

An Exploratory Study to Develop a CTE Leadership Self-Efficacy Scale

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Introduction

High-quality CTE has become a “catchphrase” in recent years used by policymakers, practitioners, and education and workforce stakeholders (ACTE, 2020). The Association for Career and Technical Education (ACTE) designed a framework to define high-quality career and technical education (CTE) programs, as well as resources and a program self-assessment.

Achieving a high-quality program as defined in the framework requires CTE leaders with an understanding of the framework as well as the skills to move programs toward the high-quality benchmarks. This study began as a discussion among the researchers on the leadership of high-quality CTE programs and understanding how leaders of such programs perceive their own skills and abilities. The discussion proceeded to the concepts of leadership skills and self-efficacy, and the need for a tool to help CTE leaders assess their skills and abilities relative to the ACTE high-quality CTE program of study framework. This study comprises the development and validation of an assessment tool to assist CTE leaders in doing just that.

Drawing on the Skills Approach to Leadership and Self-Efficacy

The skills approach to leadership was first studied by Katz (1955) as a shift from the idea of leadership traits or attributes of “ideal executives.” Katz proposed a three-skill approach: technical skill, human skill, and conceptual skill. Technical skill includes specialized knowledge in process, procedures, or techniques, the analytical ability within the particular field, and an understanding of the tools and techniques of the discipline (Katz). Later described by Northouse (2019), technical skills also include hands-on ability with a product or process. Human skill, as defined by Katz, includes the ability of the leader to work effectively with groups and to build cooperative teams. These skills allow a leader to see multiple perspectives, communicate well with others, and take others’ perspectives into account when acting in the interest of the group (Katz). The third skill, conceptual skill, are those skills that allow the leader to recognize the various functions of the organization, how change impacts the organization, and the significance of decisions on the future of the organization. In other words, conceptual skill is the mental work of shaping the meaning of policies or issues (Katz). Katz believed that a leader needed all three skills, but the relative importance of each changes over the course of an individual’s career, depending on the level of management.

Starting in the 1990s a group of researchers studying effective leadership performance in the Army expanded the skills approach (see Mumford et al. studies in references). However, for the purposes of this study, the researchers determined that the simplicity of the original Katz (1955) model had the best alignment to the ACTE high-quality CTE program of study framework.

Self-efficacy is defined as an individual’s belief in the ability to successfully handle specific situations or duties required (Bandura, 1986). Bandura (1977) outlined four sources of self-efficacy information, including performance accomplishments or personal mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. Leaders with high self-efficacy then believe in their ability to lead (Neck and Houghton, 2006), and within educational environments, to lead others toward the achievement of goals (McCormick, 2001). In developing self-efficacy measures, Bandura (2001) recommends that measurements should examine both the level and strength of self-efficacy and be context specific.

High-Quality CTE Program of Study Framework and Relevant Scales

The ACTE quality program of study framework provides a very specific context in which to assess an individual’s belief in **their** ability to lead high-quality CTE programs. Starting in July 2015, ACTE began reviewing research findings to guide the framework and to document trends in successful CTE programs. Following the initial development of the framework, three drafts were released over three years to gain feedback across a broad constituency group in secondary and post-secondary education. A correlation was conducted with program-level Perkins performance data. In October 2018, the final “ACTE Quality CTE Program of Study Framework” was released. This framework has defined high-quality for CTE programs nationally since that time (Imperatore & Hyslop, 2018).

