Instructor Perceptions of Ancillary Curricula in Cannabis Studies: A Qualitative Case Study

Dissertation Manuscript

Submitted to National University

Sanford College of Education

in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF EDUCATION

by

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San Diego, California

August 2025

Abstract

As the legal cannabis industry grows, colleges remain unprepared to train the workforce needed to sustain it. This qualitative case study examined instructors' perceptions of the structure and workforce alignment of cannabis ancillary education programs in post-secondary institutions. The study addressed a widening gap between institutional offerings and industry realities, where unclear program design and limited support continue to disadvantage students, particularly those impacted by the collateral consequences of the War on Drugs. The study evaluated whether existing cannabis programs prepare students for real-world participation and how faculty navigate instructional design within decentralized or unsupported environments. Grounded in adult learning theory, the research also explored how instructors adapt content, provide relevance, and compensate for the lack of formal curricular models. Twelve instructors from post-secondary institutions across multiple states participated in semi-structured interviews. Using numerous rounds of coding and member checking, the analysis revealed three themes: fragmented program structures influence legitimacy and outcomes; limited experiential learning weakens student preparation; and narrow access pathways exclude the very learners cannabis policy reform claims to serve. Participants described building courses from scratch, relying on personal experience to fill institutional gaps. These findings confirm that cannabis education remains underdeveloped, leaving students uncertain, disconnected from workforce opportunities, and unsupported by systems meant to help them succeed. This study offers institutions a roadmap to shift from siloed course offerings to structured, intentional programs that embed applied learning and repair historical harm. The findings point to new possibilities for coordinated cannabis education that builds equity, fosters economic mobility, and reflects the communities it aims to serve.

Acknowledgments

This dissertation reflects years of persistence, healing, and collective strength. As someone directly impacted by the War on Drugs, I did not write these pages in isolation. I wrote them from a place of urgency, responsibility, and hope. This work responds to the harm done to my community and stands as a step toward justice and repair. I would not have made it here without the steady love of my biological and chosen family. Thank you for holding space for me when I needed to fall apart and reminding me that rest, joy, and brilliance belong to me. You helped me stay grounded when the process felt overwhelming. I carry your names and your lessons into every space I enter. This degree honors all of us.

To the women in cannabis who showed me what leadership looks like, thank you. You did not wait for permission. You created the blueprint. Your voices gave me the courage to dream bigger in a space shaped by stigma and exclusion. I honor Precious Brown, Dasheeda Dawson, The Dank Dutchess, Cherron Perry-Thomas, New York State Assembly Majority Leader Crystal Peoples-Stokes, Cherye Jeter, Kristal Bush, and Olivia Cahill for leading with boldness, clarity, and care. You opened doors, built infrastructure, and made space for others to grow. Your work continues to shape how I move through this field with purpose, pride, and intention. Thank you for lighting the path.

To Dr. Debra Bockrath, thank you for your steady guidance and for believing in my voice. You helped me stay focused and reminded me that this work is bigger than the page. To my students, my future children, and every young person who wonders if someone like them can break cycles and lead with truth, this is for you. Yes, you can. Education is a tool, but your power is already within you. May this work remind you that you come from greatness and are worthy of everything you dream of.

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Chapter 1: Introduction

This qualitative case study investigated instructors' perceptions of cannabis ancillary curricula in cannabis studies, focusing on the impact of post-secondary program curricula. Cannabis ancillary curricula provided educational content that did not involve direct interaction with the cannabis plant, covering legal, business, regulatory, and social dimensions of the cannabis industry (Colclasure et al., 2023). This approach addressed legal constraints and equipped students with the necessary knowledge and skills for diverse roles within the industry (Black, 2020).

Cannabis studies encompassed a broad range of educational programs, including topics such as the endocannabinoid system, cannabis policy, business management, and regulatory compliance (Reid et al., 2024). Universities, colleges, and other higher education institutions offered these post-secondary programs, including two- and four-year schools and certificate-based programming. Cannabis ancillary curricula focused on theoretical knowledge and practical skills, while plant-touching programs emphasized agricultural and scientific pathways crucial for cultivation and product development (Johnson & Kumar, 2024).

The historical context of cannabis regulation, coupled with the industry's expansion and the evolving educational landscape, underscored the necessity for a comprehensive and inclusive approach to cannabis education. The researcher Black (2020) outlined the voices of cannabis CEOs and upper management meeting their human resources needs in entry and advanced degree roles in this rapidly emerging industry. By sharing the instructors' perceptions of cannabis ancillary curricula in cannabis studies, their voices served as a bridge between industry demands and the offerings of post-secondary curricula, thus promoting industry sustainability and driving long-term economic growth. Developing curricula responsive to industry trends and

regulatory changes was essential for fostering a sustainable and equitable cannabis industry (Montgomery & Allen, 2023). By emphasizing curricula, it centered on how to approach learning. By investigating instructors' perceptions of cannabis ancillary curricula in cannabis studies, the research supported regulatory compliance and fostered significant advancements in the cannabis sector, ultimately contributing to industry sustainability.

Statement of the Problem

The problem addressed by this study was the gap between the cannabis industry's workforce demands (Black, 2020) and the educational offerings in post-secondary institutions (Colclasure et al., 2023). The cannabis industry's rapid expansion and evolving regulatory landscape created an urgent need for a skilled workforce (Black, 2020). However, current educational programs failed to address this demand (Colclasure et al., 2023). Despite the industry's significant economic potential and increasing legalization, there was a lack of standardized curricula that covered critical aspects (Black, 2020; Smith & Brown, 2023). These educational gaps hindered students intending to enter the cannabis industry and businesses that required knowledgeable professionals, potentially stymying economic growth and exacerbating socio-economic divides (Reid et al., 2024; Vitiello, 2019). Historically marginalized communities continued to suffer from racial disparities in access to relevant education, perpetuating inequality in this rapidly growing field (Montgomery & Allen, 2023; Scheuer, 2020; Vitiello, 2019).

Agricultural programming had historically been the most prevalent post-secondary pathway in cannabis education. The University of Mississippi had been a pioneer in this field since 1968, providing standardized marijuana for researchers under a contract from the National Institute on Mental Health (University of Mississippi, 2021). Although policies had changed,

significant challenges remained. Johnson and Kumar (2024) emphasized the challenges and opportunities in integrating cannabis research into academia, highlighting legal constraints, funding shortages, and societal stigma. Smith and Brown (2023) identified significant disparities in cannabis education delivery across institutions, advocating for standardized and improved quality of cannabis education through collaboration between academic institutions and industry stakeholders. Programs like Medgar Evers College recognized the racial implications of cannabis in America and worked to create programming enhancing entrepreneurship among Black students, stressing the role of education in economic empowerment and social justice (Reid et al., 2024).

To address these challenges, it was crucial to develop cannabis ancillary curricula elements that catered to the diverse aspects of cannabis education. Exploring instructor perspectives on these cannabis ancillary curricula elements had the potential to support critical components that were lacking in post-secondary programs and proposed solutions to enhance educational alignment with industry demands (Colclasure et al., 2023). This approach supported immediate talent gap fulfillment and fostered long-term industry sustainability and equitable economic development (Scheuer, 2020).

Purpose of the Study

This qualitative case study explored instructors' perceptions regarding cannabis ancillary curricula in post-secondary education. This study unpacking instructor perceptions supported addressing the gap between the cannabis industry's workforce demands and the educational offerings in post-secondary institutions (Black, 2020; Colclasure et al., 2023). The research employed interviews and surveys to capture the complex dynamics necessary to develop effective educational programs. It was conducted across post-secondary institutions in states with

cannabis programs in their policies, including medical and adult-use programs (DISA Global Solutions, 2024). For qualitative studies, a sample size of 15-20 participants was often justified to capture diverse perspectives and ensure comprehensive data saturation. This range allowed for a richer and more nuanced understanding of the research problem, which was fundamental in complex and emerging fields like cannabis education (Moser & Korstjens, 2018; Saunders & Townsend, 2016; Vasileiou et al., 2018). Increasing the sample size beyond the minimum helped mitigate the risk of missing critical insights and enhanced the validity of the findings by encompassing a broader range of experiences and viewpoints (Young & Casey, 2019). Participants were instructors of cannabis studies programs, selected through purposive sampling to provide relevant insights (Tracy, 2020). Pseudonyms were used to maintain confidentiality.

Variables included the alignment of curricula with industry needs and instructors' perceptions of curriculum adequacy. Materials and instrumentation included semi-structured interview guides and survey questionnaires to gather detailed qualitative data (Creswell & Poth, 2018). Data analysis involved thematic analysis to identify common themes and patterns (Xu & Zammit, 2020). The findings were expected to inform curriculum design to better meet industry demands, support long-term sustainability, and contribute to educational theory by offering a model for aligning educational programs with quality teaching and learning (Fink, 2021). This holistic approach fostered a more sustainable and equitable cannabis industry, benefiting educational institutions and the broader community (Fullan & Langworthy, 2020).

Introduction of Conceptual Framework

Concept and Principles

Andragogy was the art and science of helping adults learn (Knowles et al., 2015). It emphasized the unique ways adults learned, focusing on self-directed learning, using experience,

readiness to learn, problem-solving orientation, and intrinsic motivation (Knowles et al., 2015). Andragogy posited that adult learners were self-directed and brought many experiences to be leveraged in the learning process. Knowles et al. (2015) identified six fundamental principles: the need to know, the learners' self-concept, the role of learners' experiences, readiness to learn, orientation to learning, and motivation. These principles underscored the importance of practical, problem-centered learning experiences that adults could relate to their personal and professional lives (Knowles et al., 2015). Andragogy evolved to incorporate contemporary understandings of adult learning, emphasizing the need for learning environments (Merriam & Bierema, 2013).

Since its original development, andragogy had incorporated contemporary understandings of adult learning (Taylor & Kroth, 2009). Modern adaptations of andragogy emphasized the need for learning environments that supported autonomy and practical application (Merriam & Bierema, 2013). For example, Merriam and Bierema (2013) highlighted how technological advancements and the increasing diversity of adult learners had prompted updates to the theory. These changes included greater emphasis on digital literacy, cultural competence, and flexible learning paths to accommodate varying life circumstances and learning preferences (Merriam & Bierema, 2013; Taylor & Kroth, 2009). The theory also considered the impact of online and blended learning environments on adult education, recognizing that adults often balanced education with other responsibilities such as work and family (Merriam & Bierema, 2013; Kasworm, 2010).

Application

Andragogy framed the work by guiding the development of a curriculum specifically tailored to adult learners in the cannabis industry. By focusing on self-directed learning and leveraging the professional experiences of the students, the study created an engaging and

relevant learning environment (Knowles et al., 2015). For example, incorporating real-world case studies, industry-specific challenges, and opportunities for experiential learning helped adult learners see the direct application of their studies. This approach enhanced the learning experience and ensured that the education provided was aligned with the practical needs of the cannabis industry (Knowles et al., 2015). Applying andragogical principles helped understand how adult learners perceived the relevance and effectiveness of ancillary curricula in cannabis studies. By examining how these principles influenced learners' engagement and outcomes, researchers identified areas where the curriculum could be improved to meet the needs of adult students and the industry (Merriam & Bierema, 2013).

Introduction to Research Methodology and Design

The study employed a qualitative research methodology, specifically using a case study design, to explore the perspectives and experiences of instructors regarding ancillary curricula in cannabis education. This methodology was well-suited for capturing the complex subtleties and nuanced understanding necessary (Creswell & Poth, 2018) to develop effective educational programs in emerging fields such as cannabis studies.

By leveraging qualitative research's descriptive and interpretative strengths, the study sought to bridge the gap between empirical evidence and practical application, providing a foundation for subsequent quantitative research (Marx, 2023). Qualitative research was particularly advantageous for this study because it allowed for an in-depth exploration of individual experiences and perceptions, which was essential for understanding the nuanced challenges and opportunities in cannabis education (Creswell & Poth, 2018; Yin, 2018; Maxwell, 2018). Unlike quantitative research, which focused on numerical data and generalizations,

qualitative methods provided rich, detailed narratives that revealed the complexities of human behavior and institutional dynamics (Bloomberg & Volpe, 2019).

The case study design allowed an in-depth exploration of instructors' experiences within their specific educational contexts. It provided rich, detailed narratives (Yin, 2018) essential for understanding how educational content aligned with industry needs. This approach collected comprehensive data through interviews, focus groups, and observations, capturing the complex social contexts and interactions (Bloomberg & Volpe, 2019). The flexibility inherent in qualitative research, particularly in case studies (Maxwell, 2018), was crucial for adapting to the nature of cannabis education, allowing the study to refine its focus based on emerging data and insights.

This qualitative case study design approach highlighted instructors' perspectives, providing a deep understanding of the current educational landscape to inform the development of more effective and aligned curricula. By examining the subjective elements of instructor perceptions and contextual challenges within post-secondary programming, the research generated insights to inform the design of educational programs that met industry demands and supported long-term sustainability (Black, 2020). The focus on sustainability encompassed the immediate alignment of academic content with industry requirements and the creation of curricula that could adapt to future changes in the cannabis industry, ensuring continued relevance and effectiveness. The findings were expected to contribute significantly to the field of education by offering a model for aligning educational programs with rapidly evolving industry requirements, thereby addressing both theoretical and applied aspects of curriculum development in cannabis education. This holistic approach was intended to foster a more sustainable and equitable cannabis industry, ultimately benefiting educational institutions and communities.

Triangulation was used to enhance the validity and reliability of the study. This approach involved using multiple data sources, methods, and theoretical perspectives to cross-check and verify findings (Denzin, 2017). By combining interviews and surveys, triangulation helped ensure a comprehensive understanding of the research problem, reducing the likelihood of bias and increasing the credibility of the results (Creswell & Poth, 2018). Triangulation provided a more robust data set and helped identify inconsistencies or corroborate findings across different sources (Bloomberg & Volpe, 2019). This method enhanced the depth of the analysis, offering a multi-faceted view of the educational challenges and solutions in cannabis studies. Employing triangulation thus strengthened the overall conclusions and recommendations of the study, ensuring they were well-founded and reliable (Maxwell, 2018).

Research Questions

RQ1

To what extent do cannabis instructors perceive the alignment of post-secondary ancillary curricula with industry sustainability?

RQ2

What are cannabis instructors' perceptions on the adequacy of current post-secondary ancillary curricula coursework in addressing the sustainability needs of the cannabis industry?

Significance of the Study

The research deepened the understanding of andragogy by demonstrating its application in the context of ancillary cannabis curricula. By documenting how adult learners responded to a curriculum designed with andragogical principles, this study provided evidence of the effectiveness of self-directed, experience-based learning in preparing students for the cannabis industry (Knowles et al., 2015; Merriam & Bierema, 2013). The findings offered insights into

how andragogy could be adapted to meet the evolving needs of adult learners in emerging fields, thereby contributing to the ongoing development of adult learning theories (Merriam & Bierema, 2013; Taylor & Kroth, 2009). The research highlighted the practical challenges and successes of implementing andragogical principles in cannabis education, providing valuable lessons for other educators and institutions (Merriam & Bierema, 2013; Kasworm, 2010). Sharing the findings contributed to a broader understanding of creating compelling and engaging learning environments for adult learners in various contexts (Knowles et al., 2015). This study examined how instructors perceived the adequacy of ancillary cannabis curricula in preparing students for industry demands and workforce entry. By investigating these perceptions, the research provided insights into how such curricula could support the development of sustainable practices within the cannabis industry, thereby contributing to educational and industry advancements.

Definitions of Key Terms

Ancillary Curricula

It encompassed educational programs in cannabis studies that focused on the non-cultivation aspects of the industry. These programs were designed to equip students with the necessary skills and knowledge for roles within the industry, emphasizing legal, business, and regulatory matters rather than direct interaction with the cannabis plant itself (Black, 2020; Colclasure et al., 2023).

Andragogy

The art and science of helping adults learn emphasized self-directed learning, experiential learning, learning readiness, problem-solving orientation, and intrinsic motivation (Knowles et al., 2015; Merriam & Bierema, 2013).

Cannabis

A plant used for medicinal, recreational, and industrial purposes, historically stigmatized and regulated but now increasingly legalized and studied for its potential benefits (Bonnie & Whitebread, 1974; Crocq, 2020; Fisher, 2021).

Cannabis Studies

Academic programs are designed to educate students on various aspects of cannabis, including the endocannabinoid system, dosing, consumption methods, and legal status (Reid et al., 2024).

Equitable Education

An approach to education that ensures all students have fair and equal access to learning opportunities, resources, and support, regardless of their background or circumstances (Reid et al., 2024).

Industry Sustainability

The ability of an industry to maintain its economic, social, and environmental performance over the long term, ensuring continual growth and development (Scheuer, 2020)

Summary

The cannabis industry's rapid growth and evolving regulations require a skilled workforce, yet current educational programs are insufficient (Colclasure et al., 2023). Developing cannabis ancillary curricula incorporating economic, social, legal, and cultural dimensions is essential for a holistic approach to cannabis studies (Black, 2020; Smith & Brown, 2023). Addressing these gaps is vital for preparing students to meet industry demands and support sustainable economic development (Scheuer, 2020). Historical criminalization has created racial disparities and stigma, particularly affecting marginalized communities (Bonnie & Whitebread, 1974). An inclusive and equitable educational framework is necessary to bridge these gaps and provide fair opportunities (Reid et al., 2024). Higher education institutions shape cannabis policy, economy, and society. By focusing on sustainability, educational programs can better align with industry requirements and foster long-term growth (Cummings & Ramirez, 2022; Vitiello, 2019).

Exploring the specific barriers faced by marginalized communities in accessing cannabis education and industry opportunities can help develop targeted strategies to promote more significant equity and inclusion. Policy analysis and advocacy are essential to understanding the evolving regulatory landscape and its implications for cannabis education, ensuring a supportive environment for growth and innovation (U.S. Department of Justice, 2013). Addressing these recommendations will significantly advance cannabis education,

ensuring it meets the needs of a growing industry while promoting equity and sustainability (Goldstein & Sumner, 2019).

Chapter 2: Literature Review

The cannabis industry has experienced significant growth in recent years, driven by evolving regulations and increasing societal acceptance. This expansion has created an urgent need for a skilled workforce capable of navigating the complex demands of the industry. However, there is a disconnect between the educational offerings at post-secondary institutions and the workforce needs of the cannabis sector (Black, 2020; Colclasure et al., 2023). This gap presents challenges for the industry, which requires knowledgeable professionals and educational institutions to adapt their curricula to prepare students for emerging roles. The purpose of this study is to explore instructors' perceptions of cannabis ancillary curricula within cannabis education programs, with a focus on how these programs address the industry's evolving needs. Identifying critical gaps in current educational offerings and proposing improvements to prepare students better could potentially support post-secondary advancements. These gaps are essential for developing curricula that align more closely with industry demands and supporting educational and industry sustainability (Montgomery & Allen, 2023).

The chapter presents a *Conceptual Framework* that builds on the principles of andragogy introduced in Chapter 1. Andragogy, the art and science of helping adults learn, emphasizes self-directed learning, experiential engagement, and practical application; these principles are essential for developing effective educational programs tailored to adult learners in the cannabis industry (Knowles et al., 2015; Merriam & Bierema, 2013).This section identifies gaps in existing educational programs, particularly in their alignment with industry needs, and discusses case studies on successfully integrating these needs into cannabis curricula (Taylor & Kroth, 2009). By applying andragogical principles, the framework guides the development of relevant

and engaging curricula for adult learners, ensuring that they are equipped with the knowledge and skills necessary to meet the demands of the cannabis industry (Merriam & Bierema, 2013).

This chapter reviews existing literature on critical areas related to cannabis education and industry needs. It begins with exploring the *Historical Evolution of Cannabis Sativa in the United States,* tracing its origins, early uses, and the significant legal and cultural shifts that have shaped its current status (Bonnie & Whitebread, 1974; Crocq, 2020). This historical overview provides the necessary background to understand contemporary perceptions and regulations surrounding cannabis, highlighting its journey from a widely used medicinal plant to one that was criminalized and stigmatized (Small, 2018). Understanding this history is crucial for contextualizing the current educational landscape and its challenges.

The literature review then examines the *History of the War on Drugs,* focusing on how past policies have disproportionately impacted marginalized communities and created a complex legal framework that continues to affect the cannabis industry today (Cummings & Ramirez, 2022). This section emphasizes the importance of addressing social equity when developing educational programs and policies within the cannabis sector. It explores the legacy of the War on Drugs, highlighting ongoing efforts to address these inequities through education and policy reform (Baum, 2016; Peterson, 1985). Understanding these historical and social contexts is vital for creating curricula that meet industry demands and promote social justice (Alexander, 2010).

Following this, the chapter discusses *Addressing Social Equity in the Cannabis Industry*, emphasizing initiatives to ensure that the benefits of the cannabis industry are accessible to all, particularly those most affected by its criminalization (Patterson et al., 2024). This section underscores the role of education in promoting social equity and providing opportunities for historically marginalized communities. By focusing on inclusivity and diversity within the

industry, this section illustrates the critical role that educational programs can play in supporting social justice and economic empowerment, ensuring that the cannabis industry evolves equitably and inclusively (Brown & Stone, 2021).

The literature review also explores *Higher Education: Cannabis Courses and Post-Secondary Programs*, examining the current landscape of cannabis education. This section reviews the types of programs offered, the content covered, and how well these programs align with industry needs (Reid et al., 2024; Smith & Brown, 2023). The analysis provides insights into the strengths and limitations of existing educational offerings, highlighting the necessity for curricula that are responsive to the rapidly changing demands of the cannabis industry (Johnson & Kumar, 2024). The review also considers the role of research initiatives and community outreach in advancing cannabis education and ensuring its relevance and impact, emphasizing the need for continuous adaptation and innovation in educational programs (Zolotov et al., 2021).

The chapter further addresses the workforce needs of the cannabis industry, focusing on the historical expansion of the industry in medical states and the projected workforce demands as the sector continues to grow (Reid et al., 2024). This section highlights the importance of developing curricula that address current workforce requirements as well as future trends and challenges (Black, 2020). By examining the industry's growth trajectory and the corresponding need for a well-trained workforce, this section emphasizes the critical role that education plays in sustaining the industry's long-term success, ensuring that the workforce is equipped with the skills and knowledge necessary to thrive in an evolving market (Black, 2020).

