Strengthening Postsecondary Career and Technical Education Researchers Through Research Methods Webinars

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Abstract

The resurgence of interest in career and technical education (CTE) has driven demand for skilled researchers to examine policies and practices for preparing individuals for the workforce. This study disseminates the perspectives of graduate and post-doctoral CTE research fellows on the quality and impact of research methods webinars they attended during their fellowship. The webinars aimed to enhance research skills and professional development. The study used mixed methods to analyze fellows' feedback, revealing themes such as supplementation to doctoral coursework, networking with CTE scholars, acquiring new knowledge, peer engagement, and the essential role of webinars in the fellowship. After each webinar surveys were collected from fellows ($n=175$). A total of ten fellows provided detailed responses to the open-ended questions, leading to findings about the fellows' perceived level of quality and impacts of the webinars. The findings indicate that the webinars offered valuable supplementary knowledge beyond doctoral coursework, broadened the fellows' understanding, and enhanced their capability to conduct rigorous research. The webinars also facilitated networking with CTE scholars, sparked the development of new knowledge and potential research studies, fostered peer engagement, and were regarded as an essential component of the fellowship program in enhancing research skills and capabilities.

Keywords: Career and Technical Education, Online Professional Development, Research Methods

Introduction

Over the past decade, interest in career and technical education (CTE) has resurged, driven by business demand for skilled workers, continued funding of the Perkins Act, and evidence that sub-baccalaureate curricula can lead to well-paying jobs (Rosen et al., 2018; Belfield & Bailey, 2017). This growth has increased the need for researchers to examine CTE policies and practices, focusing on enhancing learning, completion rates, and labor market outcomes. Graduate education plays a critical role in preparing these researchers by providing necessary knowledge,

skills, and dispositions (Gardner & Mendoza, 2023). However, challenges arise due to the decline in CTE programs and faculty, limited professional development, and constrained opportunities for socialization and real-world experience (Fletcher et al., 2015; Khalid et al., 2023). Historically, universities with federal grants facilitated research and development in CTE. The shift of these funded centers to non-university settings and the decline in four-year CTE programs have limited these critical interactions, posing challenges for aspiring CTE faculty and researchers. This decline exacerbates competition for CTE roles in higher education, making it harder for PhD graduates to secure faculty positions (Fletcher et al., 2015). Addressing these challenges requires collaborative efforts among universities, research organizations, funders, and policymakers to ensure a steady pipeline of qualified CTE researchers and faculty, thereby supporting economic growth. Initiatives like the Postsecondary CTE Research Fellows program exemplifies collaborative solutions aimed at sustaining the momentum of the CTE resurgence and cultivating a thriving community of CTE professionals.

Literature

The socialization of doctoral students is a critical process that integrates them into the academic community, fostering a sense of belonging and professional identity (Choi et al., 2021; Hottenrott & Menter, 2020; Khalid et al., 2023). This process involves formal academic training and informal interactions with peers, mentors, and faculty members (Mittelmeier et al., 2019). Through conferences, seminars, and collaborative research projects, doctoral students learn the norms, values, and expectations of their chosen field (Liddell et al., 2014). Effective socialization helps them navigate academia's complexities, build professional networks, and develop the confidence and competence necessary for their future roles as researchers, educators, and leaders (Douglas, 2023; Matthews, 2021). Developing robust research skills is essential for doctoral students as they prepare to contribute original knowledge to their fields (Almusaed & Almssad, 2020); Riby & Rees, 2024; Schrum & Bogdewiecz, 2022). This development includes mastering research methodologies, honing analytical and critical thinking abilities, and becoming proficient in academic writing and publishing. Doctoral programs typically provide structured coursework and hands-on research opportunities (Young et al., 2019), allowing students to apply theoretical knowledge to practical problems. Mentorship from experienced researchers is also pivotal, offering guidance and feedback that enhances students' research capabilities, ultimately equipping them to undertake independent research (Devecchi, 2019; Khalid et al., 2023) and contribute meaningfully to scholarly discourse. Online webinars have become a popular and effective method for developing research skills among doctoral students, offering flexibility, accessibility, and covering a wide range of topics, from specific research methodologies and data analysis techniques to broader subjects like academic writing and ethical considerations (Humble & Mozelius, 2022; Kuby & Bozalek, 2023). These webinars provide interactive and practical sessions led by experts, allowing students to gain valuable insights and real-time feedback while facilitating networking opportunities with peers and professionals who can support their academic and research endeavors.