The framework consists of twelve elements with 92 criteria (Imperatore & Hyslop, 2018). To summarize, the twelve elements include:

1. Standards-aligned and Integrated Curriculum: addresses development, implementation, and revision of program of study curriculum
2. Sequencing and Articulation: addresses articulation, coordination, and collaboration to support programs of study, career pathways, and accelerated learning
3. Student Assessment: addresses the types and quality of assessments
4. Prepared and Effective Program Staff: addresses the qualifications and professional development of educators and other personnel
5. Engaging Instruction: addresses instructional strategies within the learning environment
6. Access and Equity: addresses promotion, student recruitment, and strategies to support various student populations
7. Facilities, Equipment, Technology, and Materials: addresses physical/material components, such as laboratories, classrooms, industry-specific equipment, tools, etc.
8. Business and Community Partnerships: addresses partnership structure and activities to support the program and ensure alignment with workforce needs
9. Student Career Development: addresses strategies to help students engage in education and career planning and decision-making
10. Career and Technical Student Organizations (CTSOs): addresses CTSO opportunities as an integral part of the instructional program for skill and leadership development
11. Work-based Learning: addresses a variety of work-based learning for sustained, meaningful engagement with tasks of a given career field
12. Data and Program Improvement: addresses collection, reporting, and use of data for continuous program improvement (Imperatore & Hyslop, 2018).

In addition to the Framework, ACTE developed a self-assessment instrument for educators to rate their CTE program on the twelve elements (ACTE, 2018). No instrument currently exists, however, for the knowledge and skills needed for those who lead such programs.

Yost et al. (2019) piloted a study to develop a self-efficacy tool for CTE administrators. The tool utilized previous scales developed for leadership self-efficacy (Bobbio & Manganelli, 2009) and Principals' self-efficacy (Tschannen-Moran & Gareis, 2004). The original scale (51-items) was piloted in four states with 85 usable survey results. These results yielded a Cronbach's alpha reliability coefficient of .960. The final scale was reduced to 35 items, with a Cronbach's alpha of .946 (Yost et al., 2019). The focus on administrative roles in CTE programs, however, limits the leadership role to only those who are building level leaders with a role in administering CTE programs. Leadership in CTE can occur at a variety of levels and in a variety of roles, including teachers, counselors, administrators, district personnel, community college faculty, state level personnel, teacher preparation faculty, and student services personnel. No scale currently exists to study the broader self-efficacy beliefs of this broader group of CTE leaders.

Scale Development Methodology

Scale development consisted of three phases. In phase one, a review of the ACTE Quality program of study framework (Imperatore & Hyslop, 2018) was reviewed by one of the researchers and a content expert working with the Association for Career & Technical Education (ACTE) to determine what leadership knowledge and skills were needed for leadership in CTE programs. The knowledge and skills identified cut across 17 themes including understanding CTE federal funding, utilizing Perkins accountability data for decision making, building an

inclusive culture for underserved populations in CTE, recruiting and retaining CTE faculty, developing business and industry partnerships, etc.

To classify the themes in the quality program of study framework, the skills approach to leadership first proposed by Katz (1955) was consulted. Katz (1955) defines technical skill as those skills needed “to accomplish the mechanics of the particular job” (p. 42), human skill as those skills related to “working with others to be an effective group member and to be able to build cooperative effort with the team he leads” (p. 42), and conceptual skill as the skill “to recognize the interrelationships of the various factors involved in his situation” (p. 42). In a later explanation of Katz’s approach, Northouse (2019) defines these as, technical skills deal with things, human skills deal with people, and conceptual skills deal with ideas. Moving these skills into categories of technical, human, and conceptual skills aligns well with other CTE frameworks (i.e., academic, technical, employability skills). Table 1 provides an overview of how each skill set aligned with the ACTE quality program of study framework.

Phase two consisted of identifying possible scales that could be utilized to determine self-efficacy in CTE leaders. One scale emerged with the closest relationship to CTE leadership, which was the CTE Administrator’s Self-Efficacy Survey (CASES) (Yost et al., 2019). Other scales exist, but relate more broadly to leadership or other aspects of education, such as leadership traits for organizations and the workforce (Gardner, Coglisier, Davis, & Dickens, 2011), and Tschannen-Moran and Gareis’ (2004) research of school principals and their ability to handle school reform efforts. The original 51-item CASES (modified with permission) was reviewed to identify which items fit within each skill set (technical, human, and conceptual) for the knowledge and skill themes that emerged from the ACTE quality of study framework (used with ACTE permission). Following review with the content expert of the item fit within the skill sets, fourteen of the original scale items were retained. Three additional items were included, but modified for broader CTE leadership application. In all three items, the phrase “school/district” was changed to either “CTE program or school community” or “educational” to become more inclusive of the various environments where CTE programs exist. Revisiting the ACTE quality program of study framework and the Katz (1955) skills approach then led to the development of an additional ten items, bringing the total number to 28 items.