This structured approach ensures that the literature review directly connects to the themes and issues outlined in Chapter 1, offering a deeper exploration of the theoretical underpinnings and practical applications necessary for advancing cannabis education. The literature search was

conducted using the school library database, focusing on peer-reviewed articles that specifically addressed cannabis workforce development, workforce demands, and post-secondary education programs related to the cannabis industry.

Search parameters included a combination of terms such as “cannabis workforce,” “workforce development,” “post-secondary cannabis education,” and “cannabis curricula.” The search targeted literature published within the last seven years to ensure relevance and applicability to current industry trends. The literature reviewed ranged from empirical studies and theoretical papers to case studies and reviews, providing a comprehensive foundation for understanding the complexities of cannabis education and its impact on the industry. By systematically reviewing this literature, the chapter lays the groundwork for developing curricula that align with industry requirements and promote long-term sustainability and equity within the cannabis sector.

Conceptual Framework

The guiding conceptual framework for this study is andragogy, a theory pioneered by Malcolm Knowles that focuses on the unique characteristics of adult learners. Knowles et al. (2015) posited six core principles of andragogy that distinguish adult learners from children: (1) the need to know, (2) the learners’ self-concept, (3) the role of learners’ experiences, (4) readiness to learn, (5) orientation to learning, and (6) motivation. These principles shape how adults engage in educational settings, particularly in professional and higher education environments, where they tend to be more self-directed and are focused on the practical, immediate application of knowledge. In cannabis education, andragogy is a well-suited framework as it aligns with the intrinsic motivations of adult learners, who often bring

significant professional experiences to their studies, leveraging these experiences to engage deeply with the material (Merriam & Bierema, 2013).

Concept and Principles of Andragogy

Central to andragogy is the principle that adult learners take primary responsibility for their educational journeys, actively seeking out knowledge to meet personal and professional objectives (Garrison, 2016). This principle is particularly relevant in cannabis studies, where students are often motivated to understand complex regulatory, business, and legal frameworks that govern the industry. The framework also highlights the importance of experiential learning, recognizing that adult learners rely on their prior experiences to contextualize new information and apply it to real-world problems (Knowles et al., 2015). In cannabis studies, learners might come with varied levels of familiarity, from business experience to hands-on involvement in cultivation or compliance, and these experiences significantly shape how they engage with educational content (Scholtz, 2024). Practical problem-solving is emphasized in andragogy, underscoring the tendency of adult learners to focus on resolving real-life challenges, such as navigating the regulatory landscape of cannabis or developing business strategies (Dougherty, Haddock, & Patton, 2020). This practical focus is critical in professional programs to prepare learners for the rapidly evolving cannabis industry.

Theoretical Relationships and Framework Development

Andragogy's emphasis on self-directed learning and experiential education forms the basis of its theoretical relationships, particularly in how adult learners engage with educational content. The principle of intrinsic motivation is foundational to andragogy, as adult learners are often driven by the personal and professional relevance of the material they are studying. This motivation is critical in cannabis education programs that meet the industry's specific demands,

including regulatory compliance, legal frameworks, and operational business needs (Merriam & Bierema, 2013). The interplay between self-directed and experiential learning is crucial; adult learners draw upon their past experiences to make sense of new concepts, making their education more meaningful and applicable in their professional or personal lives (Garrison, 2016). This experiential learning aspect is essential in cannabis education, where students may need to apply newly acquired knowledge quickly in a rapidly evolving and highly regulated industry (Scholtz, 2024).

The development of andragogy as a distinct educational theory dates back to the 1970s, with Knowles' efforts to differentiate it from pedagogy, which had traditionally focused on children's education (Knowles et al., 2015). Over time, the theory has evolved to accommodate the changing nature of adult education, particularly with the rise of digital learning environments. Scholars such as Merriam and Bierema (2013) and Kasworm (2012) have expanded on Knowles' original framework, incorporating modern concerns such as digital literacy, cultural competence, and the need for flexible learning paths that cater to adult learners who are often balancing education with work and family responsibilities. These adaptations have been particularly relevant in cannabis studies, where many learners may already be professionals seeking to enhance their knowledge or transition into new roles within the industry. The integration of online and blended learning formats has made education more accessible and adaptable to the needs of such learners, providing them with the flexibility they need to succeed (Eynon & Malmberg, 2021).

Assumptions and Propositions

The andragogical framework is built on several critical assumptions regarding adult learners. The primary assumption is that adults are self-directed learners, meaning they take

responsibility for their educational goals, methods, and outcomes (Knowles et al., 2015). This assumption is critical in shaping educational programs for adult learners, as it implies that they actively seek learning opportunities that align with their personal and professional needs. In cannabis studies, this manifests in learners' motivation to gain practical knowledge that can be applied directly to their professional roles, such as understanding legal compliance or developing business strategies (Black, 2020). Another core assumption is that adults bring valuable experiences to the learning process. Their prior experiences serve as a foundation for new learning, which makes the educational process more relevant and meaningful (Garrison, 2016). This assumption is particularly significant in professional education, where learners often have industry experience that can inform and enhance their engagement with new material.

Adult learners are assumed to be goal-oriented, meaning they engage in education with clear objectives, such as career advancement or personal development (Kasworm, 2012). This goal-oriented mindset is evident in cannabis studies, where learners seek to acquire specialized knowledge that will enable them to navigate the complexities of the industry. The final assumption is that adults are intrinsically motivated. Unlike younger learners, who may be driven by external factors such as grades or parental expectations, adult learners are primarily motivated by internal factors, such as the desire for self-improvement or professional growth (Merriam & Bierema, 2013). In cannabis education, this motivation is often driven by the desire to master the industry's regulatory, legal, and business aspects, directly impacting how learners engage with their education.

Application and Justification for Andragogy in the Present Study

This study focuses on the application of andragogical principles in the design and implementation of ancillary cannabis curricula, which aligns directly with the needs of adult

learners who are likely engaged in or transitioning into professional roles related to cannabis regulation, business and compliance (Scholtz, 2024). By utilizing the andragogical framework, this study informs its problem statement by exploring how effectively current cannabis education programs meet the needs of adult learners and prepare them for industry-specific challenges. The research questions are similarly guided by the principles of experiential learning, self-directed education, and problem-solving approaches, seeking to understand how these elements impact learner engagement and educational outcomes (Knowles et al., 2015). The application of this framework allows the study to investigate how adult learners perceive and engage with educational content that is designed to prepare them for ancillary roles in the cannabis industry (Merriam & Bierema, 2013).

Alternative educational frameworks, such as transformative learning theory or experiential learning theory, were considered but ultimately deemed less appropriate for this study. Transformative learning emphasizes personal change through critical reflection, while experiential learning focuses on learning through direct experience. Although both are relevant to some extent, they lack a comprehensive focus on self-direction, intrinsic motivation, and the immediate application of knowledge critical for adult learners in professional cannabis education (Garrison, 2016). Andragogy offers a more holistic approach, directly addressing adult learners' practical and motivational needs while emphasizing their ability to leverage prior experiences to solve real-world problems (Dougherty et al., 2020). This makes it the most appropriate framework for guiding this study's purpose statement and research questions, allowing for a thorough exploration of how cannabis education programs can be better aligned with the needs of adult learners in the cannabis industry.

The Historical Evolution of Cannabis Sativa in the United States

The origins of Cannabis sativa can be traced back to the ancient regions of Central Asia, particularly in areas that are now part of modern-day Mongolia and southern Siberia. Recent studies suggest that the plant was first utilized for its psychoactive and medicinal properties as far back as 12,000 years ago, marking it as one of the earliest cultivated crops in human history (Abel, 2020). This early use highlights the plant's long-standing importance well before its European introduction and subsequent global dissemination.

Early Beginnings and European Impact

The history of Cannabis sativa showcases its transformation from a plant valued for diverse purposes in ancient societies, including medicinal, nutritional, and industrial uses, into a legally governed crop under European control (Small, 2018). Initially, Cannabis sativa found widespread application for its fibers, seeds, and therapeutic properties across multiple ancient cultures. However, with the expansion of European power and the establishment of global trade networks, the cultivation and regulation of cannabis became intricately linked to economic and political agendas. By the 16th century, the importance of the plant had escalated to the point where its cultivation was legally enforced by European monarchs such as Queen Elizabeth I, who recognized its crucial role in bolstering the naval and economic infrastructure of the era (Small, 2018). This transition highlights the plant's shift from being a versatile resource in ancient cultures to a strategically significant commodity under European dominion, reflecting broader transformations in agricultural practices and legal structures during this period (Stoa, 2017). In conjunction with the rise of European colonialism, the transatlantic slave trade was instrumental in the spread of cannabis cultivation to the New World. Enslaved Africans were often compelled to grow hemp, among other crops, as European settlers endeavored to create

economically viable American colonies (Herschthal & Brooke, 2024). This exploitation underscores the intertwined histories of agricultural development and human oppression, as the demand for cash crops like hemp sustained the institution of slavery in the colonies (Small, 2018).

Introduction to the Americas and Colonial Cultivation

The introduction of Cannabis sativa to the Americas was propelled by similar economic motivations, as European settlers recognized the plant's utility in establishing self-reliant colonies. The 1619 legislation enacted by the Virginia Assembly at Jamestown, which mandated hemp cultivation, serves as one of the earliest examples of how European agricultural practices were adapted to the American colonial context (Fletcher, 1947). This legal requirement was pivotal in establishing hemp as a staple crop in the colonial economy, where it was used to produce various essential goods, including textiles, ropes, and even as a form of currency. The early American legal framework surrounding hemp cultivation represents a direct continuation of European agricultural strategies, emphasizing the crop's economic indispensability and its role in promoting colonial self-sufficiency (Stoa, 2017). The legal codification of hemp cultivation in colonial America also highlights the broader transatlantic exchange of legal and economic practices, shaping early American agriculture and commerce (Carliner et al., 2017). This legal and economic foundation laid the groundwork for the plant's pervasive presence in colonial life and its critical role in the emerging American economy.

Legal and Cultural Shifts in the 19th and 20th Centuries

As the United States transitioned into the 19th and 20th centuries, the role of Cannabis sativa in society underwent profound changes driven by shifts in legal frameworks and cultural perceptions. Initially, the plant was widely recognized for its medicinal properties, with its

inclusion in the U.S. Pharmacopeia as an accepted treatment for various ailments such as rheumatism, nausea, and labor pains, reflecting its established place in American medicine (Small, 2018). However, the early 20th century witnessed the onset of a significant legal and cultural shift as cannabis became increasingly associated with social deviance and was subjected to growing regulatory scrutiny (Crocq, 2020). The passage of the Marihuana Tax Act of 1937 marked a pivotal turning point, as it effectively criminalized cannabis under federal law, driven by a confluence of racial biases, economic interests, and evolving societal norms (Carliner et al., 2017). This legislative shift was emblematic of the broader trend toward prohibition in the United States, transforming Cannabis sativa from a valued agricultural and medicinal resource into a controlled and stigmatized substance (Stoa, 2017).

The early prohibitions against cannabis laid the groundwork for the intensification of drug enforcement policies that would define the later part of the 20th century (Bonnie & Whitebread, 1974). These prohibitions were about controlling the substance and reflected the broader socio-political changes in American society. As cannabis became increasingly criminalized, its legal status sparked significant debate and controversy, mirroring the evolving cultural and social norms of the time (Crocq, 2020). The shift in how cannabis was viewed legally and culturally led to its redefinition from a previously accepted medicinal and agricultural resource to a controlled and often stigmatized substance. This redefinition played a crucial role in shaping the legal and societal attitudes towards cannabis that persisted throughout the 20th century (Bonnie & Whitebread, 1974; Crocq, 2020).

History of the War on Drugs

The criminalization of *Cannabis sativa* has significantly shaped societal norms and policies in the United States. For centuries, cannabis was integral to medicinal and spiritual

practices globally. The Harrison Narcotic Act of 1914 marked a turning point by establishing federal control over drug distribution, leading to stricter regulations. This act primarily targeted opiates and cocaine, but it laid the groundwork for future drug control measures. In the 1930s, Harry J. Anslinger, the first commissioner of the Federal Bureau of Narcotics, led a campaign against cannabis, culminating in the Marihuana Tax Act of 1937, which criminalized its use (Fisher, 2021). Anslinger's campaign was fueled by racial prejudice and sensationalized media reports, often referred to as yellow journalism, that linked cannabis use with minority groups, reinforcing existing societal discrimination (Bonnie & Whitebread, 1974). This early legislation not only stigmatized cannabis but also began a pattern of drug enforcement that disproportionately targeted marginalized communities, a trend that would continue throughout the 20th century.

The War on Drugs, declared by President Nixon in the 1970s, further intensified drug enforcement policies, categorizing marijuana as a Schedule I substance, which is classified as having a high potential for abuse and no accepted medical use (Peterson, 1985). Nixon's administration sought to establish a firm stance against drug use, which was portrayed as a growing menace to American society. This era saw a disproportionate rate of arrests among black and brown communities, transforming the justice system into a sprawling network of courts, jails, and prisons (Cummings & Ramirez, 2022). The enforcement of these drug policies created a pipeline that funneled large numbers of young men of color into the criminal justice system, often for non-violent offenses. John Ehrlichman, a Nixon aide, later admitted that the administration's drug policy was designed to disrupt antiwar activists and black communities, further stigmatizing cannabis and other drugs (Baum, 2016). This revelation underscored the

political motivations behind the War on Drugs, which were less about public health and more about controlling and suppressing particular groups within society.

Impact of the War on Drugs During the Clinton Administration

The 1990s, under President Bill Clinton, saw an escalation in the War on Drugs despite campaign promises to reform drug policies. Instead of scaling back the punitive measures of the previous decades, Clinton's administration doubled down on them. The 1994 Violent Crime Control and Law Enforcement Act, which Clinton signed into law, introduced mandatory minimum sentences and three-strikes laws, leading to the incarceration of non-violent drug offenders at unprecedented rates (Gottschalk, 2020). These policies disproportionately affected Black and Brown communities, as they were more likely to be arrested and receive harsher sentences for drug-related offenses. The Clinton administration's policies intensified the criminalization of drug use, further entrenching systemic inequalities and exacerbating the racial disparities in the U.S. criminal justice system (Tonry, 2019).

The effects of these policies were far-reaching. The prison population in the United States swelled, and the term "mass incarceration" became synonymous with the country's approach to crime and punishment. The financial and social costs of this approach were enormous, affecting not only those incarcerated but also their families and communities. Children grew up with parents behind bars, and entire communities were destabilized. The Clinton administration's failure to address the root causes of drug use, such as poverty and lack of access to education and healthcare, meant that the cycle of incarceration continued unabated. Moreover, these policies contributed to the stigmatization of drug users, who were increasingly seen as criminals rather than individuals in need of help and support. This period in history is now widely criticized, with

ongoing efforts to reform the criminal justice system and address the injustices perpetrated during this era.

Shift Towards Cannabis Legalization and Ongoing Challenges

The turn of the millennium brought a gradual shift in attitudes towards cannabis, influenced by increasing awareness of the failures of the War on Drugs and the disproportionate impact on marginalized communities. As the public became more aware of the ineffectiveness of harsh drug laws and the severe consequences for those targeted by them, advocacy for cannabis legalization gained momentum. The 1996 Compassionate Use Act in California marked the beginning of medical cannabis legalization, setting a precedent for other states to follow (Pacula et al., 2018). This act allowed patients with certain medical conditions to use cannabis for therapeutic purposes, sparking a nationwide debate about the potential benefits of cannabis and the need for reforming existing laws (Goldstein & Sumner, 2019).

Over the following decades, more states passed laws permitting the medical use of cannabis, and some even moved towards full legalization for recreational use. As of 2023, the National Conference of State Legislatures notes that all 50 states have enacted some form of medical cannabis legislation, with many also legalizing it for recreational use (National Conference of State Legislatures, 2023). These changes reflect a growing recognition of the medical benefits of cannabis and a shift in public opinion towards a more lenient approach to its use. However, despite these advances, the legacy of cannabis criminalization continues to affect the justice system. The overrepresentation of Black and Brown individuals in drug-related arrests and convictions remains a significant issue, with ongoing efforts to expunge records and address the societal impacts of past policies (Muhammad, 2021).

Efforts to legalize cannabis have been accompanied by a growing movement to address the injustices of past drug policies. Many states that have legalized cannabis have also implemented measures to expunge the records of those convicted of cannabis-related offenses. These initiatives are a step towards rectifying the harms caused by decades of discriminatory enforcement practices. However, the process is slow, and many individuals who were caught up in the War on Drugs continue to face barriers to employment, housing, and other opportunities due to their criminal records. The expanding legal cannabis industry has raised concerns about equity and access, as White entrepreneurs largely dominate the industry. At the same time, those most affected by criminalization struggle to gain a foothold in the market. As the movement towards legalization continues, it is crucial to ensure that the benefits of this new industry are shared equitably and that those harmed by past policies are not left behind.

Addressing Social Equity in the Cannabis Industry

The legalization of cannabis across various states has significantly impacted the economy and job market, creating a growing demand for a skilled workforce equipped to navigate the complexities of this emerging sector (Reid et al., 2024). In response, post-secondary institutions have begun developing educational credentials specifically focused on cannabis studies, aiming to bridge the gap between industry needs and available talent (Reid et al., 2022). These programs educate students on critical aspects such as the endocannabinoid system, dosing, consumption methods, and legal statuses, which are vital for their roles in the cannabis industry (Reid et al., 2024).

Understanding the endocannabinoid system, a biological system involved in regulating various physiological and cognitive processes, is crucial for professionals in the cannabis industry. This knowledge helps them comprehend how cannabis interacts with the human body

and why it is used for specific medical conditions (Reid et al., 2024). Similarly, dosing, defined as the process of determining the appropriate amount of cannabis or its derivatives to achieve the desired therapeutic effect, requires a deep understanding to ensure both efficacy and safety (Crocq, 2020). Knowledge of consumption methods is also essential, as these include various ways of using cannabis, such as smoking, vaping, edibles, tinctures, and topical applications, each with different onset times, durations of effects, and bioavailability (Anderson & McCarthy, 2022). Lastly, understanding the legal statuses that govern cannabis use across different regions is crucial for compliance and navigating the complex landscape of cannabis laws effectively (Patterson et al., 2024).

The emphasis on advanced coursework tailored to the evolving needs of the cannabis industry highlights the importance of workforce development. Black (2020) argues that cannabis-focused education addresses current knowledge gaps and sets the stage for future innovation within the sector. By aligning educational outcomes with industry demands, institutions prepare students to excel in various roles, including cultivation, production, regulatory compliance, and business management. This integration of targeted instruction reflects a broader trend within higher education to adapt to and support emerging industries (Pacula et al., 2018).

While workforce development is crucial for the growth of the cannabis industry, it is equally important to address the social equity issues rooted in the historical context of cannabis criminalization, particularly during the War on Drugs. This period left enduring impacts on various communities, especially among black and brown populations (Alexander, 2010). The socioeconomic consequences of these policies have exacerbated systemic inequalities, leading to

disparities in income, employment, and educational opportunities that persist today (Vitiello, 2019).

Recent initiatives in cannabis education aim to address these inequities by providing equitable opportunities for historically marginalized communities. These programs are designed to ensure that the benefits of the cannabis industry are more widely shared and that these communities are not left behind in the industry's growth (Patterson et al., 2024). Social equity initiatives within the cannabis industry are crucial for empowering individuals from communities disproportionately affected by the War on Drugs (Patterson et al., 2024). These efforts include offering scholarships, mentorships, and business grants, which help create pathways for success in the industry for those who have been historically marginalized (Kavousi et al., 2022). By integrating social equity principles into both education and industry practices, there is hope for a more inclusive and diverse cannabis sector that actively works to rectify the harms of the past and build a fairer future (Brown & Stone, 2021).

Higher Education: Cannabis Courses and Post-Secondary Programs

As the cannabis industry's legal landscape continues to evolve, the academic sector is increasingly called upon to match this pace with robust educational frameworks. The integration of cannabis studies into post-secondary education reflects a strategic response to the industry's economic, medicinal, and societal roles. Educational programs that span certification courses to full academic degrees aim to equip students with the foundational and specialized knowledge necessary to navigate this complex field (Reid et al., 2022).

However, a critical examination of the current educational offerings reveals significant gaps, especially in the medical domains. For instance, Colclasure et al. (2023) highlight that despite the growing acceptance of cannabis in treatment protocols, many medical education

programs have yet to integrate studies of the endocannabinoid system systematically. This gap is concerning, given the system's critical role in mediating the effects of cannabis, and suggests a disconnect between industry practices and educational curricula (Johnson & Kumar, 2024). Moreover, while certification programs provide pathways into the cannabis industry, their variability in quality and depth, particularly in fundamental subjects such as Chemistry and Pharmacology of Cannabis, often leaves graduates underprepared for the scientific rigors of their roles (Reid et al., 2022).

This narrative underscores the necessity for ongoing curriculum development and the importance of aligning these educational efforts with industry needs and scientific advancements. As highlighted by Cardinal News (2024), while about 40 colleges in the United States now offer cannabis-related programs, the challenge remains to standardize what constitutes a comprehensive cannabis education to support the sector's sustainable growth better.

Educational Programming in Cannabis

The rapid expansion of the cannabis industry has resulted in a growing demand for educational programs tailored to the various facets of cannabis, ranging from science and cultivation to legal and business management. Educational institutions have responded by developing curricula that provide theoretical knowledge and practical skills required to meet the evolving needs of the industry (Reid et al., 2024). In recent years, cannabis-related education programs have emerged across universities and community colleges, offering certificates and degrees that focus on ancillary aspects, including regulatory compliance, policy, and business operations (Colclasure et al., 2023).

The industry's workforce requirements underscore the importance of such educational programs. Studies have indicated that the U.S. cannabis industry will employ over 500,000

individuals by 2025, necessitating a diverse array of skills (Patterson et al., 2024). Moreover, estimates suggest that every $1 million in cannabis sales generates approximately 12.4 jobs in the cultivation, manufacturing, and retail sectors, further emphasizing the need for specialized training (Schulz, 2019). These programs equip professionals with the expertise to ensure regulatory compliance and the successful operation of cannabis-related businesses (Vitiello, 2019).