Purpose and Research Questions

This study aims to disseminate postsecondary CTE research fellows' perspectives on research methods webinars regarding their quality and overall impact. Gaining insight from the fellows'

viewpoints into the perceived quality and overall impact of the webinars, which played a significant role in their professional development during the program, is essential for various reasons. This feedback serves as a preliminary evaluation metric for the webinar series, demonstrating their current efficacy in fostering research skills among the fellows. In essence, this feedback and evaluation process is a proactive measure to refine and improve the webinars, ultimately aiming to support the development of the upcoming generation of postsecondary CTE researchers. By understanding and responding to the perspectives of the current cohort of research fellows, the program can more effectively serve future participants' needs and continue contributing to the evolution and development of the field of postsecondary CTE research. The following research questions were examined in this study:

> *Research Question 1*: What are the postsecondary CTE research fellows' perceptions of the quality of the research methods webinars?
> *Research Question 2*: How do postsecondary CTE research fellows describe the overarching impact of the research methods webinars?

Framework of Postsecondary CTE Fellows Program

The Postsecondary CTE Research Fellows program aims to provide selected doctoral students and postdoctoral researchers training in research methods, mentorship, funding, and networking with experienced faculty and researchers. This initiative is crucial for preparing fellows for competitive faculty labor markets and conducting high-quality postsecondary CTE research. A key component of the program is the webinar series focused on research methodologies, designed to expand and enhance research abilities and improve the quality of future research. At the end of each session, fellows complete surveys to provide feedback, enabling ongoing evaluation and enhancement of the webinar content and delivery which is carefully analyzed through both quantitative and qualitative methods to ensure a comprehensive understanding of the webinars' effectiveness and to inform improvements. The program, sponsored by the ECMC Foundation and hosted by a large, Research I university, supports a yearly Fellows cohort of 12–18 graduate students and postdoctoral researchers nationwide. It aims to develop high-quality postsecondary CTE researchers to advance the field. Delivered in a hybrid structure with in-person and online training, the program includes required online research methods webinars each year. This study looks at data from the first three program cohorts, which included 16 research fellows in the first cohort (academic year 2018-2019), 18 in the second cohort (2019-2020), and 14 fellows in the third (2020-2021). Across all cohorts, fellows entered the program with various levels of research experience. The program supports diverse research methods, from qualitative to quantitative designs, tailored to the fellows' individual projects. These efforts ensure the program's ongoing relevance and effectiveness in equipping fellows with the necessary skills to meet the increasing demand for rigorous causal CTE research. A pre-participation survey was distributed to each cohort to determine topics for research method webinars. Research method webinar topics included quantitative and qualitative methods such as"Introduction to R," "Regression Discontinuity using R," "Using Observational Data to Determine Causal Effects: Selecting and Balancing Comparison Groups with Nonexperimental Data Using Propensity Score Matching," "Qualitative Comparative Analysis," "Phenomenology," and "Qualitative Methods for High-Quality Postsecondary CTE Research."

Theoretical Framework

Evaluating the perspectives of postsecondary CTE research fellows on research methods webinars, particularly how these webinars fill gaps left by their doctoral programs, is well-explained through George Siemens' (2004) connectivism. Doctoral programs, while rigorous, may not always address the rapidly evolving needs and practical skills required in postsecondary CTE research (Digo & Labor, 2022; Lumbreras & Rupley, 2017). Webinars act as bridges, helping to fill learning gaps by facilitating a distributed, collaborative learning network. They offer a platform for fellows to engage with emerging research methods, connect with experts and peers, and apply new knowledge practically (Amado-Salvatierra et al., 2020; Gegenfurtner & Ebner, 2019). By focusing on CTE research fellows' feedback, the study explores how webinars complement and enhance doctoral programs, aligning with connectivism's view that learning is enriched by diverse perspectives and experiences. The study investigates how webinars provide access to resources, discussions, and expertise beyond the traditional doctoral curriculum, expanding fellows' learning networks. This examination offers insights into effectively integrating digital platforms into postgraduate education, developing a robust, adaptive learning ecosystem for postsecondary CTE researchers, and contributing to the discourse on using digital learning platforms to enrich doctoral education.

Methods

This mixed methods study examines postsecondary CTE fellows' perceptions of research methods webinar training. The 10 research methods webinars were delivered during each fellowship year. A survey was distributed pre-participation to determine topics for research method webinars. Research method webinar topics included quantitative and qualitative methods such as "Introduction to R," "Regression Discontinuity using R," "Using Observational Data to Determine Causal Effects: Selecting and Balancing Comparison Groups with Nonexperimental Data Using Propensity Score Matching," "Qualitative Comparative Analysis," "Phenomenology," and "Qualitative Methods for High-Quality Postsecondary CTE Research. "Fellows selected for participation in this program employ various research methods for their sponsored research projects and are at varying stages of the doctoral journey at graduate schools nationwide. Therefore, knowledge, skills, and abilities regarding research methods can vary widely among the participants as the program aims not only to support the fellows' proposed research projects during the fellowship year but also to develop their research methods, knowledge, and skills, enabling them to continue to produce high-quality research that will benefit the field of postsecondary CTE throughout their careers. To that end, the webinar series within the program is designed to expand the methodological tool belt for each fellow, regardless of their prior experience or knowledge of research methods.