In phase three, the team of researchers were asked to review the 28 items and the ACTE quality program of study framework to validate the existing content and to determine if there were any gaps between the framework and the 28 items. Following this review, an additional seven items were added to address these gaps and ensure the items were representative of the skills needed to lead a high-quality CTE program. The final scale then was 35 items.

Table 1

Skills aligned with the ACTE Quality Program of Study Framework.

Technical Skills:

“knowledge about and proficiency in a specific type of work or activity” (Northouse, 2018, p. 44); “technical skills deal with *things*” (Northouse, 2018, p. 45)

Corresponding Elements from ACTE HQ Framework:

- #1 – Standards-aligned and Integrated Curriculum
 - #3 – Student Assessment
 - #7 – Facilities, Equipment, Technology and Materials
 - #12 – Data and Program Improvement
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Human Skills:

“knowledge about and ability to work with *people*” (Northouse, 2018, p. 44)

Corresponding Elements from ACTE HQ Framework:

- #4 – Prepared and Effective Program Staff
 - #5 – Engaging Instruction
 - #9 – Student Career Development
 - #10 – Career and Technical Student Organizations (CTSOs)
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Conceptual Skills:

“skills involve the ability to work with *ideas*” (Northouse, 2018, p. 45); “A leader with conceptual skills is comfortable talking about the ideas that shape an organization and the intricacies involved” (Northouse, 2018, p. 45)

Corresponding Elements from ACTE HQ Framework:

- #2 – Sequencing and Articulation
 - #6 – Access and Equity
 - #8 – Business and Community Partnerships
 - #11 – Work-based Learning
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Pilot Study Data Collection and Analysis

In Spring 2020, practicing career and technical educators were accessed using CTE national and state organization listservs, as well as through university CTE programs. These educators were asked to complete the scale to determine its alignment with ACTE's high-quality framework. The 35-item CTE leadership self-efficacy scale was administered electronically via SurveyMonkey and took approximately five to ten minutes to complete. Data collection was slow, presumably due to the COVID-19 pandemic, so the survey remained open through Fall 2020 with additional emails sent out to possible new participants or listservs.

An informed consent statement was included as the first item, followed by the 35 CTE leadership scale items along with seven demographic items (gender, state, age, race, total years of CTE experience, content area, and current position). The self-efficacy items utilized the question stem, “As a CTE leader, to what extent can you . . .” and participants were asked to indicate their self-assessment of each item by marking: 1 - Not at all, 2 - Not much (<50%), 3 - Some (50-70%), 4 - Often (70-80%), or 5 - A great deal (>80%). For access to the full CTE Leadership Self-Efficacy Scale, see Murray State Digital Commons (<https://digitalcommons.murraystate.edu/faculty/74/>).

Following data collection, participants with missing data were eliminated, and data were entered into SPSS statistical software for analysis.

Pilot Study Participants

The convenience sample for this study consisted of a total of 204 participants from 20 states as self-identified from state and national listservs and university CTE programs. The total number of participants could not be obtained as listserv membership can vary daily, and student information was not collected to encourage participation. Of those 204 participants, however, 154 (75%) completed all 35 items and were included in the analysis.

The final sample consisted of 49.4% men and 50.6% women. 93.5% of participants identified as Caucasian, with other races identifying as African American (2.6%), Asian (1.3%), Hispanic/Latino (.6%), and other (1.9%). The majority were CTE teachers in secondary classrooms (40.3%) or CTE teachers in post-secondary classrooms (11%). Other participants included CTE teacher in another environment (2.6%); CTE building/district level coordinator (4.5%); CTE administrators in an area career center (7.8%), in a comprehensive school environment (5.2%), and in another environment (.6%); career services counselor or support services (1.3%); postsecondary CTE coordinator or administrator (5.2%); CTE educator preparation faculty (11%); state level administrators (1.9%); or other (1.9%). Four participants did not answer.