States such as New York, which have recently legalized cannabis, are projected to create between 30,731 and 63,270 new jobs within the next decade, depending on market development (Rockefeller Institute of Government, 2019). Expanding educational programs is critical not only for addressing immediate workforce needs but also for ensuring sustainable and equitable growth within the cannabis sector (Vitiello, 2019). Integrating social equity into curricula can further help redress historical injustices associated with cannabis regulation (Alexander, 2010).

Prerequisite Programs. Prerequisite programs are designed to provide students with a solid foundation in cannabis science, ensuring they possess the necessary knowledge to succeed in more advanced coursework. These programs typically introduce critical concepts in the biology and chemistry of cannabis and offer a basic understanding of the field's legal, social, and regulatory frameworks (Roanoke College, 2024; University of California, 2021). By covering these essentials early on, students can progress confidently into more specialized areas of study. Such courses are crucial for helping students grasp the interdisciplinary nature of cannabis science and for preparing them to navigate the complex landscape of research, policy, and industry demands (Black, 2020; Researchers from the University of California, 2019). Many institutions offer these programs to demonstrate their commitment to advancing cannabis education and to provide a well-rounded understanding of the subject's scientific and societal

dimensions. As the demand for skilled professionals in this field continues to grow, completing these foundational courses becomes essential for equipping students with the knowledge and skills required for future careers.

Academic Course. Many universities and colleges now offer courses related to cannabis science, medicinal cannabis, and cannabis law. These courses provide students with a comprehensive understanding of the biology, chemistry, and pharmacology of cannabis, as well as the legal and social implications of its use. For example, the University of California, Davis offers a course on the Physiology of Cannabis, which focuses on the plant's biology and its interactions with human physiology (University of California, 2021). According to a summary from the University of California's Cannabis Research Workshop, the institution's efforts to integrate cannabis education into its curriculum reflect a broader commitment to advancing cannabis science and education (Researchers from the University of California, 2019). These types of courses are critical for preparing students to navigate the complexities of cannabis science and regulation. This is echoed by Black (2020), who emphasizes the importance of comprehensive cannabis education within higher education curricula to ensure graduates are adequately prepared to meet industry demands.

Roanoke College offers majors in Cannabis Science and in Social Justice and Policy, along with a minor in Cannabis Studies. These programs provide students with a comprehensive understanding of both the scientific and societal dimensions of cannabis, equipping them for careers in science, policy, and law. As the first program of its kind in Virginia, Roanoke College's initiative positions graduates to engage meaningfully with a rapidly expanding industry (Roanoke College, 2024).

Certification Programs. For those seeking to enter the cannabis industry without pursuing a full degree, certification programs offer a specialized and more flexible alternative. These programs typically cover topics such as cannabis cultivation, dispensary operations, regulatory compliance, and cannabis business management. For example, Northern Michigan University offers a Cannabis Agriculture and Horticulture Certificate, a six-month program designed to equip students with practical skills in cultivation (Northern Michigan University, 2024). Zane State College offers a Cannabis Extraction and Product Development Specialist Certificate, an online program tailored for those interested in the production and extraction aspects of the industry (Zane State College, 2024). Certification programs like these are crucial for providing targeted education that aligns with industry needs, ensuring graduates are well-prepared for various roles in the sector. Research supports the effectiveness of such specialized training, which has been shown to significantly enhance workforce readiness in the cannabis industry (Northern Michigan University, 2024; Reid et al., 2022).

At Black Hawk College, the Cannabis Cultivation Specialist program is available to individuals over 18 with a high school diploma or GED equivalent, providing a flexible entry point into the cannabis sector (Black Hawk College, 2024). Gateway Community College also offers a Cannabis Studies program, similarly structured and accessible to students with a high school diploma or equivalent, further demonstrating the inclusivity of these educational paths (Black, 2020; Reid et al., 2022). While not as academically intensive as full degree programs, these offerings provide students with focused, practical training tailored to the needs of the cannabis industry.

Non-Prerequisite Programs. As the cannabis industry continues to expand, non-prerequisite programs have emerged as accessible and flexible options for individuals without

formal educational backgrounds or for those seeking targeted training without the commitment of a full degree. These programs are typically open to anyone, regardless of prior academic experience, allowing for broad participation from a diverse range of individuals (Cooper et al., 2021). They address key areas such as cannabis cultivation, product development, regulatory compliance, and more—directly responding to the specific demands of the rapidly evolving cannabis workforce (Reid et al., 2022).

By focusing on practical skills, non-prerequisite programs allow students to gain the necessary expertise to succeed in the cannabis industry without the barriers of traditional academic prerequisites. These programs are particularly beneficial for those seeking to enter the workforce quickly or those looking to pivot their careers into the cannabis industry (Kavousi et al., 2022).

Research Initiatives. Post-secondary institutions are increasingly pivotal in cannabis research, recognizing the importance of advancing scientific knowledge and informing public policy. Cannabis research initiatives at universities focus on a variety of topics, including the therapeutic applications of cannabis, potential risks, and the development of new cannabis-based products. These studies are crucial for generating evidence that informs clinical practice and regulatory frameworks.

For example, McGill University is conducting significant research into the medical applications of cannabis, particularly in areas like chronic pain management and neurological disorders. Their work advances medical science and shapes educational programs in cannabis science and policy (Researchers from the University of California, 2019). Such research initiatives are vital to creating evidence-based curricula that help educate future professionals on the complexities of cannabis use, including its pharmacodynamics and pharmacokinetics (Clobes

et al., 2022). Moreover, these initiatives provide critical data for policymakers, helping shape legal frameworks informed by the latest scientific evidence (Clobes et al., 2022).

Universities also foster interdisciplinary cannabis research by collaborating with industry partners and healthcare organizations, ensuring that the scientific developments in academia translate into real-world applications. These collaborations are essential for keeping educational programs current and aligned with industry standards as the cannabis industry evolves rapidly. This approach positions universities as not only educational hubs but also as leaders in cannabis innovation and regulation.

Community Outreach and Education. Universities and colleges often engage in community outreach to educate the public about cannabis. This can include public lectures, workshops, and informational campaigns to dispel myths and provide accurate information about cannabis. For instance, the University of Denver (2021) offers a Cannabis Journalism course that examines how cannabis is covered in the media and teaches students about the legal and social issues surrounding cannabis. Community outreach is vital as it fosters public understanding and informed dialogue about cannabis use and regulation. The New York Social and Economic Equity Plan outlines strategies for engaging communities disproportionately impacted by cannabis prohibition through educational and social programming (New York State Office of Cannabis Management, 2021).

Future Directions and Recommendations

The future of cannabis education looks promising, with continued expansion and innovation expected. Institutions will likely increase collaborations with industry partners to ensure their programs remain relevant and aligned with industry needs. There will be a growing

emphasis on online and flexible learning options to accommodate the diverse needs of students and professionals seeking to enter the cannabis industry.

However, limitations and gaps in current programming need to be addressed. Continuous professional development for educators is crucial. Programs like the Cannabis Curriculum Convening (CCC) have enhanced educators' knowledge and confidence. Future professional development should focus on forming industry partnerships and providing non-formal education to ensure educators remain current with industry advancements (Colclasure et al., 2023). There is also a pressing need for competency-based curricula in medical cannabis education. Healthcare providers must receive adequate training to make informed recommendations to their patients regarding cannabis use. Incorporating comprehensive medical cannabis education into healthcare training programs is essential (Cooper et al., 2021).

Effective community outreach programs are needed to educate the public about cannabis. The New York Social and Economic Equity Plan highlights the importance of engaging communities impacted by cannabis prohibition and providing accurate information and training opportunities. Expanding such outreach programs can help mitigate the negative impacts of past cannabis policies and support community growth (New York State Office of Cannabis Management, 2021). Current curricula need to be updated to include more comprehensive coverage of regulatory compliance, socio-economic impacts, and practical skills related to cannabis cultivation and business management. Addressing these gaps is crucial for preparing students to meet industry demands and for the overall success of cannabis education programs (Black, 2020; Colclasure et al., 2023).

Workforce in the Cannabis Industry

The cannabis industry in the United States has emerged as one of the fastest-growing sectors, mainly driven by the progressive legalization of both medical and recreational cannabis across numerous states (Small, 2018). This rapid expansion has led to a substantial workforce, encompassing roles in cultivation, production, retail, and regulatory compliance. As the industry continues to evolve, understanding the historical context of workforce development in medical states, alongside the projected growth and challenges ahead, is crucial for comprehending the full impact of this industry on the U.S. economy (Barcott & Whitney, 2023). Developing a skilled workforce is essential for maintaining the industry's growth trajectory and ensuring that the cannabis sector can meet the complex demands of regulation, consumer safety, and economic sustainability (Abel, 2020).

U.S. Expansion 1st in Medical States

The expansion of the cannabis workforce in the United States has been closely tied to the incremental legalization of medical cannabis across various states. This process began in 1996 with California's Compassionate Use Act, which established the first legal framework for medical cannabis in the country (Pacula et al., 2018). California's legislation set a critical precedent that encouraged other states to follow suit, leading to a wave of medical cannabis legalization throughout the early 2000s (National Conference of State Legislatures, 2022). States like Oregon, Washington, and Colorado quickly adopted similar laws, recognizing the therapeutic potential of cannabis and the economic benefits of a regulated medical cannabis industry. As a result, the demand for a skilled workforce to manage the cultivation, distribution, and regulation of medical cannabis surged, creating numerous job opportunities across the country (Schulz, 2019).

For example, Colorado, a pioneer in medical and recreational marijuana, saw its cannabis industry create over 12,591 full-time equivalent (FTE) jobs by 2015, with significant portions of these roles concentrated in retail and cultivation sectors (Rockefeller Institute of Government, 2019). The industry's growth in Colorado and other states generated traditional agricultural jobs and led to specialized positions in dispensary management, compliance, and patient care (Smith & Brown, 2023). These roles were crucial in ensuring that the medical cannabis industry could operate within the regulatory frameworks established by state laws while also addressing the needs of patients who relied on cannabis for therapeutic purposes (Alexander, 2010). The expansion of the medical cannabis workforce laid a strong foundation for the broader legalization movement as states began transitioning from medical-only cannabis markets to full recreational use, further driving employment and economic growth in the sector (Bonnie & Whitebread, 1974).

Projected Workforce Growth

Looking ahead, the projected growth of the cannabis workforce in the United States is expected to be substantial, driven by ongoing legalization efforts and the increasing normalization of cannabis for both medical and recreational use (Carliner et al., 2017). As the industry continues to expand, it is anticipated that by 2030, the cannabis sector could employ over 500,000 individuals, reflecting the cumulative effects of state-level legalization and the potential for federal regulatory changes (Patterson et al., 2024). This anticipated growth will require a diverse workforce encompassing various roles, such as horticulturists, extraction technicians, regulatory compliance specialists, and retail workers (Kavousi et al., 2022). Each of these roles will be integral to the successful operation and expansion of the cannabis industry,

ensuring that the sector can meet the growing demand for cannabis products while adhering to stringent regulatory standards (Stoa, 2017).

The economic impact of the cannabis industry is further magnified by its significant multiplier effect. Estimates suggest that every $1 million in cannabis sales generates approximately 12.4 jobs, spanning cultivation, manufacturing, and retail sectors (Schulz, 2019). This job creation underscores the industry's potential as a significant economic driver. It highlights the importance of targeted education and training programs designed to equip the future workforce with the necessary skills and knowledge (Reid et al., 2022). In states like New York, where recent legalization efforts have been implemented, the cannabis market is projected to generate between 30,731 and 63,270 jobs, depending on how quickly the market develops and matures (Rockefeller Institute of Government, 2019). This projected workforce expansion underscores the need for comprehensive workforce development strategies to support the industry's growth while ensuring that new entrants into the workforce are prepared to meet the demands of this rapidly evolving sector (Vitiello, 2019).

Unionization and Labor Peace Agreements

Unionization has emerged as a critical factor in the development of the cannabis workforce, particularly in states like New York, where Labor Peace Agreements (LPAs) are mandated by law (Gray & Heffernan, 2023). The Marijuana Regulation and Taxation Act (MRTA) in New York requires cannabis businesses to sign an LPA with a labor union as a condition for obtaining an operating license (Montgomery & Allen, 2023). These agreements ensure that employers and unions maintain neutrality during unionization efforts, creating a more favorable environment for organizing workers in the cannabis sector (Cummings & Ramirez, 2022). This legal requirement has significantly facilitated the unionization of New York's

cannabis workforce, with Local 338 of the Retail Wholesale and Department Store Union (RWDSU)/United Food and Commercial Workers International Union (UFCW) already representing workers across various cultivation sites and retail dispensaries (Gray & Heffernan, 2023).

Unionized cannabis jobs in New York offer numerous benefits, including guaranteed wage increases, comprehensive health benefits, and retirement plans, making these roles attractive as stable, long-term career options within the industry (Fisher, 2021). Implementing LPAs is expected to play a crucial role as New York transitions into a larger adult-use market, potentially setting a standard for other states to follow in their cannabis workforce development strategies (Kavousi et al., 2022). The success of unionization efforts in New York's medical cannabis industry is a blueprint for similar efforts in the state's burgeoning adult-use sector, where unionized positions are likely to become increasingly common (Johnson & Kumar, 2024). As more states adopt similar requirements for LPAs, the cannabis industry could see a broader trend toward unionization, which may contribute to the stabilization and professionalization of the workforce (Fink, 2021).

Workplace Challenges and Policy Development

The integration of cannabis into the mainstream workforce presents unique challenges, particularly in managing workplace policies under federal regulations. The Drug-Free Workplace Act of 1988 mandates that federal contractors and grant recipients maintain a drug-free workplace, complicating matters for businesses operating in states where cannabis is legal (U.S. Code, 2009). Employers are required to enforce stringent drug-free policies, which can be at odds with state laws permitting cannabis use, particularly for medical purposes. This federal-

state legal conflict creates significant complexities for businesses, especially those that hold federal contracts or operate in highly regulated industries.

The current discourse regarding the potential rescheduling or descheduling of cannabis under the Controlled Substances Act represents a pivotal moment that could significantly redefine the legal landscape for cannabis-related businesses and associated workplace policies (McGlinchey, 2023). These options, which have gained serious consideration only recently, could lead to substantial changes in how cannabis is regulated at the federal level, with broad implications for its management within various sectors across the country (Montgomery & Allen, 2023). Should cannabis be rescheduled, it would remain a controlled substance but under a less restrictive classification, potentially reducing specific federal barriers to research and operational activities within the industry (Hazle et al., 2022). Nevertheless, rescheduling would continue to impose regulatory complexities on businesses, particularly those operating at the intersection of state and federal jurisdictions (McGlinchey, 2023). Conversely, the descheduling of cannabis would remove it entirely from the Controlled Substances Act, likely facilitating broader acceptance and integration into federal and government employment sectors (Gray & Heffernan, 2023) and helping to repair the harms caused by the war on drugs. Such a paradigm shift could substantially alter the compliance requirements for employers, especially those engaged in federal contracting, necessitating a thorough reassessment of existing workplace policies (McGlinchey, 2023).

Employers must navigate the ongoing tension between state and federal cannabis laws while also addressing the potential impacts on workplace culture and employee well-being (Peterson, 1985). In this evolving landscape, unions are positioned to play a critical role in advocating for worker protections, especially as unionized employees may have greater leverage

when negotiating workplace cannabis policies (Gray & Heffernan, 2023). As the industry continues to expand, the demand for clear, consistent, and enforceable policies will intensify—particularly in sectors where safety and precision are non-negotiable (Cummings & Ramirez, 2022). Thoughtful policy development will be essential for maintaining both compliance and productivity. The future cannabis workforce is expected to span a wide range of roles, from hands-on agricultural positions to ancillary services supporting regulatory and operational needs. This breadth underscores the importance of a multifaceted approach to workforce development and policy formulation (Montgomery & Allen, 2023; Vitiello, 2019).

Addressing Industry Needs and Educational Gaps in the Cannabis Sector

The rapid expansion of the cannabis industry has highlighted the urgent need for a well-trained workforce capable of navigating the sector's unique and evolving challenges. As legalization advances across the United States, demand has surged for skilled professionals in areas such as cultivation, processing, and regulatory compliance (Black, 2020). However, this growth has also revealed critical gaps in current educational offerings aimed at preparing individuals for cannabis careers. While institutions have begun developing programs covering various aspects of production and management, many still fall short of providing the comprehensive training needed to fully equip students for success in this complex industry (Colclasure et al., 2023).

Inconsistencies in Educational Quality and Availability

One of the primary challenges faced by the cannabis industry is the inconsistency in educational quality and availability across different regions, leading to significant disparities in workforce readiness (Cornell University, 2022). While some institutions have made strides in developing cannabis-related curricula, these efforts are often unevenly distributed, resulting in an

inconsistently prepared workforce to meet industry demands (Schulz, 2019). For the industry to thrive, educational programs must address not only the technical aspects of cannabis cultivation and processing but also incorporate critical components such as legal compliance, social equity, and business management (Vitiello, 2019). These areas are vital for ensuring the industry operates sustainably and responsibly, yet they are frequently underrepresented in current curricula (Black, 2020).

Disparities in cannabis education across regions contribute to broader socio-economic inequities within the industry. Programs in wealthier areas often benefit from better funding and stronger ties to industry partners, giving their students a clear advantage over those from under-resourced institutions (Cornell University, 2022). This uneven access to quality education disproportionately impacts underrepresented and marginalized communities, who already face systemic barriers to industry entry (Alexander, 2010). To address these imbalances, it is essential to standardize the quality of cannabis education across institutions, ensuring that students, regardless of geography or economic background, receive robust training and equitable opportunities (Schulz, 2019). This will require increased investment in educational infrastructure and the development of comprehensive curricula that encompass both technical skills and the socio-legal dynamics of cannabis work (Cornell University, 2022).

The Need for Standardized Curricula

The absence of a standardized curriculum across post-secondary cannabis education programs contributes to uneven preparation among graduates, which can lead to significant differences in the competencies of individuals entering the workforce (Colclasure et al., 2023). While some institutions have created specialized courses to address specific needs within the industry, these efforts often lack cohesion. They do not reflect a broader, industry-wide

consensus on essential knowledge areas (Cornell University, 2022). This fragmentation in educational offerings exacerbates the challenges faced by employers in finding candidates with the necessary skills and knowledge to succeed in the cannabis sector (Schulz, 2019). Moreover, there is a critical need for interdisciplinary approaches that integrate scientific, legal, and business perspectives within cannabis education. Without a comprehensive understanding of the socio-legal context of cannabis, including the history of its regulation and ongoing efforts to promote social equity, graduates may find themselves ill-equipped to navigate the complexities of the industry (Cummings & Ramirez, 2022).

Standardized curricula would ensure a more consistent level of education across institutions and help establish a core set of competencies that all cannabis industry professionals should possess (Schulz, 2019). These competencies could include a deep understanding of cannabis biology and chemistry, familiarity with the regulatory landscape, and knowledge of best practices in cultivation and processing (Zheng et al., 2021). Standardization could also support the development of accreditation systems for cannabis education programs, ensuring that institutions meet defined educational benchmarks before their programs are recognized by the industry (Cornell University, 2022). Establishing such standards would help build a more reliable pipeline of qualified professionals, which is essential for sustaining the sector's growth and ensuring that it operates responsibly and with innovation (Schulz, 2019). In addition, standardized curricula could help address the social equity concerns identified by Alexander (2010), as students across regions would gain access to the same foundational knowledge and skills, regardless of their institution's resources or location.

Gaps in Experiential Learning Opportunities

Experiential learning opportunities are also limited in many cannabis education programs, which hinders students from gaining the practical experience needed to apply their academic knowledge in real-world settings (Leafly, 2022). The absence of partnerships with industry players further exacerbates this issue, as students often miss out on the hands-on experience highly valued by employers in the cannabis sector (Schulz, 2019). Practical experience is crucial for students to develop the skills and confidence needed to succeed in the workplace, particularly in a field as forward thinking and complex as the cannabis industry (Schulz, 2019). Without adequate experiential learning opportunities, graduates may struggle to transition from academic settings to professional environments, hindering their career progression and the overall effectiveness of the industry's workforce (Cornell University, 2022).

Collaboration between educational institutions and industry stakeholders is essential to bridge these gaps. By developing curricula that align with the specific needs of the cannabis industry, these partnerships can enhance the quality of education and better prepare graduates to meet the challenges of this rapidly growing field (Cornell University, 2022). Such partnerships could involve internships, co-op programs, or collaborative research projects that allow students to gain practical experience while contributing to the industry's development (Schulz, 2019). Integrating experiential learning into cannabis programs can help ensure that graduates are knowledgeable and capable of adapting to the practical demands of the industry (Zheng et al., 2021). Addressing these gaps is not only vital for the industry's growth but also crucial for rectifying historical inequities that have disproportionately impacted marginalized groups, an issue that has been deeply intertwined with the history of cannabis regulation (Alexander, 2010).

Ensuring Sustainable and Equitable Growth

Addressing these educational gaps is crucial not only for meeting the immediate workforce needs of the cannabis industry but also for ensuring its sustainable and equitable growth in the long term (Vitiello, 2019). As more states move toward legalization, the demand for qualified professionals will continue to rise, making it imperative that the industry is supported by a knowledgeable and adaptable workforce (Schulz, 2019). Incorporating social equity and legal compliance into educational programs will help ensure that the cannabis industry can operate responsibly and inclusively, addressing historical injustices related to cannabis regulation (Alexander, 2010). These programs must be designed with an eye toward the future, preparing students for current industry demands and the challenges and opportunities that will arise as the industry continues to evolve (Schulz, 2019).

Ultimately, a well-structured and comprehensive educational framework will support the continued expansion and maturation of the cannabis sector, enabling it to thrive in an increasingly competitive and regulated market (Schulz, 2019). This framework should include robust curricula, ample experiential learning opportunities, and a strong emphasis on social equity and legal compliance (Vitiello, 2019). By addressing these needs, the cannabis industry can ensure that it develops in an economically viable and socially responsible way, contributing to a more equitable and just society (Alexander, 2010). Integrating these elements will be crucial for the industry as it continues to navigate the complexities of legalization and seeks to establish itself as a sustainable and ethical sector of the economy (Zheng et al., 2021).