Data Sources

Data for this study was generated through post-participation webinar surveys across three cohorts of Research Fellows (*n*=48), each receiving 10 sessions of research methods webinar trainings, for a maximum potential of 480 survey responses. Participants were invited to respond to a survey after each webinar they attended, resulting in 175 survey responses (36.5%). Fellows

were individually surveyed at the conclusion of each webinar, and each cohort was surveyed on the overarching impact of the webinar series.

Participants

The participants for this study were recruited through purposive sampling and were included based on their participation in the webinars as research fellows during the study timeframe. Fellows selected for participation in this program employ various research methods for their sponsored research projects and are at varying stages of the doctoral journey at graduate schools nationwide. Therefore, knowledge, skills, and abilities regarding research methods can vary widely among the participants as the program aims not only to support the fellows' proposed research projects during the fellowship year but also to develop their research methods, knowledge, and skills, enabling them to continue to produce high-quality research that will benefit the field of postsecondary CTE throughout their careers. To that end, the webinar series within the program is designed to expand the methodological tool belt for each fellow, regardless of their prior experience or knowledge of research methods.

Data Collection

The data collected for this study came from fellows' responses to webinar evaluation surveys gathered through SurveyMonkey, with one additional Google Form question. Each of the 48 fellows was asked to complete a survey for each of the 10 webinars they attended, with a post-webinar evaluation completion rate of 36.5%. Quantitative data for research question 1 (n=175) was collected via SurveyMonkey with Likert scale questions about the webinars. Data for research question 2 (n=10) was collected via a Google Form survey with one open-ended question, "How would you describe the overarching significance/impact of the webinar series for you personally?" Fellows were then invited to have a group conversation about their thoughts on the significance and impacts of the webinars.

Quantitative Data Analysis

In analyzing the data for research question 1, *What are postsecondary CTE research fellows' perceptions of the quality of the research methods webinars?,* we used STATA 18. The initial step in the data analysis process involved cleaning and preparing the raw data. This step entailed identifying and addressing any missing, inconsistent, or outlier responses that might skew the results and converting Likert scale responses into numerical values for statistical analysis. After ensuring the data was clean and suitable for analysis, we calculated descriptive statistics for the responses to each of the 11 questions. This provided a summary of central tendency, as indicated by means, and dispersion, as indicated by standard deviations. Next, we performed a factor analysis to identify any underlying structures within the variables. The factor loadings, which illustrate how heavily each variable contributes to the factor, helped us identify two factors: "quality of the webinar" and "application and learning." We then compared the means of the ratings for the quality of the webinars, the perceived learning from them, and the application of the acquired knowledge. We also examined the standard deviations, which indicated the variability or spread in the fellows' responses. A smaller standard deviation suggested that responses were concentrated around the mean, implying consistency in the perceptions of the

participants. Finally, we interpreted the findings, focusing on the mean ratings and the identified factors, to understand the fellows' perceptions of the webinars' quality and how these correlated with their learning and the perceived applicability of the content to their future work.

Qualitative Data Analysis

In analyzing the data for research question 2, *How do postsecondary CTE research fellows describe the overarching impact of the research methods webinars?,* qualitative research methods were employed to draw meaningful insights. The first level of qualitative data was an open-ended question at the end of the survey. Participants were then invited to participate in a group discussion around the same question for thicker descriptions and stories about the impacts of attending the research webinars. Initially, the responses were compiled and thoroughly reviewed to familiarize ourselves with the breadth and depth of the data. The responses were then categorized into thematic codes, using an inductive approach that allowed themes to be generated organically from the data rather than imposing pre-defined categories. Open coding was initially used to identify and label concepts in the data, which were subsequently grouped into categories and overarching themes through axial coding. Each response could contribute to one or more themes.

Results

The research methods webinars have been identified as advantageous to budding researchers in a multitude of ways. One of the primary benefits observed based on the data was a noticeable enhancement in the fellows' qualitative and quantitative research abilities. This was also triangulated in discussions, ideation for research topics, and approaches for additional projects that emerged in the training. The webinars provided a comprehensive and robust understanding of these research methodologies, which subsequently improved the fellows' analytical skills and proficiency substantially.

As shown in Table 1, a factor analysis provided evidence of two factors from the questions that were used to evaluate the webinars: (1) the quality of the webinar with loadings ranging from .877 to .489 and (2) the content, application, and learning with factor loadings ranging from .867 to .639. Of the items, "overall quality of webinar content" and "session tie was sufficient" loaded across factors but were summated in the scale with the most face validity.

