competitions*. Available from ProQuest Dissertations & Theses Global.

Abstract

The number of robotics competitions has steadily increased over the past 30 years. Schools are implementing robotics competitions to increase student content knowledge and interest in science, technology, engineering, and mathematics (STEM). Companies in STEM-related fields are financially supporting robotics competitions to help increase the number of students pursuing careers in STEM among other reasons. These financial supporters and school administrations are asking what the outcomes of students participating in competitive robotics are. Few studies have been conducted to investigate these outcomes. The studies that have been conducted usually compare students in robotics to students not in robotics. There have not been any studies that compare students to themselves before and after participating in robotics competitions. This may be due to the lack of available instruments to measure student outcomes.

This study developed an instrument to measure the self-efficacy of students participating in VEX Robotics Competitions (VRC). The VRC is the world's largest and fastest growing robotics competition available for middle and high school students. Self-efficacy was measured because of its importance to the education community. Students with higher self-efficacy tend to persevere through difficult tasks more frequently than students with low self-efficacy. A person's self-efficacy has major influence over what interests, activities, classes, college majors, and careers he or she will pursue in life.

The self-efficacy survey instrument created through this study was developed through an occupational and task analysis (OTA), and initial content and face validity was established through the OTA process. Exploratory and confirmatory factor analyses were also conducted to assist in instrument validation. The reliability was calculated using Cronbach's alpha. Face validity was established through the OTA process. Construct validity was established through the factor analyses. The processes of the OTA and factor analyses have created an instrument that results indicate is reliable and valid to use in further research studies.

McMullin, K. (2013). *Identifying perceptions that contribute to the development of successful project lead the way pre-engineering programs in utah*. Available from ProQuest Dissertations & Theses Global.

Abstract

Many secondary schools in Utah have adopted the Project Lead the Way (PLTW) pre-engineering program. Little research has been conducted in Utah to show how successful these programs are or what factors are perceived to contribute to that success. This research is about defining PLTW program success and identifying factors perceived to improve success. This was accomplished by interviewing career and technical education directors in Utah who have the PLTW program in their districts. Questionnaires were also developed to question PLTW teachers, school administrators, and counselors with PLTW in their schools about factors that might contribute to PLTW program success. A successful PLTW program in Utah was found to be a program that was perceived to meet the goals of implementation, had the ability to attract adequate student enrollment, and was perceived to promote scholarly student achievement. It was found that successful PLTW programs (a) utilize dynamic teachers taking advantage of teacher professional development, (b) capitalize on student interest in the subject and differentiate learning models and environments, (c) utilize a collaborative effort between schools, industry, and community, (d) advertise class offerings and program benefits so students can make wise class choices during registration, and (e) make sure resources and facilities are available for all the curriculum requirements.

Youngberg, L. (2008). *The democratic purpose of postsecondary education: Comparing public, private nonprofit, and private for-profit mission statements for expression of democratic social purpose*. Available from ProQuest Dissertations & Theses Global.

Abstract

Thomas Jefferson envisioned a symbiotic relationship between democracy and public education because he considered educated citizens to be the critical ingredient of a successful democracy. kind to the relationship that Jefferson envisioned. This study examines frequency that postsecondary education institutions declare a democratic social purpose in their mission statements. The DSP definition, data instrumentation, and theoretical lens for this study were situated from the Jeffersonian perspective. Although the primary concern for this study was publicly funded/subsidized postsecondary education, recent enrollment growth in private education and privatization initiatives, such as voucher programs, justifies comparison with private nonprofit and private for-profit institutions to reveal how the different types of institutional control influence DSP. The comparison also provides a sense of the non-economic consequences of reduced public education subsidy and intentional or unintentional privatization. A number of Carnegie classification variables were also examined to better understand what factors influence DSP expression. This study utilized a national random sample of undergraduate institutions, from associates colleges to research universities. The sample size was 336 and there were no cases of missing data. Interrater reliability was calculated as .873 Kappa on the dichotomous dependent variable (DSP presence or absence). The first research objective was to determine if public, private nonprofit, and private for-profit institutional mission statements differ in the frequency of DSP expression. Public institutions exhibited 36.5% DSP, private nonprofit institutions exhibited 69.1% DSP, and private for-profit institutions exhibited 11.9%

DSP. Chi-square test determined that there was significant difference between each of 2x2 comparisons ($p < .003$). The second research objective utilized logistic regression analysis to gauge the influence of several variables on DSP frequency. Institutional control, focus, enrollment, and mission statement length were found to be significant at the $p = .05$ level. There are differences between public and private institutions and also between two-year and four-year institutions in the frequency of DSP expression. These differences have serious social and political implications that will likely go unnoticed as the bulk of society focuses on private and economic concerns.

	2008-2009	2009-2010	2010-2011
Number of research/scholarly presentations (or exhibitions, performances, etc. as appropriate) made by students in this program at state, regional, national, or international meetings	3	3	3
Total number of peer-reviewed publications whose primary author is a student in this program	2	2	2
Total number of peer-reviewed publications where a student in this program is a co-author	1	1	1
Number of students from the previous year's graduating class that have found employment in the field	1	1	2

Data-Based Decisions

Data from student progress reviews and comprehensive exams gathered by faculty have resulted in a doctoral program taskforce to review current doctoral programs with the goal of revising the program in terms of coursework for the Ed.D. vs. the Ph.D., reframing the capstone dissertation project, and language that will guide students to the appropriate program for their career goals.

The CTE concentration was established in 2016, therefore no programmatic decisions have been made. Program leaders will review course learning objectives, IDEA evaluations, and review student exit interviews for areas of improvement.