Summary

Chapter 2 of the literature review addresses the rapid growth of the cannabis industry and the significant gap between the evolving demands of this sector and the educational offerings

available at post-secondary institutions. Despite the widespread legalization and increasing societal acceptance of cannabis, many academic programs have not kept pace, leaving a shortage of adequately trained professionals equipped to navigate the industry's complex legal, regulatory, and operational landscape (Black, 2020; Colclasure et al., 2023). This misalignment has created a situation where the industry struggles to find employees with the comprehensive knowledge and skills required for effective engagement in a multifaceted market. Consequently, the chapter argues that higher education must be restructured to integrate specialized content that aligns with industry expectations. By doing so, these programs can support workforce development and promote long-term sustainability within the cannabis sector (Montgomery & Allen, 2023). The chapter introduces a guiding conceptual framework grounded in andragogy, a theory emphasizing self-directed learning and the practical application of knowledge for adult learners. This framework is especially relevant for cannabis education, as many learners are professionals seeking to advance their careers by acquiring specialized knowledge or transitioning into new roles within the industry (Knowles et al., 2015; Merriam & Bierema, 2013). The chapter showcases case studies where institutions have successfully applied andragogical principles, thereby ensuring that learners gain theoretical understanding and hands-on skills directly applicable to the cannabis field (Taylor & Kroth, 2009).

The literature review also provides a historical overview of *Cannabis sativa* in the United States, tracing its journey from a widely used medicinal plant to a heavily regulated and stigmatized substance and eventually to a legitimate industry struggling with regulatory complexity. This historical context is crucial for understanding the persistent legal and societal challenges faced by the cannabis industry today. Key milestones, such as the Marihuana Tax Act of 1937 and subsequent criminalization efforts, marked a turning point, setting the stage for

restrictive policies that led to widespread stigmatization (Bonnie & Whitebread, 1974). The chapter delves into the far-reaching impact of the War on Drugs, which disproportionately targeted marginalized communities and created a lasting legacy of criminalization and social inequity (Baum, 2016; Cummings & Ramirez, 2022). As a result, educational programs must incorporate social equity principles to address these historical injustices and promote inclusivity within the cannabis sector (Alexander, 2010). The chapter also examines the current state of cannabis education, identifying significant gaps in curriculum standardization and experiential learning opportunities. While some institutions offer specialized certification programs in areas like cultivation and business management, the lack of consistency across institutions poses challenges for employers seeking uniformly trained candidates (Reid et al., 2024). To address these disparities, the chapter advocates for interdisciplinary curricula that integrate scientific, legal, and business perspectives and establish accreditation systems to ensure educational quality and alignment with industry needs (Schulz, 2019).

Chapter 3: Research Method

The problem this study intended to address was the gap between the cannabis industry's workforce demands and the educational offerings in post-secondary institutions. The cannabis industry's rapid expansion and evolving regulatory landscape created an urgent need for a skilled workforce (Black, 2020). However, educational programs at the time were not meeting this demand (Colclasure et al., 2023). Despite the industry's significant economic potential and increasing legalization, there was a lack of standardized curricula that covered critical aspects (Black, 2020; Smith & Brown, 2023). The purpose of this qualitative case study was to explore instructors' perceptions regarding cannabis ancillary curricula in cannabis education. By examining instructor perceptions, this study intended to address the gap between the cannabis industry's workforce demands and the educational offerings in post-secondary institutions (Black, 2020; Colclasure et al., 2023).

This chapter outlined the research methodology and design, including participant selection, data collection, and data analysis strategies for the study. It also presented the rationale for the chosen qualitative approach. It described how the research addressed the stated problem and purpose, ultimately contributing to the development of effective cannabis educational programs.

Research Methodology and Design

The study employed a qualitative research methodology using a case study design to explore the perspectives and experiences of instructors regarding ancillary curricula in cannabis education. This methodology was appropriate because it allowed for an in-depth examination of complex, context-dependent phenomena within real-world settings (Yin, 2018). Qualitative research was effective for capturing the nuanced perceptions of instructors and their

interpretations of how educational content in post-secondary cannabis programs aligned with industry demands and sustainability needs (Mitchell & Clark, 2018). This approach helped address the gap between the cannabis industry's rapidly evolving workforce needs and the then-current educational offerings.

The case study design provided flexibility in data collection and analysis, making it possible to integrate multiple data sources, such as interviews, to capture diverse perspectives on the research problem (Creswell & Poth, 2018). This approach delved into how external factors, such as institutional support, regulatory changes, and evolving industry standards, influenced instructors' experiences and curriculum development. The contextual nature of case studies generated a comprehensive understanding of the alignment between educational programs and industry requirements, which was essential for developing practical strategies to enhance curriculum relevance (Yin, 2018).

Alternative Methodologies and Design

Several alternative methodologies were considered but were deemed less suitable for addressing the study's problem, purpose, and research questions. A quantitative survey methodology was explored, as it could have provided a broad overview of instructor perceptions. However, this approach lacked the depth needed to capture the subjective experiences and complex interactions between educational programs and industry demands (Mitchell & Clark, 2018). While quantitative surveys quantified trends, they did not offer the rich narratives necessary to understand the specific challenges and opportunities within the context of cannabis education.

A phenomenological approach was also considered due to its focus on understanding the essence of lived experiences. However, it focused solely on personal experiences, making it less

suitable for examining how broader contextual factors influenced curriculum development and industry alignment (Onwuegbuzie et al., 2009). Phenomenology's limitation in addressing both personal and systemic influences would have restricted the ability to provide comprehensive insights into the research questions, which required exploring individual and institutional perspectives.

A grounded theory approach was evaluated but found unsuitable for the study's objectives. Grounded theory was designed to generate new theoretical models based on emerging data, which was not the focus of this research (Vicsek, 2007). The study sought to explore and understand existing perceptions regarding curriculum alignment and to provide actionable recommendations for improving these programs rather than developing new theories. As a result, grounded theory's emphasis on theory construction would have shifted the focus away from the practical implications central to the study.

Rationale for the Chosen Methodology

The qualitative case study methodology was selected because it offered an ideal framework for examining complex phenomena in a real-world educational context. The methodology aligned with the study's purpose of gaining insights into the alignment between cannabis education programs and industry needs. Unlike quantitative approaches, which often focus on generalizability, the case study design emphasized the contextual richness and depth of understanding crucial for exploring unique, emerging fields like cannabis education (Yin, 2018). This method captured the intricacies of instructor perceptions and allowed for the exploration of the underlying factors that shaped these views, making it the best choice for addressing the research questions.

The use of triangulation further supported the rationale for the chosen methodology. By integrating multiple data sources, such as interviews and observations, triangulation enhanced the validity and reliability of the findings (Creswell & Poth, 2018). This approach reduced potential biases and provided a well-rounded understanding of the research problem, strengthening the study's conclusions and recommendations (Onwuegbuzie et al., 2009). Therefore, the qualitative case study, emphasizing contextual depth, flexibility, and data triangulation, provided a structured yet adaptable framework that closely aligned with the research's goals.

Population and Sample

The population for this study consisted of instructors teaching cannabis-related courses in post-secondary institutions across the United States. Since cannabis education is a relatively new academic field, the number of active programs was estimated to be small, ranging from approximately 50 to 100 across the country (Colclasure et al., 2023). Relevant characteristics of this population included professional experience in cannabis education, involvement in curriculum development, and familiarity with industry standards. Instructors typically had diverse backgrounds in agriculture, business, law, healthcare, and social justice, providing a broad perspective on how educational content aligned with the cannabis industry's requirements and sustainability needs (Colclasure et al., 2023).

This population was appropriate for the study because the research problem focused on addressing the gap between the cannabis industry's evolving workforce demands and the educational offerings in post-secondary institutions. By examining instructor perspectives, the study captured insights from those directly involved in curriculum delivery and design, making their input essential for identifying strengths and gaps in existing curricula (Mitchell and Clark,

2018). Their expertise aligned with the study's purpose: to explore how post-secondary cannabis curricula met industry demands and supported sustainability within the field.

Sample Size and Sampling Strategy

The sample comprised approximately 10 to 15 instructors recruited from various post-secondary institutions. This sample size was considered appropriate for qualitative research and was expected to achieve data saturation, where no new themes or insights emerged from additional data (Vasileiou et al., 2018). Purposive sampling was used to select participants based on their relevance and experience in teaching cannabis-related subjects. Purposive sampling allowed for the inclusion of participants who could provide rich, detailed data about their experiences and perceptions, ensuring a comprehensive understanding of the research problem (Creswell & Poth, 2018).

Purposive sampling was suitable for this study because it ensured that only participants with direct experience in cannabis education were included. This approach aligned with the research questions, which explored perceptions of curriculum adequacy and alignment with industry standards (Yin, 2018). The diversity within the sample, which included instructors from different geographical locations, program types, and institutional settings, enhanced the study's ability to capture a broad range of experiences and viewpoints. Monitoring for saturation was conducted throughout the data collection process, and adjustments to the sample size were made if new themes continued to emerge (Vasileiou et al., 2018).

Recruitment Strategy

Participants were recruited through professional networks, academic associations, and direct outreach to post-secondary institutions offering cannabis-related programs (Creswell & Poth, 2018). Initial recruitment involved sending targeted emails to academic departments and

program directors, using contact information obtained from publicly available sources such as institutional websites and professional directories. These emails introduced the study, outlined its purpose, and invited eligible instructors to participate (Marx, 2023). Professional organizations related to cannabis education were contacted for permission to distribute recruitment emails through their member listservs. Invitations were also shared in relevant LinkedIn groups and forums where cannabis education professionals network and exchange resources (Marx, 2023). Recruitment materials included a detailed description of the study's purpose, confidentiality measures, and the criteria for participation to ensure informed consent and participant understanding (Mitchell & Clark, 2018). This targeted recruitment strategy was designed to reach a diverse group of qualified instructors, ensuring that participants were well-informed and that the study captured a broad spectrum of experiences and insights, which was crucial for addressing the research questions comprehensively.

Instrumentation

The primary instrument used in this study was a semi-structured interview designed to explore instructors' perspectives regarding ancillary curricula in cannabis studies. This approach aligned with the study's focus on addressing educational gaps in the field, particularly the need for programs that effectively prepared students for the cannabis industry's evolving sustainability and workforce demands, as highlighted in Research Question 1 (RQ1). Ancillary curricula encompassed aspects of cannabis studies such as policy, business, law, and healthcare, which were essential for building a comprehensive educational framework to support industry expansion (Black, 2020). The semi-structured interview format was ideal for qualitative research because it balanced guided questions and open-ended responses, ensuring that critical topics related to RQ1 and RQ2 were addressed while allowing participants to share detailed insights

based on their experiences (Creswell & Poth, 2018). Appendix A details the interview protocol, while Appendix B outlines the specific questions.

The study utilizes a collective case study design, a qualitative research approach to explore complex phenomena within real-life contexts by examining multiple cases (Yin, 2018). This design is especially suitable for addressing both RQ1 and RQ2, as it allows the study to investigate how different post-secondary programs approach curriculum alignment with industry sustainability and workforce readiness. By analyzing multiple cases, the study can identify common themes and variations in instructors' perceptions, providing a comprehensive understanding of how well current educational offerings meet industry needs and what improvements may be required to support long-term sustainability.

Interview Protocol

The interview protocol, included in Appendix A, contained approximately 16 questions: six background questions and ten open-ended questions. These questions focused on key themes such as the alignment of cannabis studies curricula with industry standards (RQ1), the development of career-focused programs, and opportunities for creating innovative courses that addressed evolving workforce needs (RQ2). For example, one question asked, "How do you perceive the current alignment of your institution's cannabis studies curriculum with industry sustainability needs?" to explore RQ1. Another asked, "In your opinion, how adequate is the current coursework in preparing students for sustainable roles within the cannabis industry?" to address RQ2. Each question explored the complexity of curriculum design and its connection to industry expectations.

The protocol prioritized clarity and direct alignment with the study's research questions. The structure and language of the questions reflected terminology familiar to instructors and

ensured accessibility across different instructional contexts. The interview began with background questions to establish context, followed by core open-ended items that encouraged depth and reflection.

All interviews occurred in a single session. Each participant received a recruitment email, responded with interest, and scheduled their interview. Participants answered the background questions during the session before transitioning to the core discussion. With consent, each interview was audio recorded and then transcribed verbatim for analysis. These recordings provided the foundation for coding and interpretation during the data analysis phase.

Interview Procedures

Each participant completed one interview session conducted through a secure video conferencing platform. Once a participant confirmed interest via email, an individual appointment was scheduled to accommodate their availability. At the start of the session, participants received a brief overview of the study and had the opportunity to ask questions. After confirming informed consent, the conversation moved into the interview process. The session opened with background questions that gathered information about the participant's teaching experience, role, and familiarity with cannabis-related educational content and workforce expectations. These initial questions helped establish context and rapport before transitioning into the core portion of the interview.The remainder of the session focused on key themes related to curriculum development, workforce alignment, instructional innovation, and perceived gaps in educational offerings. While the interview followed a semi-structured guide, space remained for follow-up prompts based on participants' responses to explore emerging perspectives more deeply.

Each interview lasted between 60 and 75 minutes. With participant consent, the session was audio recorded and transcribed in full. As part of member checking, each participant received their transcript via email and had the opportunity to review, clarify, or amend any portion of their responses to ensure accurate representation. This step enhanced the credibility of the data and helped confirm that the findings reflected participants' authentic views. Alongside the transcripts, field notes captured important contextual cues such as emphasis, tone, and pauses. The study team stored all data securely and used it directly to support coding and thematic analysis in the subsequent research phase.

Validity and Reliability Considerations

Ancillary cannabis studies remained a developing area in higher education, making it essential to establish content validity and reliability. Black (2020) emphasized that the cannabis industry required specialized academic programs to prepare a capable workforce. The study team aligned each instrument with the research questions to ensure that the tools captured the varied perspectives of instructors accurately. The interview questions directly aligned with RQ1 and RQ2 and used terminology familiar to instructors who were actively teaching cannabis-related courses to support content validity.

Participant feedback also informed refinements throughout the process to ensure the questions remained meaningful and relevant. This feedback loop, paired with clear structuring and thoughtful language, strengthened the connection between the tools and the research objectives (Mitchell & Clark, 2018). Each interview followed the same protocol to enhance reliability and ensure consistent data collection across all participants. The study documented interview procedures, maintained detailed process notes, and kept transcripts organized to allow replication in similar contexts (Creswell & Poth, 2018). These efforts helped ensure that the

findings reflected actual patterns across participants rather than variations in method. Any changes made during this process were documented in Appendix A, providing complete transparency and accountability.

Use of Supplementary Materials

Supplementary materials such as industry reports and academic research articles provided valuable context for participants' responses. These materials, including workforce development reports (Bertino, 2022) and industry growth analyses (Reid et al., 2022), were referenced during the interview discussions to support a more nuanced exploration of the challenges and opportunities in cannabis education programs. By incorporating these external references, the study captured both educational and industry perspectives, aligning with Research Questions 1 and 2 (RQ1 and RQ2). By administering a structured questionnaire, using a validated semi-structured interview protocol, and conducting follow-up interview discussions, the study effectively captured the diverse viewpoints and experiences of cannabis education instructors. This multi-method approach, supported by iterative refinement and participant feedback, provided a robust framework for addressing the research questions. It also contributed to a deeper understanding of how post-secondary education aligns with the workforce needs of the cannabis industry.

Study Procedures

This study employed a collective case study design to explore the perspectives of post-secondary instructors regarding ancillary curricula in cannabis studies. The research was conducted in several phases, each following a detailed sequence to ensure data were systematically collected and aligned with the study's objectives. The following steps outline the

procedures that were used to gather comprehensive data from participants, allowing the research to address the core research questions.

Step 1: Recruitment of Participants. Recruitment began by identifying eligible participants teaching cannabis-related courses in post-secondary institutions. Participants were recruited through professional networks, academic associations, and direct outreach to post-secondary institutions offering cannabis programs. Recruitment emails were sent to potential participants, inviting them to participate in the study and outlining the purpose, criteria, and confidentiality measures. Contact information for potential participants was obtained from publicly available sources such as institutional websites and directories of professional organizations related to cannabis education. Eligible participants had experience teaching courses related to cannabis studies, specifically in ancillary areas such as policy, business, healthcare, or law. They were currently employed in a post-secondary institution within the United States. Participants received an informed consent form explaining the study's purpose, their participation, and how their data would be used. Only participants who provided written consent were included in the study.

Step 2: Interview Preparation and Scheduling. Once participants expressed interest via email, they scheduled a one-on-one virtual interview through a secure video conferencing platform like Zoom. The outreach included a brief overview of the study's purpose, expectations for participation, and assurances regarding confidentiality and data protection. Before each session, participants received instructions and consent information to ensure informed participation. The interview began with background questions to establish relevant demographic and professional context. These questions focused on years of teaching experience, subject expertise, program type, and familiarity with cannabis industry expectations. Starting with these

foundational items helped build rapport and smoothly transitioned into the more in-depth exploration of the research questions. The preparation phase ensured a consistent process across participants and created a focused environment for gathering meaningful data.

Step 3: Conducting the Interview. Each interview followed a semi-structured protocol centered around two primary research questions. The discussion explored how post-secondary cannabis curricula aligned with industry needs and examined the strengths and limitations of current program structures. Questions addressed instructional strategies, curriculum development, workforce alignment, and sustainability competencies. The interviewer used clarifying and follow-up prompts to encourage participants to elaborate on experiences or explain complex points. Each session lasted approximately 60 to 90 minutes, providing sufficient time for participants to reflect on and articulate their perspectives. With explicit consent, the study team recorded all sessions and transcribed them for thematic analysis. To support data accuracy, participants received their transcripts by email and participated in member checking—a verification step that strengthened the validity of the data collected.

Step 4: Data Analysis and Validation. The study employed thematic analysis to systematically examine interview transcripts. Using NVivo 14 software, the process began with open coding to break responses into meaningful data segments. This was followed by axial coding to group related ideas and identify connections among concepts. These categories formed the foundation for broader themes aligned with Research Questions 1 and 2. NVivo supported the tracking of emerging insights, memoing, and maintaining a consistent coding structure across all interviews. Member checking and standardized coding practices enhanced the reliability and trustworthiness of the findings. By comparing themes across participants, the analysis

highlighted both shared experiences and divergent perspectives on how cannabis education responds to evolving industry demands.

Step 5: Reporting, Dissemination, and Data Management. The final results will be compiled into a comprehensive report that directly addresses the research questions and highlights key findings. To provide a nuanced understanding of the research problem, the report will incorporate direct participant quotations that exemplify major themes. Findings will be disseminated to academic and professional organizations involved in cannabis education, accompanied by actionable recommendations to enhance curriculum alignment with industry needs. All data—including survey responses, audio recordings, and transcripts—will be securely stored on encrypted, password-protected devices. Participant identities will be fully anonymized in all published materials, with pseudonyms used to ensure confidentiality and protect individual privacy.

By following these detailed procedures, the study will systematically collect and analyze data from a diverse group of instructors, ensuring a comprehensive examination of the research questions and generating actionable insights to inform the development of ancillary curricula in cannabis studies.

Data Analysis

The data collected for this qualitative case study were analyzed using thematic analysis and descriptive statistics. These approaches allowed for a comprehensive examination of both quantitative and qualitative data, ensuring that the analysis addressed the research questions and the study's goal of exploring the alignment between cannabis education curricula and industry workforce needs.

Survey Data Analysis

Quantitative data from the pre-interview survey, which included demographic information and initial perceptions of the study's research questions, were analyzed using descriptive statistics. This provided an overview of participant characteristics such as teaching experience, professional background, and involvement in cannabis education. The data were analyzed using software such as SPSS or Microsoft Excel, generating measures like means, frequencies, and percentages. This analysis served as a foundation for understanding participant backgrounds and contextualizing the more in-depth qualitative findings.

Interview Data Analysis

The qualitative data from the semi-structured interviews and interview discussions were analyzed using thematic analysis, a process particularly suited for identifying patterns or themes within qualitative data (Creswell & Poth, 2018). This approach ensured that the study captured the nuanced perspectives of participants and aligned them with the study's research questions. The following steps guided the thematic analysis:

1. Familiarization with the Data: All interviews were transcribed verbatim. To gain an in-depth understanding, the researcher repeatedly read the transcripts, allowing for early identification of potential patterns or recurring topics.
2. Initial Coding: Using NVivo 15, open coding was applied to break the data into meaningful segments. These segments were linked to key themes related to curriculum alignment, sustainability, and the adequacy of current cannabis programs in preparing students for roles in the industry. The codes were grounded in the research questions to ensure their relevance.

3. Axial Coding: Once initial coding was complete, axial coding grouped the codes into more significant, overarching categories. This process helped identify relationships between themes, such as how various curriculum components aligned with industry standards (RQ1) and the perceived strengths and gaps in current educational offerings (RQ2).
4. Theme Development: After axial coding, broader themes were developed to reflect the deeper meanings that emerged from the data. These themes directly connected with the study's research questions and were used to structure the study's findings.
5. Review and Refinement of Themes: The identified themes were reviewed and refined to ensure they comprehensively and accurately represented the data. Any inconsistencies or unclear patterns were revisited to maintain consistency and accuracy.
6. Triangulation: The study used triangulation to ensure the validity and reliability of the findings. It compared survey data, interview responses, and discussion transcripts to cross-check and confirm recurring themes and patterns (Creswell & Poth, 2018). This process provided a well-rounded perspective and strengthened the credibility of the results.

Software and Tools for Analysis

The qualitative data were managed and analyzed using NVivo 15, a specialized software designed for qualitative research. NVivo 15 supported systematic coding, theme development, and comparison across data sources, making the analysis process more efficient and organized. The software also facilitated triangulation by cross-referencing different data sources, such as survey responses and focus group transcripts.

Role of the Researcher

As the researcher, I played a vital role in collecting, coding, and analyzing the data. To reduce bias and enhance the credibility of the findings, I engaged in reflexivity, regularly reflecting on how my background and assumptions might have influenced the analysis process. The study included detailed field notes during interviews and used the interview data to provide context and clarity. In addition, the study employed member checking to enhance accuracy by allowing participants to review emerging themes and confirm that their perspectives were represented accurately.