Table 1

Factor Analysis of Items to Assess Quality, Application, and Learning from Webinars

Statement	Components	
	Content, Learning, & Applicability	Presenter Quality
I acquired relevant knowledge, skills, and/or abilities from participating in the webinar.	.867	.094
The webinar has equipped me with knowledge, skills and/or abilities that I can apply to postsecondary CTE research projects.	.843	.109
Overall quality of webinar content	.800	.385
The webinar provided me access to resources that I would likely not have seen if I was not an ECMC Foundation Fellow.	.662	.061
Concepts and information presented were up to date.	.639	.289
The presenter was prepared and organized.	.037	.877
The presenter was highly knowledgeable of the subject matter.	.054	.855
The presenter was effective in communicating terms and concepts.	.338	.828
The presenter encouraged participants to participate when appropriate.	.211	.689
Overall, the presenter was excellent.	.556	.635
Session time was sufficient to cover content.	.454	.489

Research Question 1—"*What are postsecondary CTE research fellows' perceptions of the quality of the research methods webinars?"* are reported in Table 2 below in means and standard deviations. A total of 11 questions were used to evaluate the quality of the webinar and assess learning and application to research. The reliability of the content, learning, application, and quality items was .80 and the overall quality of the webinar is .87.

Table 2

Means, Standard Deviations, and Cronbach's Alpha for Webinar Quality and Content, Learning, and Application Scales

Items to assess content, learning, application, and quality	α	M	SD
Content, Learning, and Applicability			
Concepts and information presented were up to date.		4.66	.58
The webinar provided me access to resources that I would likely not have seen if I was not an ECMC Foundation Fellow.		4.60	.68
I acquired relevant knowledge, skills, and/or abilities from participating in the webinar.		4.56	.63
The webinar has equipped me with knowledge, skills, and/or abilities that I can apply to postsecondary CTE research projects.		4.43	.80
Summated	**.80**	**4.53**	**.52**
Quality of Webinar			
The presenter was highly knowledgeable of the subject matter.		4.79	.55
The presenter was prepared and organized.		4.78	.56
Overall, the presenter was excellent.		4.70	.56
Overall quality of webinar content		4.67	.55

The presenter was effective in communicating terms and concepts.	4.63	.63
The presenter encouraged participants to participate when appropriate.	4.63	.71
Session time was sufficient to cover content.	4.32	.84
Summated **.87**	**4.65**	**.49**

Note. A 5-Point Scale is used, where 1-Strongly Disagree and 5-Strongly Agree.

As highlighted in Table 2, using a five-point scale, with five being Strongly Agree, the participants strongly agreed (*M*=4.65, *SD*=.49) that the webinars were high-quality and rated the content, learning, and application slightly lower (*M*=4.53, *SD*=.52). Within the quality of presentations, the lowest-rated item was that the "session time was sufficient to cover content" (*M*=4.32, *SD*=.84). The participants rated their perceived application of the content ("The webinar has equipped me with the knowledge, skills and/or abilities I can apply to postsecondary CTE research projects" (*M*=4.43, *SD*=.80)) lower than their perceived level of learning of relevant content ("I acquired relevant knowledge, skills, and/or abilities based on participating in the webinar" (*M*=4.56, *SD*=.80)). This indicates that the majority of the participants reported learning and were able to see an application to their future work. The seminars overall were perceived to be high-quality, and the small standard deviations indicated homogeneity among the participants in relation to their ratings.

Research Question 2, *How do postsecondary CTE research fellows describe the overcharging impact of the research methods webinars?*, was collected via open-ended survey questions where fellows provided their perceptions of the impact. Themes that were generated included (a) supplementation to their doctoral program, (b) networking with CTE scholars in the field, (c) gaining new knowledge for future research studies, (d) participating in peer engagement with other fellows, and (e) the importance of the webinar element to the fellowship program.

Theme 1: Supplement to Doctoral Coursework

Fellows provided feedback indicating that the research methods webinars offered them valuable supplementary knowledge, effectively enhancing their research proficiency beyond what they had learned in their doctoral curriculum. These webinars extended fellows' formal education, providing deeper or alternative insights into research methodologies. Consequently, fellows reported appreciation of the webinars' role in broadening their understanding and capability to conduct rigorous research, thus complementing and expanding the foundational knowledge obtained during their doctoral studies. One fellow reflected, "Each of the webinars brought new knowledge of methods that are supplemental to the classes I have taken during my doctoral program." Similarly, another fellow stated, "The webinar series exposed me to topics that I had received limited or no training on in my graduate coursework." Professional development initiatives focusing on research skills can be pivotal in supplementing doctoral coursework (Digo & Labor, 2022) since doctoral programs, while rigorous, may not cover every aspect of research methodology, analytics, or emerging tools in depth (Chaló et al., 2023). Thus, additional training, like research methods webinars, can complement and expand doctoral students' methodological understandings (Davies, 2021. This additional exposure solidifies the fundamentals taught in their coursework and provides a broader and more nuanced perspective on research practices. This continuous professional development can keep doctoral students abreast of new trends and

tools in research, enhancing their overall research proficiency and, subsequently, the quality of their work (Riby & Rees, 2024).