Half of the sample was from West Virginia and 19.5% of the sample from Missouri. The remaining (30.5%) states identified included Texas, Nevada, California, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Minnesota, Nebraska, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, and South Carolina. Sample size was the primary limitation of this study. Although there were greater numbers of participants from two states, upon reviewing the data, the researchers determined that for an exploratory study (Vogt & Johnson, 2016, p.152), the sample appears to be representative of patterns of the CTE population in general.

A broad range of CTE content areas were included among the participants, including Agriculture (19.5%), Business/Marketing (13.6%), Family Consumer Science (5.8%), Construction Trades (5.8%), Health Science (7.8%), Automotive Fields (3.9%), and other fields (31.9%). Eighteen participants (11.7%) did not answer the content area question. Total years of CTE experience also ranged from those identifying as having five years or less of experience at 27.9%, 6-10 years at 19.5%, 11-20 years at 27.3%, 21-30 years at 14.3%, to those with over 31 years in CTE at 11%.

Reliability Analysis of the Scale

The 35-item CTE leadership self-efficacy scale returned a Cronbach's Alpha of .944. The items were sorted into the three categories of technical, human, and conceptual skills as were identified by Katz (1955). Table 2 provides descriptive statistics for each item. Items have been grouped into the three categories.

Items that were developed for each of the skills areas of the ACTE quality program of study framework were also analyzed for reliability with Cronbach's Alphas reporting as: Technical skills = .842, Human skills = .883, and Conceptual skills = .827.

Table 2

Means and Standard Deviations for Each Item Grouped by Skill Area.

Technical Skill	M	SD
3. Effectively establish program recruitment plans?	3.78	.9235
11. Promote ethical data usage among educational leaders?	3.88	1.072
12. Ensure program equipment and technology reflect current workplace practices?	4.08	.9071
19. Set a new direction for a CTE program or school community?	3.73	1.031
22. Integrate core subjects into CTE curriculum?	4.14	.8435
23. Creatively solve new or unusual organizational problems?	3.90	.9342
30. Build reliable assessments into a CTE program to ensure student learning?	4.21	.8321
31. Effectively utilize data and research to develop CTE best practices?	3.95	.9060
32. Develop and carry out an institutional improvement plan?	3.85	1.008
Human Skill		
1. Handle the time demands of your job?	4.35	.8520
2. Identify my strengths and weaknesses?	4.25	.6524
7. Utilize technology in CTE program delivery?	4.16	.8866
15. Confidently build an effective group?	4.21	.7727
17. Communicate with counselors to support appropriate student decision making?	3.95	1.034
18. Identify strengths and weaknesses in staff members?	3.87	1.027
20. Engage students through a variety of instructional approaches (PBL, WBL, inquiry, authentic scenarios, etc.)?	4.19	.8839
21. Integrate CTSO activities into CTE programs?	3.78	1.062
24. Go straight to the matter when communicating with others?	4.25	.8289
25. Change things within a group not under my direct control?	3.15	.9887
27. Change the attitudes and behaviors of others when objectives aren't met?	3.64	.8758
28. Support the transition to teaching by non-traditional instructors?	3.87	1.095
33. Prioritize among competing demands of the job?	4.18	.9012
34. Accept personal and professional constructive feedback to enhance my career?	4.45	.6864
35. Motivate and raise enthusiasm of a group starting a new project?	4.31	.7261