By using these systematic steps, the data analysis provided in-depth insights into how cannabis education curricula aligned with industry workforce demands, addressed the research questions, and contributed to the development of improved educational offerings.

Assumptions

This study operated on several key assumptions that underpinned the research design and approach. First, it assumed that participants, all of whom were instructors in cannabis-related programs, would respond honestly and accurately to the survey and interview questions. This assumption rested on the expectation that instructors held a professional interest in shaping curricula aligned with industry needs and, therefore, would offer thoughtful, candid insights. Another assumption was that participants had sufficient knowledge and experience in cannabis education to provide meaningful perspectives on curriculum alignment with industry standards. This reasoning reflected the selection criteria, which targeted instructors directly involved in teaching cannabis-related courses.

This study assumed that the semi-structured interview protocol effectively captured the information needed to answer the research questions. The tools were designed and validated to

ensure clarity and relevance, which supported this assumption. Lastly, the study assumed that themes emerging from the qualitative analysis reflected broader trends in cannabis education, even though the sample included a specific group of instructors. While these assumptions supported the foundation of the study, it was equally important to acknowledge its limitations, which may have influenced the findings' scope, depth, or generalizability. Member checking, which involved presenting preliminary findings to participants and requesting feedback to confirm the accuracy of interpretations, helped mitigate some of these limitations.

Limitations

Several limitations may have affected the findings of this study. One limitation was the relatively small sample size, as the study focused on approximately 15 to 20 instructors. While this number was appropriate for qualitative research and generally sufficient to reach data saturation, it may not have captured the full diversity of experiences in cannabis education across the United States. This could limit the transferability of the findings to other contexts or institutions. Another limitation was the reliance on self-reported data, which may have been influenced by response biases such as social desirability bias—where participants present themselves or their programs more favorably. To mitigate this, the study prioritized participant anonymity and confidentiality to promote candid and honest responses.

While practical, virtual interviews limited the richness of interactions compared to in-person discussions. Technical difficulties, internet connectivity issues, or participants' comfort with the virtual format could have affected the depth of the data collected. The study mitigated this challenge by providing clear instructions and support for using the virtual platform and offered follow-up interviews to participants if needed.

Delimitations

This study had several delimitations, which were intentional boundaries set by the researcher to focus the scope of the research. One delimitation was the selection of participants, limited to instructors who were currently teaching cannabis-related courses at post-secondary institutions in the United States. This focus aligned with the study's purpose of examining how cannabis education curricula met the evolving workforce needs of the U.S. cannabis industry. By narrowing the population to instructors with direct experience in cannabis education, the study sought to provide in-depth insights into curriculum development rather than exploring perceptions from broader or unrelated educational fields. Another delimitation was the focus on ancillary (non-plant-touching) aspects of cannabis education, such as business, law, and policy. This decision aligned with the study's emphasis on workforce readiness and sustainability, which were critical issues in the ancillary sectors of the cannabis industry. Limiting the study to these areas allowed for a more targeted exploration of educational gaps, directly addressing Research Questions 1 and 2.

These research decisions were grounded in the existing literature, which highlighted the need for standardized, industry-aligned curricula in cannabis education (Black, 2020; Colclasure et al., 2023). By focusing on a specific population and content area, the study filled a gap in academic research and practical curriculum development. The delimitations also aligned with the study's theoretical framework, which centered on the intersection of education and industry and directly related to the problem and purpose statements by concentrating on how well educational offerings prepared students for roles in the cannabis industry.

Ethical Assurances

This study received approval from Northcentral University's Institutional Review Board (IRB) before the commencement of data collection. The IRB approval ensured that the survey complied with ethical standards and protected the rights and welfare of participants. The study involved minimal risk to participants and anticipated no significant ethical concerns. However, several measures were applied to safeguard participant rights and address ethical considerations.

The study maintained confidentiality throughout the research process. Each participant was assigned a unique identification code, and names or identifiable information were excluded from all published materials. The informed consent process explained the voluntary nature of the study, the right to withdraw at any time, and the confidentiality measures in place to protect participant identities. All interviews were conducted virtually, and participants were informed that the sessions would be audio-recorded. These recordings were stored in password-protected files.

All data, including audio recordings and transcripts, were stored securely on password-protected devices and encrypted in cloud storage to ensure further confidentiality. Only the researcher accessed these files, which were retained for a minimum of three years in accordance with IRB requirements. After this period, the data would be permanently deleted or destroyed.

As the researcher, I was aware of potential biases arising from my personal or professional experiences with the cannabis industry and educational curricula. I adopted reflexive practices to minimize these biases, including maintaining detailed field notes during data collection and reviewing my assumptions throughout the research process. Additionally, member checking was used to ensure that participants' perspectives appeared accurately in the

findings. By taking these steps, the study minimized the risk of personal experiences influencing the analysis and conclusions.

Summary

This chapter provided an in-depth overview of the research methodology and design for the qualitative case study, focusing on the gap between the cannabis industry's workforce demands and the current educational offerings in post-secondary institutions. The study used a qualitative case study approach to explore instructors' perceptions of ancillary cannabis curricula. This methodology allowed for an in-depth examination of how well post-secondary programs aligned with industry standards and workforce readiness.

The research methodology included sampling 15 to 20 instructors teaching cannabis-related courses. These instructors were selected based on their professional experience in curriculum development and involvement in cannabis education. Data collection methods included a structured online survey, semi-structured interviews, and virtual interview discussions, ensuring a comprehensive collection of qualitative and quantitative data. By employing triangulation and combining data from multiple sources, the study enhanced the validity and reliability of its findings, ensuring a well-rounded understanding of the research problem.

The chapter also outlined the study's assumptions, limitations, and delimitations. Key assumptions included the expectation that participants would provide honest and accurate responses and possess sufficient experience in cannabis education to offer meaningful insights. A primary limitation was the relatively small sample size, which may have affected the generalizability of the findings. However, the study mitigated this limitation by focusing on data saturation, where no new themes emerged after a certain point in the collection. While practical,

virtual interviews also presented some limitations regarding potential technical difficulties or reduced interaction compared to in-person discussions. The study provided clear guidance on the virtual platform to address these challenges and offered follow-up interviews if necessary. These delimitations focused on instructors within the United States and emphasized ancillary, non-plant-touching aspects of cannabis education. This focus kept the research targeted and aligned with the study's purpose.

This chapter thoroughly addressed ethical considerations, including the confirmation that the study received approval from Northcentral University's Institutional Review Board (IRB) before data collection began. Confidentiality was maintained by assigning unique identification codes to participants, ensuring their identities remained anonymous in all published materials. The study obtained informed consent, outlining the voluntary nature of participation and the right to withdraw at any time. Data security was prioritized, with all recordings, transcripts, and survey responses stored on password-protected devices and encrypted cloud storage. The study applied reflexivity throughout the research process to minimize personal bias and used member checking to ensure that participants' perspectives appeared accurately in the findings.

In conclusion, this chapter laid a robust framework for addressing the research questions through a carefully designed methodology, rigorous data collection strategies, and ethical safeguards. By exploring instructors' perspectives on cannabis curricula, the study provided valuable insights into how post-secondary education programs could better align with the cannabis industry's evolving workforce needs. The next chapter presents the study's findings, offering a detailed analysis of the data collected from interviews and identifying key themes that contribute to a deeper understanding of the research problem.

Chapter 4: Findings

This chapter presents the findings of a qualitative case study exploring instructors' perceptions of post-secondary cannabis ancillary curricula. The purpose of the study was to examine how these curricula align with industry sustainability goals and to evaluate the extent to which current coursework prepares students for meaningful careers in the cannabis sector. Grounded in the principles of andragogy, which emphasize adult learners' need for self-directed, experience-based education, this chapter shares the voices and experiences of instructors working within this emerging academic field.The problem addressed in this study is the persistent gap between the cannabis industry's growing workforce demands (Black, 2020) and the educational offerings currently available at post-secondary institutions (Colclasure et al., 2023). This qualitative case study aimed to explore instructors' perceptions regarding cannabis ancillary curricula in post-secondary education. By examining these perspectives, the study seeks to find ways to bridge the gap between industry expectations and the current state of academic preparation (Black, 2020; Colclasure et al., 2023).

Data analysis followed a three-phase approach. Interviews were uploaded into NVivo 14 qualitative analysis software to support open coding, allowing for the systematic organization and retrieval of significant concepts. Manual coding was also conducted alongside software-assisted analysis to ensure deeper data engagement and capture subtle nuances that automated queries might overlook. Open coding identified central ideas directly from participants' narratives. Axial coding groups related codes into broader categories reflecting shared patterns and relationships across interviews. Finally, thematic analysis synthesized these categories into overarching themes that structured the study's findings. This combined approach enhanced

analytic rigor and ensured that interpretations remained closely connected to participants' authentic experiences.

Through this analytic process, four major themes emerged: mismatch between education and industry demands, barriers to sustainability and equity, structural and social obstacles in cannabis education, and emerging innovations and reform opportunities.

This study organizes the findings around the two research questions that guided the research.

RQ1: To what extent do cannabis instructors perceive the alignment of post-secondary ancillary curricula with industry sustainability?

RQ2: What are cannabis instructors' perceptions on the adequacy of current post-secondary ancillary curricula coursework in addressing the sustainability needs of the cannabis industry?

Chapter 4 is structured thematically according to the research questions. Each section introduces the relevant themes of each question, supported by direct quotations from participant interviews. These voices provide depth, context, and vivid illustration of the findings. The chapter also includes a discussion of the strategies employed to establish the trustworthiness of the data. It concludes by evaluating the findings about the conceptual framework and relevant literature.

The Trustworthiness of the Data

This study prioritized establishing the trustworthiness of the data. In qualitative research, trustworthiness is demonstrating that the findings are credible, transferable, dependable, and confirmable. Following the guidance of Creswell and Poth (2018), several strategies enhanced the rigor of the research process and ensured the findings authentically reflected participants' experiences. Specific strategies intentionally address each aspect of trustworthiness, aligning

with qualitative best practices. Establishing these elements helped reinforce the transparency, accuracy, and reliability of the study's outcomes. The following sections describe how credibility, transferability, dependability, and confirmability were maintained.

Sample and Participant Characteristics

Describing the characteristics of the study sample provides context for understanding the following findings. This study includes 12 participants currently serving as instructors, faculty members, or program directors in post-secondary cannabis education programs across the United States. Their institutions span different regions, including the West Coast, Midwest, Northeast, and Southeast, and they represent a variety of educational settings. All participants hold direct instructional roles and actively engage with cannabis-related curriculum design and delivery.

The group reflects a mix of academic environments, including two-year community colleges, four-year universities, and workforce-oriented certificate programs offered through post-secondary institutions. Participants report between 1 and 7 years of teaching experience in cannabis education, with an average of 3.9 years. Many also bring prior knowledge from the cannabis industry, including roles in cultivation, dispensary operations, policy advocacy, scientific research, and regulatory compliance. During the interview process, each participant self-assessed their subject-matter expertise. Nine of the twelve (75%) describe their expertise as either advanced or expert-level, based on their professional background and instructional history. Teaching modalities vary across programs. Some instructors teach primarily in person, while others deliver content through hybrid or fully online formats. Participants teach in various subject areas, including cannabis business, cultivation science, compliance, social equity, lab-based extraction techniques, and legal frameworks.

Across these settings, participants share a strong commitment to preparing students for careers in the cannabis industry. Their perspectives highlight the tension between institutional limitations and fast-changing industry expectations. This study maintains participant confidentiality by identifying individuals by number only throughout this chapter and excluding all institutional affiliations or identifying details. The sample offers a detailed and well-rounded view of cannabis educators operating within higher education. It also provides a strong foundation for the thematic analysis that follows. The sample size supports data saturation. After approximately ten interviews, no new ideas or codes emerged, and the final responses reinforced patterns already present in the earlier transcripts. The achievement of data saturation demonstrates that the information gathered reflects both sufficient variation and analytic depth for a robust qualitative interpretation.

Credibility

Credibility and trustworthiness were established using multiple validation strategies consistent with Creswell and Poth's (2018) recommendations for qualitative research. Triangulation was applied by collecting data from instructors across diverse post-secondary cannabis programs, providing multiple perspectives, and reducing the influence of individual biases. Member checking was conducted by sharing preliminary findings and emerging themes with participants, who were invited to verify that interpretations accurately reflected their experiences. Open and axial coding were completed in multiple rounds to ensure consistency in theme development and alignment with participants' own words. The coding process was supported by both manual techniques and NVivo software to maintain transparency and enable a clear audit trail. Reflexivity was maintained throughout data collection and analysis, supporting confirmability by monitoring researcher influence. Saturation was achieved after ten interviews,

with no new themes emerging in subsequent sessions. These combined strategies enhanced the study's findings' credibility, dependability, and overall trustworthiness.

Transferability

A thick description captures the depth and richness of participants' experiences and educational contexts, promoting transferability. Detailed information about institutional types, program designs, and participant roles gave readers a clear picture of the research environment. Rather than seeking universal generalization, the study offered contextual insights that readers could apply to similar settings. Bloomberg and Volpe (2019) emphasized that providing thick description helps readers determine whether findings may transfer to similar contexts. By painting a vivid portrait of the participants and their experiences, the study invites readers to assess similarity and relevance, both key elements of transferability in qualitative research (Merriam & Bierema, 2013). Rich contextualization serves as a bridge between the study's setting and broader educational applications.

Dependability

A rigorous and transparent research process supports dependability. A detailed audit trail documented each study step, including interview protocols, coding procedures, theme development, and analytic decisions. NVivo 14 software managed and organized the data, ensuring systematic handling and storage of codes and memos. Maintaining an audit trail and using NVivo for consistent coding aligns with Creswell and Poth's (2018) emphasis on procedural transparency in qualitative inquiry. Manual coding was used alongside software to ensure deeper immersion, which echoes Maxwell's (2018) recommendation for critical engagement. Consistent application of procedures across all participants strengthened the study's

reliability and coherence. These practices enable future researchers to trace the study's methodology and, if desired, replicate it in similar contexts.

Confirmability

To enhance confirmability, the researcher used systematic strategies such as reflexive journaling, peer debriefing, and dual coding to minimize personal bias and ensure that findings remained grounded in participant data. Reflexivity played a central role, with the researcher maintaining a reflective journal to capture evolving insights and emotions, a strategy Denzin (2017) endorsed for qualitative integrity. Cross-checking codes manually and using NVivo software helped confirm analytic consistency. Peer debriefing sessions with academic colleagues offered additional external checks on interpretation. These confirmability practices are grounded in Merriam and Tisdell's (2016) assertion that qualitative findings must reflect participant voice, not researcher preference. The result was a transparent audit trail linking conclusions to the data and reinforcing the study's objectivity.

Results

This chapter reports the findings from a qualitative analysis focused on how instructors design, implement, and adapt post-secondary cannabis education programs to meet evolving workforce demands. The study focused on the perspectives of instructors, faculty, and program leads across various higher education institutions. Data collection involved semi-structured interviews with 12 participants. The study's two research questions present the results, with findings reported thematically and supported by participant quotes. The results are presented objectively and do not include interpretation, discussion, or speculation. All interpretation is reserved for Chapter 5.

As noted in the sample section, participants held instructional roles in two-year, four-year, and certificate-granting post-secondary programs. Their teaching experience ranged from one to seven years, and most reported advanced or expert-level cannabis industry knowledge. Instructional modalities varied across institutions, including in-person, online, and hybrid formats. This chapter excludes identifying details and institutional affiliations to maintain participant confidentiality. Table 3 outlines the major themes that emerged from coding and preview the thematic structure used to present the results by research question.

Data Analysis and Coding Process

This study analyzes the interview transcripts through a structured, multi-step coding process. The analysis begins with a close, line-by-line reading of each transcript to identify meaningful words, repeated phrases, and ideas connected to the research questions. These early observations generate open codes that capture shared concerns, repeated concepts, and essential contrasts across participants' responses. The coding process combines NVivo 14 software with manual techniques. The research team uploads transcripts into NVivo to organize codes, write analytic memos, and visualize connections. At the same time, handwritten notes and printed segments allow for a slower, deeper engagement with the data. The combination of digital tools and manual methods supports accuracy and critical reflection. This approach promotes attention to nuance while preserving the structure needed to track analytic decisions.

After open coding, the team develops broader categories by grouping related codes. During this axial coding phase, the analysis focuses on how participants' responses connect across topics and situations. NVivo's visual mapping tools support this work, while manual clustering and memoing guide deeper interpretation. These categories reveal consistent tensions, values, and strategies shared across the participant group.

The final step involves synthesizing those categories into central themes. The research team refines these themes through multiple rounds of review and ties each one back to the research questions. Direct quotations from participants illustrate the meaning and complexity of each theme. The analysis prioritizes participants' language and experiences while building a clear and structured interpretation of the data. The following tables show how the analysis progresses from initial open codes to categories and final themes. These tables provide the foundation for the results section that follows.

Open Coding Summary. The open coding phase provided the foundation for analysis. Each transcript was reviewed line by line to identify significant words, repeated concepts, and ideas relevant to the research questions. This inductive process allowed codes to emerge naturally from the participants' language. NVivo 14 supported the digital organization of codes, and manual annotation allowed for a deeper interpretation of participants' responses. At this stage, the goal was to capture experiences without assigning meaning too quickly, preserving the detail and tone of instructors' reflections. Table 1 presents a selection of open codes along with quotations that illustrate recurring instructional themes and concerns.

Table 1: Open Coding Summary with Illustrative Participant Quotes

TABLE 1 Open Coding Summary with Illustrative Participant Quotes		
Code	**Quote**	**Interviewee**
Lack of Hands-on Training	Everything is theoretical. We are just showing students photos or mini video clips.	#10
Limited Institutional Support	There could be more support on the university side to continue programming.	#12
Disconnect Between Curriculum and Industry	There's a disconnect between what's being taught and what's needed in the cannabis business.	#9

Sustainability Awareness	We are a horribly energy-consuming industry and a packaging waste industry.	#10
Need for Compliance Education	Compliance is complex; while we teach it, students learn it on the job.	#4
Stigma in Academia	Academia is doing themselves a disservice by shunning the industry.	#12
Instructor Passion	They care so much about the industry, and they give it their all.	#12
Hands-on Skills Require Partnerships	We partner with METRC and have a hemp farm, but very few students get hands-on experience.	#4
Student Motivation Gaps	Many students underestimate the work required in the cannabis industry.	#11
Experiential Learning is Critical	Only through experiential learning are you able to keep up with evolving standards.	#12
Faculty with Industry Backgrounds	I bring real-time regulatory updates into the classroom because I work in the industry.	#12
Need for Standardization	Programs vary significantly across institutions. My research aims to push for standardization.	#4
Legacy Operator Insight Missing	Cannabis education lacks the voices of legacy operators and those impacted by prohibition.	#5
Academic Restrictions on THC	The biggest challenge is that students are not allowed to work with high-THC cannabis.	#8
Regulatory Landscape is Ever-Changing	Laws are constantly changing, which makes teaching compliance difficult.	#8
Financial Barriers to Access	Certificate programs are expensive and not always accessible to impacted communities.	#5
Transparency in Career Prospects	I believe that academic institutions are not always honest with students about job prospects.	#8
Cultural Myths in Cannabis	I break down a lot of the mythology around cannabis that they are still holding on to.	#10
Lack of Advanced Career Pathways	There’s not enough education for meaningful careers beyond budtender or security roles.	#12
Engagement with Policy-Makers	Universities should be active in policy discussions and contribute to shaping regulations.	#11

Diversity and Equity Gaps	We're not doing enough to address the legacy of incarceration and ensure equity in training.	#5
Interdisciplinary Curriculum Needs	A course combining entrepreneurship with compliance could better equip students.	#6
Rapid Curriculum Adaptation	We ask ourselves every year how well our program aligns with industry needs.	#6
Student Enthusiasm for Science	Regardless of their background, they are eager to learn about the science behind cannabis.	#9

Axial Coding Categories. Axial coding followed open coding and focused on organizing related codes into broader analytic categories. Codes were reviewed and clustered based on commonalities, contrasts, or underlying patterns across participant responses. This process supported the transition from individual expressions to more abstract groupings that reflected shared challenges or instructional strategies. NVivo's visual tools helped identify connections, while written notes and memos informed interpretation. Table 2 displays the axial categories developed from this analysis phase and concise descriptions and examples highlighting how the categories reflect everyday experiences across interviews.

Table 2 Axial Categories Developed from Participant Codes

TABLE 2 Axial Categories Developed from Participant Codes	
Category	**Aligned Code**
Curriculum Gaps	Lack of Hands on Training
Curriculum Gaps	Limited Institutional Support
Curriculum Gaps	Disconnect Between Curriculum and Industry
Curriculum Gaps	Lack of Advanced Career Pathways
Curriculum Gaps	Academic Restrictions on THC
Curriculum Gaps	Need for Standardization
Sustainability Issues	Sustainability Awareness
Sustainability Issues	Diversity and Equity Gaps
Sustainability Issues	Interdisciplinary Curriculum Needs

Sustainability Issues	Student Enthusiasm for Science
Compliance & Regulation	Need for Compliance Education
Compliance & Regulation	Regulatory Landscape is Ever-Changing
Compliance & Regulation	Engagement with Policy-Makers
Compliance & Regulation	Faculty with Industry Backgrounds
Barriers & Challenges	Stigma in Academia
Barriers & Challenges	Financial Barriers to Access
Barriers & Challenges	Transparency in Career Prospects
Barriers & Challenges	Student Motivation Gaps
Innovative Opportunities	Experiential Learning is Critical
Innovative Opportunities	Hands-on Skills Require Partnerships
Innovative Opportunities	Rapid Curriculum Adaptation
Innovative Opportunities	Instructor Passion
Innovative Opportunities	Cultural Myths in Cannabis

Theme Development .The final step in the analysis synthesized the axial categories into overarching themes. This stage involved identifying the most significant ideas that spoke directly to the research questions and captured the core meanings expressed by participants. Reviewing transcripts, analytic memos, and coded segments helped refine the themes into coherent, focused insights. Throughout this process, the aim was to ensure that each theme remained grounded in the data while offering a cohesive and insightful interpretation of the broader findings. Table 3 presents the final themes and summary statements that clarify their relevance to the study's focus on cannabis education, instructional design, and workforce preparation

Table 3 Final Themes Synthesized from Axial Categories

Table 3: *Final Themes Synthesized from Axial Categories*		
Theme	**Theme Meaning**	**Aligned Categories**
Mismatch Between Education and Industry Demands	Describes how current cannabis curricula often fail to align with practical industry requirements and expectations.	Curriculum Gaps, Compliance & Regulation
Barriers to Sustainability and Equity	Addresses the limited attention given to sustainable practices, environmental impact, and equity-driven education.	Sustainability Issues
Structural and Social Obstacles in Cannabis Education	Captures institutional, social, and economic challenges that hinder students' access to meaningful cannabis career pathways.	Barriers & Challenges
Emerging Innovations and Reform Opportunities	Reflects instructors' advocacy for hands-on learning, updated curriculum, and the integration of real-world insights into education.	Innovative Opportunities

RQ1: Alignment of Curricula with Industry Sustainability Needs

Research Question 1 explored how instructors perceive the alignment between post-secondary cannabis curricula and the industry's sustainability needs. Participants offered candid reflections on whether their programs adequately prepare students to navigate the real-world challenges of cannabis work. Two primary themes emerged from their responses. First, many instructors described a persistent mismatch between education and industry demands**,** particularly around compliance, experiential learning, and the depth of student preparation. Second, instructors identified barriers to sustainability and equity that hinder curriculum development and student access. These included environmental gaps in course content, limitations of historical context, and structural inequities that restrict who benefits from cannabis

education. The following sections unpack each theme, grounded in the voices of those teaching within this evolving field.