Theme 2: Networking with CTE Scholars in the Field

A second theme across fellows' responses reflected an appreciation of the intentional inclusion of research experts outside of the program's faculty to present webinars, thus expanding the fellows' academic and research networks. In responses to the open-ended survey on the webinar series, one fellow stated, "I think the most valued aspect is getting exposure to new scholars in the field," and another fellow reflected, "I gained access to expert speakers that I had not spoken to prior to the webinar series." Networking can significantly benefit future postsecondary CTE scholars, particularly given the limited number of CTE researchers present at many institutions (Rojewski, 2022). Networking opportunities, e.g., attending conferences, participating in online forums, and engaging in professional development webinars, can connect these budding scholars with a wider CTE research community (Mydin & Surat, 2021). This can lead to collaborative research projects, mentorship opportunities, and access to diverse perspectives that can enrich their research (Mydin et al., 2021). These connections can provide a sense of belonging and validation in their specialized field, especially when such a community is not readily available in their own institutions (Villanueva, 2016). Networking is a crucial strategy that can broaden the reach and impact of future CTE scholars while reinforcing their professional identity in the field (Baker & Lattuca, 2010; Patterson et al., 2019).

Theme 3: New Knowledge and Potential Future Research Studies

The development of new knowledge and brainstorming of future research projects as a result of exposure to previously unknown research methods also emerged as a significant theme. One fellow responded that the webinar series "definitely opened my eyes to various possibilities in CTE research." Another fellow stated, "Each of the webinars brought new knowledge of methods," while a third reflected that "the webinar series has been a useful way to learn about different researcher/practitioner approaches to CTE research and how different research methodologies... enable us to pursue different research questions." These statements reflect the benefit of exposing research fellows to methodologies beyond the scope of their supported projects for the future benefit of CTE research. Understanding diverse research methods is critical for researchers across disciplines (Creswell & Plano Clark, 2017), including those in CTE. Wide-ranging knowledge of research methodologies allows researchers to select and tailor the most suitable approach for their specific research question, enhancing the rigor and validity of their studies (Ragab & Arisha, 2017). By utilizing various methods, researchers can foster interdisciplinary approaches, promoting a more holistic understanding of complex phenomena and contributing to the field's depth of knowledge. This diverse methodological understanding also promotes flexibility, allowing researchers to adapt to different research contexts and challenges that may arise during their studies (Turner et al., 2018). As such, a robust understanding of various research methods is an indispensable skill for researchers and is integral to the production of high-quality, impactful research. This theme closely aligns with the goal of the Research Fellow program: to develop emerging researchers who will continue to produce high-quality postsecondary CTE research to benefit the field.

Theme 4: Peer Engagement

Survey respondents expressed how an additional value of the research methods webinars was the scheduled opportunities for them to gather virtually around research topics, strengthening the cohort experience despite varied locations across the U.S. This was reflected in the following responses, "The webinar series also allowed the fellows to talk and interact with each other once per month." And, "Talking through the methods with others who knew the method well taught me more than reading a textbook and hearing the questions from those that did not know the method well was also helpful in learning things about the research method I had not thought of before." The engagement of peers within a research community plays a vital role in facilitating the development and growth of researchers. Peer interactions can foster intellectual exchange and collaboration and offer a platform for constructive feedback that significantly enhances the quality of research and learning outcomes (Tenenbaum et al., 2020). Moreover, peer engagement can establish supportve relationships and networks instrumental in emotional and motivational support during the often-challenging research process (Baker & Pifer, 2011). Importantly, peer interactions also contribute to developing a professional identity and instilling a sense of belonging to a research community, both crucial for a successful research career. Therefore, promoting peer engagement within research communities is crucial for fostering a nurturing and productive research environment.

Theme 5: Essential Element of the Fellowship Program

Fellows reported that the research methods webinars were essential to the overall fellowship program. One fellow reported, "The impact of the webinar series has been influential for me and my research," and another stated, "I think it is a critical component of the fellowship." The fellows supported the fundamental need for sharpening their research methods skills; some examples include, "I would describe the overarching impression of the webinar series as necessary" and "I thought the webinars were needed to meet the needs for everyone." One goal of the research methods webinars was to help build additional tools that can be utilized beyond the fellowship. This was highlighted in the following response, which stated the webinars were "very valuable as an aspiring CTE researcher." Webinars have emerged as a significant tool for enhancing research skills and capabilities, especially in the era of digital learning (Gegenfurtner et al., 2020). As a form of synchronous online learning, webinars provide a platform for researchers to gain exposure to new research methodologies, tools, and trends, thereby contributing to their professional development. Webinars allow researchers to engage with experts and peers from around the globe, facilitating broader perspectives and intellectual exchanges that can enhance the quality and impact of their work (Garao et al., 2023). Webinars also allow for real-time feedback and discussion, leading to deeper understanding and immediate clarification of complex research concepts (Carpenter & Linton, 2016). Thus, the use of webinars in developing research skills is of paramount importance, offering flexibility (Perkasa & Surono, 2023), accessibility, and interactivity that cater to the diverse needs of today's researchers.