Conceptual Skill		
4. Develop effective programs of study for CTE programs?	4.00	.9597
5. Promote an inclusive culture for underserved populations in CTE?	3.94	.9682
6. Effectively communicate with diverse groups?	4.11	.8673
8. Explain CTE policy to colleagues?	3.94	.9575
9. Effectively meet the needs of your community?	4.05	.7809
10. Generate enthusiasm for a shared vision for CTE program or school community?	4.12	.8267
13. Influence CTE political issues?	3.06	.9883
14. Promote a positive image of your CTE program?	4.63	.5471
16. Provide accommodations/modifications to meet accessibility requirements?	4.12	.8881
26. Meet federal requirements (Perkins funds and reporting)?	4.12	1.094
29. Work with business and industry (workplace) partners (advisory committees, meeting industry needs for workers, developing internship possibilities, etc.)?	4.13	.9507

The first research question for this study addressed the relationship of CTE leader self-efficacy to high-quality CTE programs. This connection is further divided among three categories of skills: technical, human, and conceptual. As indicated in Table 2, means ranged from a low of 3.06 to a high of 4.63, indicating that participants' beliefs in their ability to accomplish the tasks indicated ranged from "sometimes" to "often." The task item that participants were least efficacious about ($M = 3.06$, $SD = .9883$) was 'the ability to influence CTE political issues' (conceptual skill). The task item with the highest mean ($M = 4.63$, $SD = .5471$), indicating highest efficacy, was 'promote a positive image of a CTE program' (conceptual skill). Additionally, the relatively low standard deviation indicates that participants were consistent in their beliefs about their ability with respect to this task item. This could be attributed to the specific job responsibilities of participants, given that the greatest number of participants were CTE secondary or postsecondary teachers (51.3%). Many of the standard deviations ranged between 0.8 and 1.1, indicating that there was variability in the degree to which participants believed in their ability to accomplish task items. There is tremendous variability in job descriptions of CTE leaders among teachers, administrators, state leaders, and university faculty, as well as the variability due to the range of CTE locations (high schools, standalone career centers, community colleges, other sites, etc.), leading to potential wider deviations on any individual item. As the focus of this exploratory study was scale development, pursuing these variabilities was left for future studies.

Discussion

Educational leadership standards in preparing leaders in CTE are quite different from traditional K-12 educational administration (Zirkle & Jeffery, 2017). CTE leaders must be capable and believe in their ability to perform cognitive and behavioral functions necessary to move others toward attaining set goals essential to meeting student educational achievement (McCormick, 2001). CTE programs need leaders who understand the unique needs and characteristics that shape high-quality programs. The framework developed by ACTE gives guidance on the qualities and criteria for high-quality CTE programs of study, but leaves open the question of the skills and abilities needed to lead the development and operation of these programs. Katz's

(1955) skills approach to leadership (technical, human, conceptual) closely aligns with the skill concepts used in CTE (technical, employability, academic), making it a realistic basis on which to build an instrument specifically to assess leadership skills for high-quality CTE programs.

Connecting the ACTE Quality Program of Study framework with Katz's skills approach to leadership then, provides a specific domain to measure CTE leadership self-efficacy beliefs. The goal of the instrument developed in this study is for anyone taking a leadership role in CTE programs. In its present form, the instrument could be used to guide professional development for CTE administrators, instructors, service coordinators, etc. who want to identify growth areas. It could also be used as a pre-post measure for CTE college preparation programs to determine strengths or potential areas for further development in the curriculum.

As the paradigm of "born leaders" has shifted to a recognition of leadership development based on skills acquired through life experiences (Katz, 1955; Northouse, 2019), future research in CTE leadership self-efficacy should include different groups of educational professionals. CTE leaders are found among teachers, district leaders, state personnel, and university faculty. The CTE leadership self-efficacy scale, would likely benefit from further validation with a larger national sample including leaders from secondary CTE charter schools and private post-secondary CTE institutions. Also, a larger sample may provide a more robust assessment of CTE leaders' skills based on selected demographic and background variables. A follow up study for a longer duration of time would also be recommended.

Enhancing CTE leader knowledge and skills will likely bring about beneficial changes for CTE stakeholders and students. The CTE leadership self-efficacy scale provides a means for validating these leadership skills. Sound CTE leadership training and assessments are essential to the success of educational leaders as it directly impacts the success of CTE as a whole.

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