Theme 1: Mismatch Between Education and Industry Demands. A recurring concern shared by participants was the disconnect between cannabis education programs and the demands of the evolving cannabis workforce. Instructors explained that while current curricula cover foundational topics, they often fail to prepare students for applied skills essential in real-world settings. Participants attributed this gap to regulatory barriers, a lack of hands-on opportunities, and minimal support from their institutions. Interviewee #10 remarked with frustration, "Our hands are incredibly tied. The states don't allow us to bring non-badged employees into cultivation facilities, manufacturing facilities, or dispensaries. So again, everything is theoretical. We are just showing them photos or little mini video clips." This limited exposure prevents students from gaining practical experience with equipment, workflows, and environments that define cannabis careers. Faculty expressed that these constraints prevent them from delivering instruction that meets the complexity of the field.

Instructors pointed to compliance education as another area where cannabis programs underdeliver. While all participants acknowledged the importance of regulatory knowledge, many agreed that students leave their programs without understanding what compliance looks like in practice. Interviewee #4 explained with resignation, "Compliance is complex, and while we teach it, students learn it on the job." Others echoed this concern, citing the challenge of keeping pace with policy changes that evolve faster than academic processes allow. Interviewee #12 shared with a sense of inevitability, "Some of it's still being built out. It's not necessarily the program's fault; it's the nature of the beast." Without access to tools like seed-to-sale software,

mock inspections, or SOP simulations, instructors find it challenging to present compliance in ways students can apply.

Instructors described variation in course design across institutions as a significant barrier to consistent workforce readiness. Many said they revise their materials regularly based on personal industry experience, but do so without formal support or alignment. Interviewee #6 stated, “We ask ourselves every year how well our program aligns with industry needs,” underscoring the self-directed nature of many instructors’ efforts. However, Interviewee #4 cautioned, “Programs vary significantly across institutions,” a concern echoed throughout the interviews. Without shared expectations or feedback loops, students in different programs may graduate with vastly different competenciespers. Instructors emphasized that institutional fragmentation undermines efforts to develop stronger program models.

Faculty also discussed the gap between student expectations and actual career preparation. Participants explained that many students believe cannabis education will lead to executive or entrepreneurial roles, though programs often only address entry-level pathways. Interviewee #12 shared, “There’s not enough education for meaningful careers beyond budtender or security roles.” The interviewee added, “A meaningful job is a salary job, not something I can get with just a high school diploma.” Interviewee #8 agreed, “Students think they’re going to walk into management, but the programs don’t prepare them for that.” Instructors called for clearer, more explicit guidance, expanded curricular offerings, and stronger industry pathways to meet emerging workforce demands. Several said their institutions have not yet committed the resources necessary to evolve these programs beyond foundational instruction.

Institutional context shaped how instructors viewed program limitations. Several reported that cannabis programs often exist on the academic periphery, without long-term investment or

recognition. Interviewee #12 noted, “There could be more support on the university side to continue programming,” pointing to the structural challenges faculty face in sustaining and improving their work. Without support for staffing, professional development, or partnerships, instructors said their ability to align programs with workforce needs remains constrained. They described this dynamic as a barrier to progress and sustainability. As detailed in Table 3, this theme draws from axial codes including Curriculum Gaps, Compliance and Regulation, Lack of Hands-on Training, and Need for Standardization. These findings respond directly to Research Question 1 by identifying specific areas where current curricula do not align with real-world industry demands.

These findings align with existing research on cannabis education and workforce development. Black (2020) observed that many post-secondary programs remain overly theoretical, limiting student readiness for operational roles. Colclasure et al. (2023) emphasized the lack of experiential learning opportunities and cross-institutional consistency. Montgomery and Allen (2023) advocated for flexible, industry-responsive curricula that adapt to the most demanding. These findings also reflect andragogical principles, emphasizing that learners require self-directed, applied learning to succeed in professional environments (Knowles et al., 2015; Merriam & Bierema, 2013). Participants’ accounts highlight persistent barriers that prevent programs from delivering this kind of learning, offering a foundation for further interpretation in Chapter 5.

Theme 2: Barriers to Sustainability and Equity. Multiple instructors reported that cannabis education programs often promote sustainability and equity on the surface but fail to embed those values in course content and instructional practice. Participants described how these themes are frequently addressed at a surface level, discussed briefly, delegated to guest speakers,

or framed without connection to students' lived experiences. Interviewee #10 noted with concern, "We talk about environmental impact and energy use, but it's surface-level and mostly confined to guest speakers." Interviewee #9 echoed this: "It seems to be more of a buzzword than a true focus." Faculty shared that, despite strong interest from students and instructors, these topics often remain disconnected from the main curricular goals, limiting their depth and relevance.

Environmental sustainability was particularly underdeveloped in many programs. Instructors pointed to a lack of guidance, tools, or trained personnel to develop lessons around cannabis' ecological footprint. Interviewee #1 shared, "We don't talk enough about the environmental side, like energy use, water, and packaging waste. The curriculum hasn't caught up." Others described wanting to teach these concepts more fully but encountering barriers at the institutional level. Interviewee #10 emphasized, "We are an energy-consuming, water-consuming, and packaging waste industry. We have to address those things." Interviewee #6 added, "The institution supports innovation in name, but not always in resources. As a result, things like sustainable agriculture get left out." Participants suggested that if cannabis education programs fail to prepare students to manage environmental responsibility, they will remain reactive instead of shaping proactive industry standards.

Participants described equity concerns as similarly underdeveloped. Interviewees noted a lack of representation among faculty and guest speakers, especially those directly impacted by the War on Drugs. Interviewee #5 stated, "We're not doing enough to address the legacy of incarceration and ensure equity in training." Interviewee #3 explained, "Even if someone was a legacy grower or had firsthand knowledge, institutions are still nervous to work with people with criminal records. So, we end up teaching without them." Others pointed to economic access as

another barrier. Interviewee #5 continued, “Certificate programs are expensive and not always accessible to impacted communities.” Interviewee #6 added, “Without scholarships or community partnerships, we exclude the very people our programs say they want to serve.”

To address these gaps, instructors described developing their own modules, inviting legacy operators, and connecting students with community-based projects. Participants described using self-created modules, inviting legacy operators to speak, or connecting students with community-based projects. Interviewee #11 shared, “My institution was the first in (REDACTED) State to implement a cannabis curriculum… but more program development is needed, particularly in workforce training and environmental science integration.” Interviewee #7 described how institutional discomfort with cannabis history limits how deeply faculty can explore these themes: “We can’t even talk openly about Nixon-era policy unless it’s in a general history class.” While instructors expressed pride in these individual efforts, they acknowledged that relying on personal initiative rather than institutional structures leads to fragmentation and burnout. They emphasized that without institutional investment, equity-focused reforms remained isolated and unsustainable.

These findings directly address Research Question 1 by identifying key areas where current cannabis education programs fall short of aligning with sustainability and equity goals. Instructors want to teach about environmental impact, social justice, and systemic harm, but face institutional limitations in curriculum planning, guest speaker vetting, and funding. Without dedicated pathways for inclusion, financial support, or curriculum frameworks, faculty said these topics become optional rather than central. The result is a gap between educational values and student preparation. Participant accounts reveal how equity and sustainability often remain underdeveloped despite strong faculty interest.

The findings in this theme reflect and extend prior research. Alexander (2010) argued that institutions of higher education must take an active role in addressing the harms of drug policy and racialized enforcement, a theme echoed by several participants. Patterson et al. (2024) emphasized that sustainability education in emerging sectors requires cross-disciplinary collaboration and faculty training, both identified as missing by instructors in this study. These insights also align with adult learning theory, particularly Knowles et al. (2015) and Merriam and Bierema (2013), who emphasized that adult learners benefit most from education that centers real-world relevance and lived experience. The barriers described in this theme illustrate the gap between what instructors aspire to teach and what their institutions allow them to deliver.

RQ2: Perceived Adequacy of Ancillary Coursework

Instructors offered direct insights into whether current cannabis education programs truly prepare students to engage with the sustainability challenges shaping the industry. Their responses indicated two core themes: structural and social obstacles in cannabis education and emerging innovations and reform opportunities. Several instructors described how financial limitations, stigma, lack of institutional backing, and restrictive policy environments make it difficult for students to access high-quality, relevant training. These barriers affect who gets into these programs, who stays, and how well students prepare to meet the demands of a changing workforce. At the same time, some educators see signs of progress, curricular shifts, new partnerships, and instructional creativity beginning to address those gaps. These contrasting perspectives provide a fuller picture of how instructors evaluate the adequacy of current coursework. The following two sections unpack these themes, starting with the obstacles shaping equity, access, and preparedness across cannabis education.

Theme 1: Structural and Social Obstacles in Cannabis Education

Instructors identified structural and social challenges that limited the development, access, and impact of cannabis education programs. These included public stigma, weak institutional commitment, and confusion about where cannabis programming fits within higher education systems. Faculty explained that administrators often treat cannabis curricula as temporary or experimental, which leads them to allocate fewer resources and regard the programs with less. Interviewee #11 stated, “Universities should be active in policy discussions and contribute to shaping regulations,” reflecting how disconnected many institutions remain from the broader cannabis landscape. Interviewee #6 added, “Building strong industry partnerships is key.” Interviewee #2 observed that cannabis programs are rarely integrated into broader institutional priorities, making them vulnerable to budget cuts and administrative turnover. These comments reflect a shared perception that stigma and institutional hesitation continue to limit the credibility and development of cannabis education within traditional academic settings.

Interviewees highlighted how legal restrictions and institutional risk aversion shaped student access and limited instructional design. Several instructors said compliance restrictions and risk-averse policies make it difficult to provide hands-on learning opportunities. Interviewee #3 explained, “Legal limitations on internships, especially in Pennsylvania, limit hands-on experience. Students must be patients or employees to intern, which restricts practical learning.” This limitation worsened due to the absence of lab access and seed-to-sale tracking simulations, which instructors identified as critical tools for preparing students to work in regulated industry settings. Interviewee #9 explained, “There are no working labs, no software simulations. We are talking about compliance, but we do not have the tools to demonstrate it.” Faculty described how

bureaucratic red tape slows innovation and often prevents instructors from offering students the experiential depth they need. Faculty rely on workaround strategies that are usually unsustainable or inequitable without structural solutions.

Career preparation was another area shaped by structural disconnects. Instructors observed that while cannabis jobs span fields such as compliance, cultivation, product development, and business strategy, many programs focus primarily on dispensary work. Interviewee #4 noted, “Our cannabis business track provides better employability, while the horticulture track provides essential plant-touching skills.” However, not all institutions offer this level of differentiation. Interviewee #2 shared, “Many of our students get the knowledge but struggle with how to apply it once they are in dispensary roles.” Interviewee #7 added, “People still think working in cannabis is just selling weed. That is how they frame the education, too.” Interviewee #5 further explained that courses covering law, regulation, and lab-based programs are critical for students to enter fields such as compliance and product testing. These perspectives reflect how internal and external perceptions shape what gets taught and what students believe is possible.

Instructors described how inequities in program design and access often excluded justice-impacted learners, undermining the very equity goals that cannabis education programs claim to support. Interviewee #5 stated, “exposure to legacy operators and incarcerated individuals impacted by prohibition is missing. Cannabis education needs to include visits to prisons or conversations with those who have been affected by the war on drugs.” Others pointed out how justice-impacted individuals often face structural hurdles when applying to programs, including eligibility restrictions and background checks. Interviewee #3 added that policies designed to appear neutral sometimes result in the exclusion of students with lived experience in cannabis,

cutting off an essential perspective from classroom discussions. Interviewee #5 emphasized, “Cannabis education lacks the voices of legacy operators and those impacted by prohibition,” and added that “certificate programs are expensive and not always accessible to impacted communities.” These comments underscore a misalignment between program equity narratives and actual access and reflect calls for deeper admissions and hiring practices reforms.

These findings respond directly to Research Question 2 by illustrating how structural and social obstacles influence the perceived adequacy of cannabis education. Participants described how gaps in institutional recognition, limited infrastructure, narrow portrayals of the cannabis job ecosystem, and exclusionary practices reduce the ability of programs to meet workforce and equity goals. Many instructors described developing independent workarounds, though these efforts remained scattered and often unsustainable without institutional support. These patterns suggest that while instructors know what is missing, they remain constrained by institutional rules, resources, and decision-making structures. The findings reflect descriptive accounts of challenges shaping student access, curriculum planning, and program sustainability.

Several studies provide context for these findings. Davis et al. (2022) noted that equity in workforce education depends on intentional structural planning, not just individual faculty initiative. Barcott and Whitney (2023) found that cannabis education programs often lag behind job market demands, requiring better alignment with current industry roles. Likewise, Alexander (2010) emphasized the importance of institutional engagement in reversing harm caused by the War on Drugs, highlighting the need for equity practices beyond marketing language. These issues mirror broader critiques of postsecondary systems, which often struggle to create truly accessible pipelines for justice-impacted learners. The findings in this theme echo adult learning

theory, which emphasizes learner-centered, practical education grounded in the lived experiences of diverse student populations (Knowles et al., 2015; Merriam & Bierema, 2013).

Theme 2: Emerging Innovations and Reform Opportunities

Faculty described how they address structural gaps in cannabis education by building flexible, workforce-aligned models. These innovations often come from instructors who act independently rather than through top-down institutional changes. Interviewee #6 explained, "We ask ourselves every year how well our program aligns with industry needs," signaling a commitment to continuous improvement. Interviewee #10 said, "You can't just teach this like science, you must bring in the business and law pieces too." Faculty members reported designing interdisciplinary courses that combine biology, public policy, marketing, and regulatory compliance. These strategies allow instructors to reflect the complexity of cannabis careers while responding to the needs of diverse learners. Interviewee #12 added, "I use storytelling and have them draft actual compliance memos. That's how I get them to engage." This example reflects how instructors embed practical tasks into instructional design to bridge content with real-world application. Participants emphasized that curricular reform often begins with the faculty, who tailor instruction to the demands of the industry.

Instructors also described how they form partnerships to give students access to practical learning experiences. Interviewee #4 shared, "We partner with a state compliance software vendor and have a hemp farm, but very few students get hands-on experience." Faculty work with labs, dispensaries, and legal professionals to co-teach content or provide guest instruction. Interviewee #1 explained, "Our program brought attorneys and cultivators to co-teach modules. It helped students connect classroom content to real roles." Interviewee #10 said they offer "video-based walkthroughs, like policy drills, to show what students would be doing in real-

time" when in-person internships are not possible, approaches that allow students to understand regulated environments despite institutional limitations. Faculty use creative solutions to simulate industry exposure and ensure students practice real-world applications.

Participants also described how certificate models support workforce entry for students who cannot pursue full degrees. Interviewee #8 shared, "We've worked to stack our courses into a certificate model, which gives students something tangible even if they can't complete the degree." Interviewee #11 emphasized that short-term credentials help students bypass traditional prerequisites and begin working faster. These strategies align with Schulz (2019), who noted that modular credentials create lower barriers for entry in emerging job markets. Participants named programs like the Medgar Evers College cannabis education certificate and Zane State College's product development training as examples of accessible, workforce-focused models already discussed in Chapter 2. Instructors saw these models as realistic tools for students with limited access to four-year programs. Their comments reflected a desire to make cannabis education more flexible and immediately applicable to industry roles.

Faculty also described innovations that prioritize equity. Interviewee #5 said, "Cannabis education lacks the voices of legacy operators and those impacted by prohibition," and encouraged course design that includes lived experience. Interviewee #7 explained, "I make space for cultural context and storytelling, not just science or policy." Interviewee #3 said, "We asked students to explore cannabis justice as a personal and policy issue" through community-based assignments. These accounts reflect strategies that connect equity to instructional design. Participants aimed to humanize cannabis education by amplifying social justice themes in coursework and classroom dialogue. Their work matches Reid et al. (2022), who documented how faculty at Medgar Evers College reshaped their curriculum to reflect community input.

These examples demonstrate how instructors redesign learning environments to include those most affected by cannabis policy.

These findings answer Research Question 2 by showing how faculty respond to institutional and structural gaps through innovation. While earlier themes identified barriers, Theme 4 illustrates how instructors build partnerships, develop interdisciplinary instruction, and integrate real-world experiences to improve program relevance. Their work includes certification models, cultural storytelling, simulated labs, and guest-facilitated workshops. Participants said their innovations respond to student needs, local policy shifts, and workforce demand. They identified change as a process driven by ongoing reflection, often shaped by their professional experiences. These approaches support student preparation, even without large-scale policy or institutional reform.

The literature reinforces the impact of these faculty-led innovations. Black (2020) called for more direct workforce alignment in cannabis programs and emphasized the need for less academic gatekeeping. Colclasure et al. (2023) described similar faculty strategies to bring experiential and compliance-based tools into cannabis education. Reid et al. (2022) focused on the importance of community-guided design, especially for learners affected by criminalization. These sources support what participants described in their interviews. Faculty rely on learner-centered, practical approaches that reflect adult education theory (Knowles et al., 2015; Merriam & Bierema, 2013). These findings suggest that innovation is not optional for cannabis educators. It remains essential for meeting student needs in an evolving and highly regulated field.

Comparison of Results to the Literature Review

Research Question 1 confirmed that fragmented institutional structures limit the legitimacy, clarity, and consistency of cannabis education programs. Instructors described

confusion about program placement, inconsistent administrative engagement, and minimal investment in curriculum design. These findings align with axial codes such as “unclear institutional support” and “program isolation,” detailed in Table 3. The data reinforce Knowles’ adult learning theory, emphasizing relevance, autonomy, and contextual instruction (Knowles et al., 2015; Merriam & Bierema, 2013). Instructors adapted their teaching to respond to evolving industry needs, but the absence of institutional coordination led to variation in course quality and workforce alignment. This lack of structural support weakens program sustainability and restricts the development of cannabis as a legitimate academic field. These findings build on the work of Black (2020) and Colclasure et al. (2023), who observed similar instability in other emerging disciplines.

Research Question 2 revealed limited access to experiential learning, and ongoing inequities reduce student readiness. Instructors described students completing programs without using lab tools, interacting with licensed spaces, or gaining exposure to regulatory systems. These issues support Scheuer’s (2020) findings that hands-on experience is essential in highly regulated industries. Faculty also pointed out that students affected by cannabis criminalization face structural barriers, including high tuition, exclusionary admissions policies, and a lack of culturally relevant design. These findings align with Davis et al. (2022), who argue that equitable workforce pathways must be intentionally constructed, not assumed. In this study, instructors frequently acted as navigators and mentors, providing workaround solutions to meet student needs, often without institutional support or compensation.

Participants described the difficulty of innovating within fragmented institutional systems. Faculty used adult learning principles to deliver responsive, student-centered content, but did so within systems that offered little formal backing. Table 3 illustrates the coding

structure that shaped these themes and supports the credibility of the findings. Instructors often led innovation without institutional support, reflecting patterns found in earlier research on workforce education and policy gaps (Black, 2020; Colclasure et al., 2023). Many expressed concern that these efforts remained isolated without coordinated investment from their institutions.

Summary

This chapter presented findings from a qualitative case study focused on how postsecondary cannabis instructors perceive the adequacy of ancillary curricula and workforce alignment. The study examined whether existing programs prepare students for sustainable employment and how well they reflect current industry demands. Data were collected through in-depth interviews with twelve instructors across the United States, all actively developing or delivering cannabis-related coursework. These participants brought advanced expertise in compliance, entrepreneurship, policy, and education, and contributed perspectives grounded in academic and industry experience.

A three-phase coding process (open, axial, and thematic) guided the analysis, supported by NVivo 14 and manual memoing. The coding framework surfaced repeated concerns around program legitimacy, compliance readiness, experiential access, and systemic equity. Four core themes emerged. Themes 1 and 2 responded to Research Question 1, identifying a disconnect between course content, real-world workforce needs, and institutional constraints such as limited funding, administrative uncertainty, and reputational stigma. Themes 3 and 4 addressed Research Question 2, showing how inequities in program design and delivery restrict student access, and how instructors implement reforms through certification models, interdisciplinary content, and culturally relevant instruction. Across all four themes, instructors emphasized that cannabis

education remains in development and lacks structural cohesion. At the same time, they demonstrated a strong commitment to equity, adaptability, and relevance. These findings establish the foundation for Chapter 5, which interprets the implications of these patterns and outlines recommendations for future practice and policy.