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Limitations and Contributions

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The study analyzing the perceptions of postsecondary CTE research fellows toward the quality of research methods webinars offers valuable insights but also presents certain limitations. The

reliance on self-reported data could introduce a self-report bias, leading to overestimation of learning and application due to social desirability. Additionally, the insights are based on a specific group of CTE research fellows, limiting the generalizability of the findings to all such fellows and neglecting other potentially significant aspects like the relevance of the webinar content and the effectiveness of the delivery method.

At the national level, research agendas within the CTE domain have predominantly been centered on secondary populations, often overlooking the postsecondary groups (Kosloski & Ritz, 2016). This has led to an increased need for research focusing on postsecondary CTE, particularly in response to the rapidly evolving job market and societal needs (Dougherty, 2018). There is a dearth of researchers specializing in postsecondary CTE, creating a critical gap in the research capacity of this field. Findings from this study demonstrate that webinars help to create this sense of community. Lambeth et al. (2009) posit that CTE research aids in "Understanding the critical issues and the current workforce trends are important to the success of future career and technical education programs and workforce initiatives" (p.148). Findings from this study showed that the webinars helped develop knowledge and supported the development of skills to conduct more rigorous research. This is critical because there is an equally important need to promote and execute evidence-based research practices within the CTE community. One of the key challenges facing this research community is the limited accessibility of best practices concerning various research methods among stakeholders. This, in turn, can have significant implications for the quality and effectiveness of the research undertaken. In order to address these issues, there is a pressing requirement to invest in the development of the next generation of researchers specializing in postsecondary CTE (Rojewski, 2022). Based on the initial finding from this fellowship, it is suggested that a similar program be created for secondary CTE professionals, as well as those working on CTE topics in workforce development and human resource development spaces. This concerted effort would be instrumental in maintaining the field's relevance and effectiveness in meeting the multifaceted needs of learners, increasing the production of CTE policy and practice research, and developing human resources that would fill the labor market need for CTE researchers.

Recommendations

To help build research skills among future and current CTE researchers, several recommendations are proposed. First, it is suggested that doctoral programs preparing CTE researchers examine the research methods being taught to ensure they provide a foundation for students to conduct high-quality casual research and to be lifelong learners of research methodology. It is also critical to understand how promoting webinar participation, in a program like this, can create a sense of community and enhance research knowledge, supporting rigorous research in postsecondary CTE. Doctoral programs across the country could even partner to offer this type of community for CTE researchers. Increasing access to best practices concerning various research methods is crucial for improving research quality and effectiveness. Investing in the next generation of researchers through fellowships, scholarships, and training programs is essential. Expanding research programs to include secondary CTE researchers and those that research in workforce development and human resource development could further address the research capacity across the continuum that prepare people for work. Fostering collaboration and mentorship between experienced and novice researchers can bridge the skills gap, while

supporting evidence-based research practices through workshops and continuous professional development. As well as ensures researchers are equipped with the latest methodologies. Implementing these recommendations will enhance the CTE research community's capacity, produce high-quality research, and effectively address the multifaceted needs of learners, thereby maintaining the field's relevance and effectiveness. For those wanting to sharpen their own CTE research skills, actively participate in webinars or professional development to strengthen your knowledge of research methods and skills. Additionally, seek out mentorship and collaborate with experienced researchers to gain practical insights and build the tools within the research methodologies you wish to employ.

Conclusion

This study provides valuable insights into the efficacy and value of webinars as part of postsecondary CTE research fellowship programs. The identified themes suggest that the webinars are perceived not only as a beneficial supplement to doctoral coursework but also as a vital component of the overall fellowship program. The opportunities for networking with established CTE scholars and peer engagement serve to broaden fellows' academic and professional networks, potentially leading to collaborations and enhancing the richness of their research work. The webinars appear to stimulate new knowledge acquisition and inspire ideas for future research studies. These findings underscore the multifaceted benefits that such webinars can offer in a postsecondary CTE research fellowship context. These webinars served as a platform for the researchers to discover and familiarize themselves with new research tools. These tools, which were not part of their doctoral programs or prior research studies, became valuable to their research arsenal. Exposure to these novel tools and techniques makes them better equipped to design and execute future research studies. This beneficial augmentation of their skills and tools enhances their individual capabilities and contributes to their overall growth and development as researchers. Ultimately, this makes them better prepared and more adept at contributing to their respective fields in the future, thereby potentially improving the quality and breadth of research in these areas.