Chapter 5: Implications, Recommendations, and Conclusions

As cannabis legalization expands, public colleges face pressure to lead workforce development or remain behind private actors. A persistent gap exists between post-secondary cannabis programs and the real-world demands of a regulated and evolving industry. The problem addressed by this study is the gap between the cannabis industry's workforce demands (Black, 2020) and the educational offerings in post-secondary institutions (Colclasure et al., 2023). Findings from this study indicate that institutional resistance, inconsistent policy, and weak program design limit the development of coherent and practical curricula. Instructors described how federal restrictions, limited experiential opportunities, and administrative hesitation hinder quality and alignment with industry needs. These patterns reflect a broader issue in how higher education engages with new labor markets. The challenges identified in this study mirror concerns raised by Colclasure et al. (2023) and Davis et al. (2022), who found that workforce education often lacks the structural coordination needed to address compliance and complexity in regulated industries. This chapter interprets those findings through the lens of adult learning theory (Knowles et al., 2015) and connects them to current research on program structure and instructional practice. The discussion focuses on fragmented program design, limited experiential learning, and restricted access. The chapter analyzes each theme, followed by implications, recommendations for practice, suggestions for future research, and concluding reflections.

This qualitative case study will explore instructors' perceptions regarding cannabis ancillary curricula in post-secondary education. By examining instructors' perceptions, this study aims to help bridge the gap between the cannabis industry's workforce demands and the educational offerings in post-secondary institutions (Black, 2020; Colclasure et al., 2023). Using

adult learning theory as a framework, the analysis considers how self-directed instruction, practical experience, and learner relevance are reflected or missing in current program structures. The findings show how fragmented design, limited applied opportunities, and access barriers affect instructional quality and workforce preparation. By aligning participant perspectives with core elements of adult learning theory and published research, the chapter provides a foundation for understanding how programs can evolve to meet educational and industry expectations.

Discussion

This section organizes the study's six implications into three thematic areas; reflecting how post-secondary institutions respond to the cannabis industry's evolving demands. Each implication is grounded in instructors' experiences and connects directly to the study's two research questions. The first theme, Structural Implications, explores how program fragmentation and stigma undermine long-term curricular planning and sustainability goals. The second theme, Instructional and Workforce Readiness, addresses gaps in applied learning, course design, and adult learning alignment. The third theme, Systemic Implications, examines the external and institutional barriers that shape how colleges engage with policy, funding, and equity. Together, these themes highlight the misalignment between institutional capacity and the expectations of a regulated, equity-driven cannabis workforce. Consistent with Knowles et al. (2015) and Merriam and Bierema (2013), the implications emphasize the need for adult-centered, relevant, and practice-oriented program models beyond isolated coursework. This chapter interprets the findings to inform policy, program development, and broader institutional leadership in cannabis education.

Implications for Research Question 1

Participants identified several structural and institutional barriers that affect how cannabis programs are developed, funded, and maintained. These include fragmented placement across departments, inconsistent long-term planning, and persistent stigma within institutions. Together, these factors restrict the ability of programs to adapt to the regulatory and workforce demands of the cannabis industry. These findings directly relate to the study's problem statement, which identified a gap between education and evolving industry expectations. They also support the study's purpose of understanding how instructors navigate system-level limitations to deliver coherent instruction. Participants described program development as disjointed and noted that unclear administrative processes result in inconsistent curricula and limited transparency in program goals.

These challenges also conflict with key principles of adult learning theory, which emphasize structure, relevance, and learner-centered planning (Knowles et al., 2015). Fragmentation across departments and a lack of strategic oversight prevent instructors from designing cohesive instruction or offering aligned learning experiences. Colclasure et al. (2023) found that inconsistent implementation of workforce education reduces flexibility and credibility in emerging industries. This study expands on that research by illustrating how cannabis-specific stigma and uncoordinated planning reduce instructional consistency and prevent long-term growth. Findings also align with Davis et al. (2022), who emphasized the importance of team coordination in regulated fields. Participants reported a lack of collaboration across departments, limited internal communication, and insufficient administrative support. These patterns suggest that programs are unlikely to improve consistency, accountability, or industry responsiveness without coordinated efforts among faculty and leadership.

Implication 1: Fragmented Academic Structures Hinder Program Coherence. Post-secondary cannabis education lacks centralized coordination, which undermines curriculum coherence and prevents programs from meeting workforce expectations. This issue directly reflects the core problem identified in this study: public colleges fail to implement precise instructional planning for emerging industries. Participants described how colleges assign cannabis-related courses across departments, such as business, science, or continuing education, without consistent leadership or curriculum integration. Faculty reported confusion, overlapping topics, outdated content, and limited collaboration due to this decentralized structure (Interviewees 2, 4, 7, 10). These conditions illustrate what Black (2020) identified as a key obstacle to educational innovation: fragmented programs stall development and diminish credibility. Colclasure and colleagues (2023) emphasized the need for coordinated academic oversight to foster programmatic innovation, regulatory responsiveness, and coherent outcomes.

These conditions challenge adult learners, who depend on explicit, relevant instruction. Knowles et al. (2015) and Merriam and Bierema (2013) argued that adults require goal-driven curricula tied to real-world outcomes. Students in this study questioned how courses aligned with their future goals, which diminished trust in the program's value (Interviewee 2). Kasworm (2010) explained that inconsistent academic identity adds pressure for adult learners navigating new fields. Faculty noted that the lack of institutional accountability limited their ability to update content or align instruction with current regulations (Interviewees 2, 7, 10). Fink (2021) called for scaffolded, outcome-based design in applied education, yet participants described few opportunities for structured planning. Students from historically excluded communities face even greater barriers when programs lack legitimacy or coherence (Vitiello, 2019). Gray and Heffernan (2023) highlighted cannabis as a pathway to economic participation but emphasized

the need for reliable academic infrastructure. To build effective programs, colleges must centralize leadership, integrate interdisciplinary knowledge, and support faculty collaboration to ensure accessible and industry-aligned instruction.

Implication 2: Institutional Inertia and Stigma Limit Program Development. Although cannabis legalization has expanded at the state level, many public colleges continue to hesitate in formally supporting cannabis education. Participants described how administrators delayed program approvals, limited public messaging, and withheld long-term funding, even as student interest and workforce demand increased (Interviewees 5, 9). This hesitation directly connects to the problem outlined in this study: institutional reluctance constrains cannabis education's legitimacy and limits its potential for workforce impact. Cummings and Ramirez (2022) explained that the historical stigma surrounding cannabis continues to shape leadership decisions, especially in colleges serving communities previously harmed by prohibition. Participants described proposals for new programs that received little response and course content that faculty developed informally without institutional backing (Interviewees 3, 6, 10). Patterson and colleagues (2024) noted that workforce development in emerging sectors often falters when institutions avoid risk and fail to provide clear guidance.

These conditions create uncertainty for adult learners, who need transparent, stable, and purposeful educational pathways. Merriam and Bierema (2013) emphasized that adult learners value institutions that offer consistent direction and recognize professional relevance. Participants reported that students questioned whether their programs would remain active long enough to support graduation and career placement (Interviewee 7). Kasworm (2012) found that adult learners lose trust in instruction and credential value when leadership appears uncertain. Faculty described how they integrated cannabis topics into broader courses without support,

time, or curriculum planning resources (Interviewees 3, 6, 10). Montgomery and Allen (2023) characterized this pattern as reactive leadership, where institutions rely on faculty initiative instead of building strategic infrastructure. Interviewees warned that without formal structures and consistent leadership, students may leave for unaccredited or private alternatives that lack quality oversight (Interviewee 11). If colleges want to meet adult learner expectations and lead this growing field, they must publicly support cannabis programs, allocate stable funding, and invest in long-term academic planning.

Implication 3: Institutional Barriers to Program Innovation. Although many colleges have introduced cannabis programs in response to shifting policies and workforce needs, innovation often slows or stalls after the initial launch. Participants described how early momentum faded due to a lack of long-term planning, dedicated infrastructure, and systems for updating curricula. One faculty member noted that their university never provided the support needed to sustain or expand the program, limiting its development beyond pilot status (Interviewee 12). Another shared that "the curriculum is good, but the sustainability and innovation are missing" (Interviewee 8), pointing to the absence of institutional frameworks typically found in high-demand fields. These concerns reflect structural gaps that prevent colleges from building cannabis programs capable of responding to labor market shifts. Similar to how fields like biotechnology and cybersecurity have evolved through iterative academic models, cannabis studies require a sustained approach that connects education with regulation, product development, and compliance. Reid and colleagues (2024) emphasized that workforce-facing programs must remain agile, responsive, and committed to long-term industry alignment. Without this foundation, public colleges risk offering fragmented instruction that fails to serve learners or employers.

Faculty repeatedly emphasized that innovation depends more on individual motivation than institutional systems. Instructors reported that their colleagues lacked regular curriculum review cycles, omitted cannabis from department planning agendas, and failed to create formal mechanisms for feedback integration (Interviewees 4, 6, 10). One participant described how they updated lessons and invited speakers "in our own time," highlighting the reliance on personal initiative rather than coordinated planning. These findings align with Colclasure et al. (2023), who found that emerging fields struggle to maintain momentum without structured oversight and formal support. Schulz (2019) warned that institutions dependent on informal innovation risk being outpaced by private-sector alternatives that respond more quickly to industry needs. The absence of structured review, cross-departmental collaboration, or centralized leadership restricts colleges from building sustainable cannabis curricula aligned to industry standards.

These limitations also affect how students experience cannabis education and prepare for employment. Participants explained that while students often express pride in completing the program, many lack a clear understanding of how to apply their knowledge in newer or emerging roles (Interviewees 5, 11). Key sectors like compliance, regulatory technology, and formulation science often remain underrepresented in course content. Merriam and Bierema (2013) argued that adult learners require instruction that evolves with labor trends and provides clear pathways for application. When students complete coursework that lacks scaffolding or long-term relevance, they miss critical opportunities to enter and grow within the industry. To build sustainable, future-facing programs, colleges must invest in infrastructure that supports curriculum innovation, industry partnerships, and iterative instructional design. Otherwise, cannabis education will remain dependent on isolated faculty efforts and fall short of meeting workforce expectations.

Implications for Research Question 2

This section explores how instructional practices and course content affect the adequacy of cannabis education in preparing students for workforce participation. The second research question examined whether current coursework supports sustainability in the cannabis industry. Participants described instructional gaps between classroom content and the applied knowledge students need for regulated, non-plant-touching roles. These gaps include limited access to hands-on training, few opportunities for real-world simulation, and insufficient integration of compliance tools and business frameworks. Instructors also expressed concern that program models often overlook the needs of adult learners and justice-impacted individuals. The following implications examine how course design, learning environments, and institutional support or constrain student preparation and equitable workforce access.

Implication 4: Coursework Lacks Applied Learning and Industry Alignment.

Instructors across the study consistently identified a disconnect between academic instruction and the practical demands of cannabis industry roles. Although many programs cover foundational business, biology, or public policy knowledge, they rarely include structured applied training for compliance, processing, or operations roles. Participants described how institutional risk aversion and legal ambiguity restricted opportunities for students to engage in hands-on learning. For instance, one instructor explained that students “learn compliance measures, yield reporting, and tracking,” yet cannot apply those skills in controlled environments (Interviewee 7). Another participant noted that “processing is difficult due to expensive equipment,” forcing students to wait until hired before accessing fundamental tools (Interviewee 6). Several instructors described the coursework as overly theoretical, with minimal exposure to the tools, software systems, and operational workflows used in licensed facilities (Interviewees

6, 11). These findings support Colclasure and colleagues (2023), who emphasized that workforce education must include experiential alignment to be effective, especially in fast-evolving and regulated sectors. Montgomery and Allen (2023) also stressed the need for cross-functional curricula that adapt to shifting legal and industry standards.

These instructional gaps have significant consequences for adult learners, many of whom enter cannabis programs with the goal of career transition. According to Knowles et al. (2015), adults benefit from problem-centered learning that applies to real-world scenarios. Merriam and Bierema (2013) similarly argued that connecting course content to lived experience enhances comprehension and motivation. One instructor reflected that "you need to learn by doing" and warned that "academia is doing itself a disservice" by avoiding practical application (Interviewee 12). Another noted that education must move beyond content delivery by including community-based exposure, such as visits to justice-impacted spaces or conversations with formerly incarcerated individuals (Interviewee 5). This expands the definition of applied learning to include technical practice and civic and moral relevance. Reid et al. (2022) asserted that community-informed curricula are essential for preparing learners from diverse backgrounds, particularly those impacted by cannabis prohibition. These findings suggest that students leave programs with credentials without the confidence, fluency, or experience required for job placement.

Faculty and students also reported that employers remain skeptical of degrees or certificates lacking applied depth. One participant stated, "If they don't know someone already in the industry, the credential alone won't help" (Interviewee 9), highlighting how formal instruction often fails to translate into employment. Students who lack professional networks or prior exposure, particularly those from historically excluded communities, are disproportionately

affected by this gap. Davis et al. (2022) argued that equity requires intentional curriculum design and institutional investment, not assumptions about fairness or access. Without structured simulations, externships, or community-integrated instruction, public colleges cannot claim to prepare students adequately for entry into a tightly regulated field. Black (2020) urged higher education institutions to build pipelines that center skill-building and social accountability. To meet the goals of equity and workforce readiness, colleges must integrate real-world simulations, interdisciplinary labs, and external partnerships that mirror actual industry environments..

Implication 5: Limited experiential learning reinforces workforce inequity. Instructors consistently reported that even when students completed cannabis programs, employers remained skeptical about the real-world value of their credentials. While colleges provide cultivation, compliance, or dispensary management coursework, these offerings were rarely developed in collaboration with licensed businesses or regulatory professionals. Interviewees noted that advisory boards were inactive or symbolic, not calibrating course content to current hiring expectations (Interviewees 5, 6, 10). One participant explained that their program had not adapted to recent changes in compliance software or workflow practices, even though employers requested those skills. These concerns reflect the study's central problem: public colleges treat cannabis education as an emerging curiosity rather than a professional discipline requiring industry-informed design. As noted by Davis et al. (2022)**,** employer trust depends on curricular credibility, and when that trust is missing, dismissing credentials regardless of student effort.

This gap is particularly consequential for adult learners who enroll with clear employment goals. According to Knowles et al. (2015)**,** adult instruction must be immediately applicable and oriented toward problem-solving. When experiential learning is weak or absent, learners cannot build the situational fluency needed to succeed in technical roles. Merriam and

Bierema (2013) emphasized that motivation among adult learners depends on the relevance of course content to lived experience and career transition. Participants described how students often expressed frustration that they completed the program but still lacked the confidence or readiness to pursue industry positions (Interviewees 9, 11). These insights affirm Fink's (2021) argument that programs must demonstrate practical utility to attract and sustain adult learners. If students invest in training that fails to connect them to employment, the reputational damage affects individual opportunity and institutional credibility.

Participants also warned that the absence of employer-aligned instruction reinforces exclusion, especially for learners from historically marginalized communities. When programs rely on informal connections or assume that students can "network their way in," they reproduce the very inequities that cannabis education claims to challenge. Interviewee 9 explained that "if they don't know someone already in the industry, the credential alone won't help," highlighting how structural inattention becomes a barrier to mobility. Davis et al. (2022) argued that equitable workforce development must be intentionally designed, not assumed. Without partnerships, simulated practice, and job-aligned skill-building, credentials risk becoming symbolic rather than transformative. To serve students fully, colleges must reframe cannabis education as a site of accountability, where curriculum design reflects labor trends, community representation, and institutional responsibility to ensure that training leads to opportunity.

Systemic and Policy Implications for Public Institutions

This final theme shifts focus from curriculum design and instructional gaps to the broader institutional and policy conditions that shape the development of cannabis education programs. While instructors in this study consistently highlighted the need for applied learning and equity-centered practices, they also pointed to structural barriers beyond their control. Federal

prohibition, administrative risk aversion, and unclear state guidelines continue to limit how public institutions engage with cannabis programming. These systemic issues affect everything from course approval and public visibility to funding streams and compliance integration. Participants emphasized that colleges often want to support cannabis workforce development, but feel constrained by legal ambiguity and reputational risk. As a result, programs operate with limited institutional backing, making them difficult to sustain or scale. The following implication addresses how federal restrictions and institutional hesitation undermine legitimacy and innovation in public cannabis education.

Implication 6: Federal Restrictions Undermine Institutional Engagement. Participants across this study repeatedly raised concerns about how cannabis programs unintentionally exclude the very communities they aim to uplift. Despite stated goals to expand opportunity, instructors noted that enrollment trends often reflect students with prior exposure, insider knowledge, or professional networks in the cannabis space. Faculty described application and enrollment processes that subtly screen out justice-impacted students or those without academic confidence. One explained that forms "expect polished answers and prior experience," which filters out learners who bring lived experience but lack formal credentials (Interviewee 11). Vitiello's (2019) research underscores this risk, warning that colleges could replicate industry inequities if they do not construct purposeful access strategies. Without structures such as community outreach, foundational learning modules, or financial pathways, cannabis programs will continue to benefit the already connected and marginalize those historically excluded

This dynamic directly affects adult learners seeking relevant, supportive, goal-driven education. Knowles and colleagues (2015) emphasized that adult instruction should center on accessibility and applicability. Merriam and Bierema (2013) also cautioned that unclear goals or

disconnected content can weaken engagement, especially for first-generation students or those reentering education. Faculty in this study echoed these concerns. One reported that students often feel unsure "what this program even leads to," and described a recurring distrust or misalignment (Interviewee 7). Another shared that students "wanted to believe in the mission" but struggled when they felt unsupported academically or personally (Interviewee 4). These experiences highlight a gap between institutional vision and classroom realities. Unless colleges design intentional supports for nontraditional and justice-involved learners, they risk undermining the very legitimacy of cannabis workforce development.

Instructors also pointed to institutional hesitancy as a barrier to inclusion. Several described efforts to embed community voices or civic content into courses were stalled or denied by the administration. Administrators often rejected proposals to engage formerly incarcerated speakers, partner with advocacy groups, or host public events, citing legal caution or reputational fears (Interviewees 6, 9). Schulz and colleagues (2019) argued that emerging academic programs must foreground interdisciplinarity and ethical context, not just content mastery. When colleges avoid complex subjects such as criminalization, equity, and political history, they prepare students to meet job duties but not to lead change. Black (2020) reinforces this, urging public institutions to build an inclusive, mission-aligned curriculum that reflects the full complexity of workforce needs. If cannabis education continues to ignore access infrastructure and civic learning, its promise of inclusion will remain symbolic, rather than systemic

Table 4: Summary of Implications by Theme and Research Question Alignment

Theme	Implication	Summary	Impact
Theme 1: Structural and Instructional Barriers	**Implication 1** Fragmented academic structures hinder program coherence	Colleges often place cannabis curricula across departments without providing consistent	Institutional leaders, academic departments, and curriculum designers

Theme	Implication	Summary	Impact
Aligned to RQ1		oversight. This lack of structure makes it harder to adapt to regulatory changes or to deliver cohesive, career-connected learning experiences.	
	Implication 2: Institutional inertia and stigma limit program development	Instructors shared how stigma, risk aversion, and unclear pathways lead to underfunded and unstable programming. Despite student demand, many colleges hesitate to commit, leaving programs vulnerable to collapse.	Postsecondary administrators, policy boards
	Implication 3: Institutional barriers to program innovation	Public colleges are not functioning as centers of cannabis innovation. Programs often rely on one or two faculty champions without broader support or long-term investment, making sustained growth difficult.	Faculty, program chairs, community partners
Theme 2: Workforce Readiness Gaps Aligned to RQ2	**Implication 4**: Coursework lacks applied learning and industry alignment	Across sites, instructors reported that students are not gaining hands-on experience with the tools, skills, or compliance knowledge needed for the cannabis workforce. Most of the learning remains theoretical.	Students, employers, and training providers
	Implication 5: Limited experiential learning reinforces inequity	Without access to labs, externships, or role-play experiences, students, especially those from historically excluded communities, are left behind. The lack of experiential learning deepens existing inequities and creates barriers for	Marginalized students, licensing agencies, and equity advocates

Theme	Implication	Summary	Impact
		students seeking to enter the cannabis industry.	
Theme 3: Policy Constraints Relevant to RQ1 + RQ2	**Implication 6**: Federal restrictions and internal limits weaken institutional leadership	Colleges continue to approach cannabis cautiously, primarily due to federal illegality. But this caution, combined with limited funding and siloed departments, prevents public institutions from leading nationally or globally in cannabis education.	Federal and state agencies, higher education institutions, and public research systems

Evaluation of the Findings

The findings of this study confirm the central problem: that post-secondary cannabis education remains disconnected from the operational, regulatory, and social dimensions of the industry it aims to serve. Instructors revealed that fragmented academic structures, limited experiential learning, and minimal institutional support hinder the coherence and effectiveness of cannabis curricula. These concerns mirror broader challenges in workforce education identified by Colclasure and colleagues (2023), who emphasized that rapidly evolving industries demand integrated and responsive academic approaches. Yet, cannabis programs are often confined to continuing education or isolated departments, limiting their legitimacy and ability to prepare students for regulated roles. This disjointed placement contradicts the principles of adult learning theory articulated by Knowles and colleagues (2015), who stress transparency, relevance, and problem-centered instruction. Schulz (2019) argued that institutions must embed programs within their core structures to foster innovation, ensure accountability, and maintain long-term relevance. The findings advance Research Question 1 by demonstrating that the location and structure of cannabis programs directly influence their sustainability, curricular clarity, and the

degree of faculty coordination. These limitations disproportionately affect students from historically excluded backgrounds, thereby reinforcing the systemic inequities that legalization efforts claim to redress.

Beyond structural disorganization, the study also found that experiential deficits undermine program quality and workforce alignment. The absence of applied learning in cannabis programs creates a critical barrier to workforce readiness. Students often graduate with theoretical knowledge but limited exposure to practical tools such as seed-to-sale systems, yield reporting software, and compliance audits. Merriam and Bierema (2013) and Knowles and colleagues (2015) explained that adult learners thrive when educators align experiential instruction with real-world responsibilities. Faculty in this study noted the lack of mock dispensaries, compliance simulations, and externships, which leaves students underprepared for the operational and regulatory realities of cannabis employment. This gap is especially pronounced for learners without personal networks or prior exposure to the industry—those who most depend on public colleges to facilitate career entry. Black (2020) argued that when programs offer only conceptual access without technical practice, they risk symbolic inclusion without substantive opportunity. Vitiello (2019) similarly warned that exclusionary practices rooted in the legacy of drug policy continue to shape workforce access. These findings confirm that without targeted, hands-on training structures, institutions risk perpetuating the very disparities cannabis legalization intends to dismantle.