References

Almusaed, A., & Almssad, A. (2020, July 15-19). *The role of the supervisor on developing PhD students' skills* [Paper presentation]. International Conference on Humanities, Social and Education Sciences, International Society for Technology, Education, and Science, Washington, DC, United States. https://eric.ed.gov/?id=ED626403

Amado-Salvatierra, H R., Rizzardini, R H., & Chan, M M. (2020, September 29). *The rise of webinars: thousands of learners looking for professional development. A practical case study* [Paper presentation]. 2020 IEEE Learning with MOOCS, Antigua, Guatemala. https://doi.org/10.1109/lwmoocs50143.2020.9234365

Baker, V. L. & Lattuca, L. R. (2010). Developmental networks and learning: toward an interdisciplinary perspective on identity development during doctoral study. *Studies in Higher Education*, *35*(7), 807–827.

Baker, V. L. & Pifer, M. J. (2011). The role of relationships in the transition from doctoral student to independent scholar. *Studies in Continuing Education*, *33*(1), 5–17.

Belfield, C. & Bailey, T. (2017). *The labor market returns to sub-baccalaureate college: A review*. A CAPSEE Working Paper. Center for Analysis of Postsecondary Education and Employment. https://ccrc.tc.columbia.edu/media/k2/attachments/labor-market-returns-sub-baccalaureate-college-review.pdf

Carpenter, J. & Linton, J. N. (2016). Social media as professional development: an analysis of the educational Twitter hashtag #edchat. *Teaching and Learning Inquiry*, *4*(1), 113–136.

Chaló, P., Huet, I., Nikoletou, D., & Pereira, A. (2023, March). Supporting Ph. D. students' skills development: A three-stage doctoral program. *Frontiers in Education*, *8*. https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2023.1145342/full

Choi, Y H., Bouwma-Gearhart, J., & Ermis, G L. (2021, January 1). Doctoral students' identity development as scholars in the education sciences: Literature review and implications. *International Journal of Doctoral Studies*, *16*, 89-125. https://doi.org/10.28945/4687

Creswell, J. W. & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research*. Sage Publications.

Davies, C. (2021). Online seminars in statistics for doctoral students: A case study. *Journal of University Teaching & Learning Practice*, *18*(2), 06.

Devecchi, C. (2019). Working with PhD students to build their transferability and researcher skills in the FEASST@8 and SuCCEED@8 Projects. *New Directions for Adult and Continuing Education, Fostering Employability in Adult and Higher Education: An International Perspective*, *2019*(163), 133-145. https://doi.org/10.1002/ace.20347

Digo, G. S., & Labor, J. S. (2022). Effectiveness of online colloquia in improving the research dissemination skills of graduate students. *ASEAN Journal of Open and Distance Learning*, *14*(2), 42–53.

Dougherty, S. M. (2018). *Career and technical education in high school: Does it improve student outcomes?* Thomas B. Fordham Institute.

Douglas, A. S. (2023). Engaging doctoral students in networking opportunities: a relational approach to doctoral study. *Teaching in Higher Education*, *28*(2), 322-338.

Fletcher Jr, E. C., Gordon, H. R., Asunda, P., & Zirkle, C. (2015). A 2015 status study of Career and Technical Education programs in the United States. *Career and Technical Education Research*, *40*(3), 191-211.

Gardner, S. K., & Mendoza, P. (Eds.). (2023). *On becoming a scholar: Socialization and development in doctoral education*. Taylor & Francis.

Garao, S. M., Tiongson, D. M., Soguilon, J., & Ulanday, D. M. (2023). Thesis right research writing boot camp: Link among research skills, attitudes, and anxiety of pre-service teachers. *West African Journal of Educational Sciences and Practice*, *2*(1), 40-52.

Gegenfurtner, A., & Ebner, C. (2019, November 1). Webinars in higher education and professional training: A meta-analysis and systematic review of randomized controlled trials. *Educational Research Review*, *28*, Article 100293. https://doi.org/10.1016/j.edurev.2019.100293

Gegenfurtner, A., Zitt, A., & Ebner, C. (2020). Evaluating webinar-based training: A mixed methods study of trainee reactions toward digital web conferencing. *International Journal of Training and Development*, *24*(1), 5-21.

Hottenrott, H., & Menter, M. (2020). The socialization of doctoral students in the emergence of structured doctoral education in Germany. In J. C. Weidman & L. DeAngelo (Eds.), *Socialization in higher education and the early career: Theory, research and application* (pp. 197-219).

Humble, N., & Mozelius, P. (2022). Content analysis or thematic analysis: Doctoral students' perceptions of similarities and differences. *Electronic Journal of Business Research Methods*, *20*(3), 89-98.

Khalid, S., Orynbek, G., Lianyu, C., & Tadesse, E. (2023). What goes around comes around: Shedding light on today's doctoral student's research socialization and who will be the future faculty. *Plos one*, *18*(5), e0285843.

Kosloski Jr, M. F. & Ritz, J. M. (2016). Research needs: Career and Technical Education. *Career and Technical Education Research*, *41*(2), 107–130.

Kuby, C. R., & Bozalek, V. (2023). Post philosophies and the doing of inquiry: Webinars and WEBing sessions become a special issue (s). *Qualitative Inquiry*, *29*(1), 3-6.

Lambeth, J. M., Joerger, R. M., & Elliot, J. (2009). Implications for focusing research in Career and Technical Education and workforce development. *Career and Technical Education Research, 34*(3), 137–153. DOI:10.5328/CTER34.3.137.

Liddell, D L., Wilson, M E., Pasquesi, K., Hirschy, A S., & Boyle, K M. (2014, January 1). Development of professional identity through socialization in graduate school. *Journal of Student Affairs Research and Practice*, *511*(1), 69-84. https://doi.org/10.1515/jsarp-2014-0006

Lumbreras, R., & Rupley, W H. (2017, August 24). ¡Si, se puede! Achieving academic excellence online. *Distance Education*, *38*(3), 381-393. https://doi.org/10.1080/01587919.2017.1369004

Matthews, A. (2021). Adapting to the transitional stage of the doctoral environment: An autoethnography of socialization. *International Journal of Doctoral Studies*, *16*, 71-88.

Mittelmeier, J., Jindal-Snape, D., Rienties, B., Zhang, K Y., & Chen, D Y. (2019). Developing networks near and far. In M. Dollinger (Ed.) *Getting the most out of your doctorate* (pp. 83-99). Emerald Publishing. https://doi.org/10.1108/978-1-78769-905-220191014

Mydin, F., & Surat, S. (2021). Research capability: Early-career academics' perception of doctoral studies. *European Journal of Educational Research*, *10*(4), 1893-1905.

Mydin, F., Rahman, R. A., Aishah, R. S., & Wan Mohammad, W. M. R. (2021). Research collaboration: Enhancing the research skills and self-confidence of early career academics. *Asian Journal of University Education*, *17*(3), 142-153.

Patterson, C A., Chang, C., Lavadia, C., Pardo, M L., Fowler, D., & Butler-Purry, K L. (2019, August 21). Transforming doctoral education: Preparing multidimensional and adaptive scholars. *Studies in Graduate and Postdoctoral Education*, *11*(1), 17-34. https://doi.org/10.1108/sgpe-03-2019-0029).

Perkasa, A. B., & Surono, S. (2023). Teachers' attitudes towards webinars in professional development: A case study at secondary school in Indonesia. *Journal of Innovation in Educational and Cultural Research*, *4*(2), 200-208.

Ragab, M., & Arisha, A. (2017, December 12). Research methodology in nusiness: A starter's guide. *Management and Organizational Studies*, *5*(1). https://doi.org/10.5430/mos.v5n1p1

Riby, D M., & Rees, S. (2024, April 29). Personal development of doctoral students. *Encyclopedia*, *4*(2), 743-752. https://doi.org/10.3390/encyclopedia4020047

Rojewski, J. W. (2022). An historical look at the future of Career and Technical Education and research. *Career and Technical Education Research*, *47*(3), 3–16.

Schrum, K., & Bogdewiecz, S. (2022). Cultivating research skills through scholarly digital storytelling. *Higher Education Research & Development*, *41*(7), 2382-2394.

Siemens, G. (2004, January 1). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, *2*(1), 158-166. http://jotamac.typepad.com/jotamacs_weblog/files/Connectivism.pdf

Tenenbaum, H R., Winstone, N., Leman, P J., & Avery, R E. (2020, October 1). How effective is peer interaction in facilitating learning? A meta-analysis. *Journal of Educational Psychology*, *112*(7), 1303-1319. https://doi.org/10.1037/edu0000436

Turner, R., Sutton, C., Gray, C., Stevens, S., & Swain, J A. (2018). Student experiences of research methods education in college-based higher education. *Research in Post-Compulsory Education*, *23*(8), 348-367. https://doi.org/10.1080/13596748.2018.1490089

Villanueva, I. (2016). Networking strategies for doctoral students: Insights from a communication network study of doctoral education. In *Academic conferences as neoliberal commodities* (pp. 110–118). Palgrave Macmillan.

Young, S N., VanWye, W R., Schafer, M A., Robertson, T A., & Poore, A V. (2019). Factors affecting PhD student success. *International Journal of Exercise Science*, *12*(1), 34-45. https://pubmed.ncbi.nlm.nih.gov/30761191

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