The data also show that institutional hesitation to embrace cannabis education entirely stems from both lingering stigma and unresolved legal contradictions between state and federal policy. Faculty reported sustained internal advocacy to legitimize cannabis instruction, often in the absence of institutional support or vision. Programs lack consistency in goals, content, and

delivery without a coordinated framework. This fragmentation reflects a broader leadership vacuum that prevents colleges from adapting to shifting policy conditions or labor demands. Montgomery and Allen (2023) cautioned that when institutions fail to align with cannabis policy reform, private or unaccredited providers quickly outpace them. The findings reinforce the purpose of this study: to examine how post-secondary programs can evolve beyond piecemeal offerings toward strategic, equity-oriented workforce development. This research contributes to the existing literature by documenting how faculty navigate institutional uncertainty in an emerging field where policy, pedagogy, and stigma intersect. Without bold leadership, aligned curricula, and structured field access, public colleges will continue to fall short of their mission to provide accessible, high-quality cannabis education.

Recommendations for Practice

This study finds that post-secondary cannabis education in the United States remains fragmented, under-resourced, and disconnected from the operational and regulatory needs of the cannabis workforce. While interest in cannabis-related careers continues to rise and legalization expands across states, institutions have not adequately invested in structural alignment or curricular coherence. Faculty participants described designing courses in isolation, navigating evolving legal landscapes without institutional support, and struggling to prepare students for compliance, operations, and regulation jobs. Many programs remain confined to non-credit or continuing education divisions, which diminishes their legitimacy and leaves students with few guided pathways into employment. These challenges disproportionately affect adult learners and students from historically marginalized communities, who often rely on public colleges as accessible entry points into new and emerging industries. As noted in the problem statement and

throughout the findings, this disjointed approach undermines the promise of equitable workforce development and the goals of cannabis legalization.

Responding to these conditions requires more than curricular updates or content expansion, it demands systemic change. The recommendations below emerge directly from the two central research questions guiding this study: how cannabis programs are structured (RQ1), and whether they prepare students for workforce participation and mobility (RQ2). Each recommendation is grounded in the lived experiences of instructors who serve as curriculum designers, mentors, and institutional advocates in the absence of formal infrastructure. The recommendations are grounded in findings on program design, applied learning, institutional structures, and reinforcing research presented in Chapter 2. They provide concrete, evidence-based actions that institutions can take to increase equity, improve instructional quality, and respond to labor market expectations. These recommendations are organized thematically, with each section linking institutional practice to research implications and broader theoretical frameworks. Collectively, they offer a roadmap for transforming cannabis education into a sustainable, credible, and inclusive part of the post-secondary landscape.

Recommendation 1: Establish Cannabis Departments to Guide Curriculum and Access

Colleges should establish Cannabis Studies departments that lead curriculum development, coordinate faculty hiring, and build interdisciplinary programs covering the full range of cannabis-related fields. These departments should offer credit-bearing courses that extend beyond basic retail skills and incorporate content from health sciences, law, engineering, sustainability, packaging design, regulatory technology, and public policy. Creating a formal department elevates cannabis education within the academic structure and provides students with supported and structured pathways to employment. Programs without this centralized leadership

often reflect fragmented efforts by individual faculty rather than a cohesive institutional strategy. This decentralized model contributes to unclear outcomes and reduced legitimacy, especially for students from historically excluded communities who often lack external networks to navigate employment opportunities.

This recommendation addresses Implication 1 by responding to the lack of a unified academic structure guiding cannabis curriculum. Throughout the study, the faculty described the absence of oversight, coordination, and shared curricular frameworks hindering innovation and program growth. Establishing a dedicated department creates internal visibility, builds institutional legitimacy, and ensures consistent program delivery. These organizational features are essential for adult learners who rely on transparency and structured guidance in postsecondary environments (Knowles et al., 2015; Merriam & Bierema, 2013). In addition to supporting faculty and students, a formal department can oversee research initiatives, student advising, community engagement, and curricular expansion, addressing Research Question 1 about how cannabis programs are designed and maintained. This recommendation also connects directly to the problem statement, which identified the disconnection between program structure and workforce preparation. Governance scholars such as Colclasure et al. (2023) and Scheuer (2020) have emphasized that emerging academic fields require institutional investment and strategic oversight to achieve sustainable development. Without that foundation, colleges risk reinforcing the inequities that cannabis legalization intended to dismantle, particularly by marginalizing the very students that education reform aims to serve. This recommendation echoes Scheuer (2020), who emphasized that legitimacy in cannabis programming depends on departmental support, and Black (2020), who found that fragmented program structures limit curricular alignment with industry evolution

Recommendation 2: Strengthen Faculty and Curriculum Support

Colleges must commit to sustained faculty development if cannabis programs are to become consistent, relevant, and responsive to industry demands. Participants described how faculty members frequently operate without access to curriculum planning teams, instructional designers, or institutional briefings on regulatory changes. This lack of coordinated support creates highly variable course content across institutions and forces individual instructors to adapt lessons independently as laws or industry expectations shift. These conditions align directly with Implications 2 and 3, where participants noted that institutional hesitation, legal ambiguity, and fragmented leadership often leave faculty without the tools or time necessary to ensure program coherence. Instructors in this study spoke about designing lessons with little collaboration, using personal research to stay current, and receiving minimal support from senior leadership, patterns that result in instructional inconsistency and hinder innovation. These findings reveal a critical gap in how colleges operationalize workforce education in emerging fields and underscore the need for shared curriculum repositories, interdisciplinary design sessions, and formalized feedback cycles.

The literature in Chapter 2 reinforces that infrastructure and institutional vision are foundational to adult education and workforce alignment. Knowles and colleagues (2015) emphasized that adult learners require transparent, timely, and problem-centered instruction that evolves alongside industry needs. Without systems to support curriculum evaluation, policy adaptation, or cross-departmental collaboration, cannabis education becomes reactive and incomplete. Montgomery and Allen (2023) found that emerging programs often stagnate when dependent solely on faculty initiative. Colclasure and colleagues (2023) warn that insufficient instructor support compromises a program's long-term credibility. Participants in this study

recommended professional development tailored to cannabis compliance, access to legal consultation, and scheduled opportunities to revise curricula in line with industry change. Without these systems, course quality will depend on individual faculty effort rather than institutional strategy, leaving students underprepared and eroding trust in public sector cannabis education. These concerns align with Colclasure et al. (2023), who warned that over-reliance on individual instructor labor fosters burnout and undermines long-term curricular innovation. Investing in robust faculty support signals institutional commitment to program excellence and ensures that instruction reflects this evolving sector's complexity and urgency.

Recommendation 3: Expand Experiential Learning and Simulation-Based Access

Colleges must embed experiential learning throughout cannabis curricula to ensure students build the technical fluency, applied knowledge, and situational confidence needed for success in regulated environments. As noted by Educause (2023), immersive simulations can provide equitable and scalable access to complex learning environments, especially in regulated industries where direct experience is constrained.This recommendation is grounded in specific findings where participants reported that students often lacked experience with compliance workflows, inventory systems, and operational standards that define cannabis-sector employment. These instructional gaps disproportionately impact students who lack industry exposure, particularly those from historically excluded communities. Institutions should implement applied learning strategies, including simulated compliance audits, virtual seed-to-sale tracking exercises, and mock dispensary interfaces. AI-powered tools offer scalable solutions by replicating operational environments that mirror the nuances of cannabis regulation without requiring direct plant handling. These suggestions reflect participant experience and Chapter 2 literature, emphasizing applied learning as a core requirement for adult student

success. Educause (2023) noted that immersive technologies can deliver adaptive, real-time feedback and increase engagement with complex, rule-bound tasks. These tools can ensure that learners gain hands-on practice despite legal or geographic limitations.

This recommendation directly responds to Implications 4 and 5, which identified limited access to experiential training as a barrier, reinforcing workforce exclusion and program inequity. It also aligns with Research Question 2, which explored how institutions support employment readiness through curriculum design. Taylor and Kroth (2009) argued that adult learners require practice opportunities, reinforcing relevance, and immediate applicability. Merriam and Bierema (2013) added that instruction must reflect real-world responsibilities to promote motivation and comprehension. Without applied learning structures, students often graduate with theoretical knowledge but limited technical preparation, leaving them disadvantaged in interviews and early employment. Institutions integrating applied models into formal coursework, not just supplemental activities, can close this preparation gap. When supported by interdisciplinary design and community-informed implementation, experiential learning becomes a critical strategy for improving workforce alignment, student confidence, and equitable access to cannabis careers.

Recommendation 4: Strengthen Cannabis Education Through Student Access

Colleges must design cannabis education programs that reflect the whole ecosystem of the industry while offering accessible entry points for students with limited exposure or prior experience. A comprehensive cannabis curriculum should include pathways into diverse areas such as compliance, education, cultivation, logistics, law, and product development. Institutions should provide stackable credentials, noncredit options, and flexible learning formats that remove traditional entry barriers like prior industry knowledge, upfront capital, or geographic

access. Interviewee #12 emphasized that “students without networks won’t break in unless schools make that possible,” pointing to institutional responsibility for reducing entry obstacles. Interviewee #8 explained that outdated program information or unclear enrollment processes further discourage students from facing systemic barriers. These access issues align with the Cannabis Workforce Initiative (2021), which called on institutions to intentionally design inclusive workforce pipelines that account for prior criminalization and systemic marginalization. This initiative aligns with broader literature (Reid et al., 2024; Scheuer, 2020) calling for intentional, equity-centered access pathways that consider systemic disadvantage. By creating clear and supported pathways into cannabis education, colleges can equip students from historically excluded communities to access meaningful, long-term careers.

This recommendation builds directly on Implication 5 and responds to Research Question 2, which asks whether current instruction adequately prepares students for participation in a sustainable and inclusive workforce. Interviewee #5 noted that licensing delays, financial barriers, and unclear background check policies often prevent students from advancing into internships or licensing preparation. When institutions fail to address these barriers, they reinforce the same inequities that cannabis legalization aims to repair. Scheuer (2020) and Reid et al. (2024) urge institutions to design education programs in regulated fields that prioritize transparency, adapt to evolving industry needs, and reflect the lived experiences of the communities most impacted by systemic exclusion. Additionally, Merriam and Bierema (2013) emphasized that adult learners succeed when instruction aligns with their lived experiences and immediate goals. Institutions that invest in accessible, multi-entry program models expand enrollment and promote equity and economic mobility. Without intentional access strategies, colleges will continue to overlook the very learners’ cannabis education claims to empower.

Recommendations for Future Research

This study revealed persistent structural and curricular gaps in how public post-secondary institutions design and sustain cannabis education programs. While participants shared innovative practices, they also described the absence of consistent departmental oversight, dedicated planning structures, and applied learning frameworks necessary for long-term impact. These findings respond directly to Research Question 1 and suggest that institutional context, not just faculty effort, shapes program coherence and workforce alignment. Future research should investigate how internal governance, accreditation standards, and cross-departmental policy affect the development and sustainability of cannabis education. Schulz (2019) argued that institutional legitimacy and strategic support are essential for emerging academic fields. Colclasure et al. (2023) further emphasize that innovation cannot depend solely on individual initiative without risking burnout or stagnation. Studies that examine administrative models, budget frameworks, and policy implementation across diverse colleges would help clarify the mechanisms that enable or constrain meaningful cannabis curriculum development.

In addition to program design, future research should investigate the outcomes and lived experiences of students enrolled in cannabis programs, particularly those from communities historically impacted by prohibition, aligning with Research Question 2, which examined whether current instruction prepares students for equitable workforce participation. While this study surfaced instructor concerns about access, relevance, and post-graduation readiness, there is limited evidence on how students experience program quality, career progression, or employer recognition. Longitudinal studies could track employment outcomes, credential utility, or transitions into formal cannabis roles. Knowles et al. (2015) and Merriam and Bierema (2013) emphasized that adult learners succeed when programs are timely, applicable, and grounded in

lived experience. Reid et al. (2024) also called for deeper integration of community-informed education models in regulated industries. Future research should explore whether cannabis programs deliver not only content mastery but also confidence, professional identity, and economic mobility, especially for those without prior access to the field.

Recommendation 1: Study Institutional Structures and Cannabis Program Models

To advance the field of cannabis education, researchers should explore how institutional models influence the placement, legitimacy, and sustainability of cannabis programs across academic settings. This focus stems directly from participant accounts of disjointed course development, decentralized leadership, and the absence of structured departmental support. This line of inquiry directly addresses findings from this study, where participants described building courses without shared frameworks, departmental coordination, or centralized oversight, often relying on individual initiative rather than institutional infrastructure. This finding also reflects Black's (2020) argument that unclear program governance contributes to misalignment between curriculum and real-world cannabis workforce needs.These conditions reflect structural fragmentation identified in Implications 1, 2, and 3, which showed that disconnected program design and minimal faculty support undermine instructional consistency and curriculum alignment. Scholars should investigate how different placement models, such as stand-alone departments, interdisciplinary centers, or continuing education divisions, shape curriculum development, workload distribution, and instructional quality. Doing so would deepen understanding of how institutional context influences program legitimacy, resource allocation, and student preparedness for cannabis-related employment.

This recommendation responds to Research Question 1, which explored how cannabis programs are structured and sustained across institutional contexts, and builds on the problem

statement by proposing a focused examination of administrative design as a driver of program equity and effectiveness. Black (2020) highlighted the expanding need for professionals with advanced cannabis-related credentials and called on institutions to redefine faculty expertise and program legitimacy in fields lacking licensure standards. Schulz (2019) added that colleges must embed emerging disciplines within structures that enable curriculum renewal and innovation if they wish to remain responsive to evolving industries. Future studies could compare institutional approaches across two- and four-year institutions, public and private systems, and across states with varying cannabis regulations to determine which structures best support scalable and equitable cannabis education. Researchers should also explore how colleges develop faculty hiring criteria, invest in long-term curriculum planning, and define quality in a sector where policy, industry needs, and social equity considerations intersect. These studies would contribute to a growing knowledge base on institutional design and offer actionable insights into how colleges can build cannabis education programs that are credible, comprehensive, and accessible to learners historically excluded from workforce pipelines.

Recommendation 2: Examine Experiential Learning and Workforce Preparation

Researchers should investigate how hands-on instruction and applied learning shape student readiness for the cannabis workforce. Given participant concerns about the lack of simulation-based training, externships, and exposure to cannabis-specific technologies, this line of inquiry offers valuable insight into instructional gaps affecting career outcomes. Studies should evaluate the availability and impact of externships, simulation-based instruction, compliance labs, and hands-on use of cannabis-specific tools such as seed-to-sale software or point-of-sale systems. Instructors in this study shared that students often graduate without interacting directly with these tools, leaving them underprepared to meet workforce demands.

This finding mirrors the study's limitation that it did not evaluate student outcomes directly, such as whether current instructional models support job placement, skill acquisition, or confidence in professional environments. Additional research should examine how colleges build partnerships with licensed businesses, regulatory agencies, and training centers to facilitate applied instruction, particularly in states where direct cannabis handling remains restricted. Scholars might explore which experiential methods most effectively foster technical fluency across sectors like compliance, manufacturing, or public health, and assess whether students feel more confident and career-ready after participating in such opportunities. These investigations would address one of the core findings in this study: that students, especially those without prior industry exposure or professional networks, struggle to translate classroom knowledge into regulated workplace environments. Taylor and Kroth (2009) highlighted that adult learners are best served through experiential engagement that bridges classroom learning and workforce demands, a core gap revealed in this study.

This recommendation builds on Implications 4 and 5, which identified the absence of experiential learning as a significant barrier to workforce preparation. It also responds to Research Question 2, which asked whether instructional practices provide adequate exposure to the tools and environments used in the cannabis industry. Merriam and Bierema (2013) found that adult learners benefit from applied learning that supports skill acquisition tied to tangible employment outcomes. Colclasure and colleagues (2023) also emphasized that programs risk becoming disconnected from real-world industry demands without embedded experiential opportunities, particularly in fast-moving fields. Scheuer (2020) noted that practice-based education enhances student performance and adaptability in regulated sectors. By grounding research in instructional strategy and student experience, future studies can offer more precise

guidance to institutions seeking to implement scalable, equity-oriented workforce models. By identifying successful experiential frameworks, researchers can inform program improvements that better prepare students and promote equitable participation in cannabis careers.

Recommendation 3: Investigate Access and Workforce Outcomes

Understanding the pathways and obstacles that shape student access to cannabis education remains essential for future inquiry. Researchers should explore how cannabis programs support or restrict participation among students who are new to the industry or affected by the collateral consequences of prior criminalization. These studies should evaluate how tuition costs, credentialing structures, licensing policies, and student support services influence enrollment, persistence, and graduation outcomes. In this study, instructors highlighted concerns about students receiving outdated information, lacking access to guidance, and struggling to navigate institutional or regulatory systems. These concerns reflect structural limitations identified in Implication 5. Researchers could analyze how colleges design flexible entry routes, including modular certificates, community-based training, or noncredit pathways, especially for learners without prior cannabis exposure. Comparative studies that examine differences across states, institutional types, or policy environments can reveal how state laws and educational models shape opportunity.

This recommendation expands on the study's findings and directly supports Research Question 2 by examining how cannabis programs affect access and post-graduation outcomes for diverse student populations. Participants noted that students without financial resources, legal clarity, or industry networks face disproportionate challenges. Merriam and Bierema (2013) emphasized that adult learners thrive when relevant instruction aligns with lived experience. Reid et al. (2024) argued that education systems must actively dismantle exclusionary barriers to

build equitable pipelines into emerging industries. In addition, Montgomery and Allen (2023) cautioned that programs lacking inclusive design may unintentionally reinforce the same inequities that cannabis reform efforts seek to address. Longitudinal research tracking student progression into licensure, employment, or ownership could offer critical insight into how education programs translate into mobility. These findings would help institutions design programs beyond expanding access and ensure students achieve long-term success and participation in the cannabis workforce. As Reid et al. (2024) and Montgomery & Allen (2023) affirm, programs must intentionally disrupt traditional barriers and redesign credentialing models with inclusion at their core.

Study Summary

This study examined how post-secondary instructors shape and interpret cannabis education, especially in ancillary fields like business, law, healthcare, and policy. Grounded in adult learning theory and informed by the voices of twelve faculty members from diverse institutions, the research focused on how instructors create curriculum in a space still struggling for academic legitimacy. These participants taught in community colleges, four-year universities, and certificate programs. Their experiences revealed a growing yet fragmented field, where many instructors build courses independently, manage compliance independently, and receive little support from their institutions. The study addressed a core problem: current curricula often fail to meet the workforce demands of the cannabis industry. Faculty described how gaps in institutional structure and resources weaken program quality and limit students' preparation for real-world careers, especially for those from historically excluded backgrounds.

Instructors consistently described working in isolation. They created course content without collaboration, struggled with inconsistent guidance, and lacked recognition for their

contributions. This isolation led to wide variation in how institutions delivered programs, which made it harder to ensure academic quality or workforce alignment. Faculty urged institutions to provide more decisive leadership, clearer standards, and formal validation for cannabis education. They also highlighted a significant concern: most students do not receive the needed applied learning. Without hands-on experience in compliance, cultivation, or operations, students enter the field underprepared. Instructors emphasized that experiential learning must be a central part of curriculum design, not an optional supplement, if programs hope to meet the demands of a dynamic and highly regulated industry.

In addition to instructional gaps, instructors raised concerns about access and equity. Many questioned whether cannabis programs truly support students affected by criminalization or those from marginalized communities. They identified persistent barriers such as high program costs, limited outreach, and curricula that often exclude diverse lived experiences. Faculty called on institutions to partner with communities, remove financial obstacles, and design content that reflects student realities. Despite these structural challenges, instructors demonstrated unwavering commitment to their students and the field. They advocated for more than functional training; they championed education as a pathway toward opportunity, justice, and innovation.

This research shifts the conversation from industry or policy to the classroom, where the future of cannabis education truly takes shape. Instructors lead this transformation daily but cannot sustain it alone. Institutions must invest in program infrastructure, professional development, and long-term planning. Future researchers should continue exploring how systems influence instruction, how applied learning affects job readiness, and whether current models truly expand access. Cannabis education must evolve from a scattered response to legalization

into a coherent and inclusive academic discipline. It must serve learners and communities, not just employers. These insights underscore that faculty are not just adapting to a new field—they are building it. Their work shows that the classroom can be a powerful site of legitimacy, equity, and transformation. These efforts support the shift from cannabis as an informal industry to cannabis as a formalized profession, one that demands academic rigor, ethical standards, and inclusive access to opportunity.

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Appendix A -Interview Protocol

Hello, and thank you for agreeing to participate in this interview today. My name is Brandi L. Hester-Harrell, and I am a doctoral student at National University (formerly Northcentral University). This interview is expected to last approximately 45-60 minutes. I will be recording our discussion and taking notes to ensure I have complete information. Your responses will be held in confidence.

Sample Consent: I would like to review the consent letter with you before we begin the interview. Do you agree to participate in the study?

- Participant: Yes _____ or No _____

Lead into the Interview: Thank you. I am interested in understanding instructors' perceptions of cannabis ancillary curricula in post-secondary education, specifically how these curricula align with industry needs and promote sustainability. This information will remain confidential, and your individual answers will not be shared with anyone. Your perspectives and experiences are critical to this research. Do you have any questions before we get started?

Research Activities: In this study, participants will:

- Participate in a semi-structured interview lasting approximately 45-60 minutes, conducted virtually via Zoom.
- Review the transcript of their interview for accuracy and provide clarifications if needed, which will take approximately 10-15 minutes and occur remotely.

Debriefing Questions:

1. Do you have any questions or concerns following our discussion?

2. Is there anything you would like to add or clarify about your experiences or the topics we covered?

Thank you again for your time and valuable insights!

Appendix B- Interview Questions

Background Questions:

1. Can you please share your full name and preferred contact information (email or phone)?
2. How many years have you been teaching at the post-secondary level?
    - Less than 5 years
    - 5-10 years
    - More than 10 years
3. Have you taught any courses related to cannabis studies?
    - Yes
    - No
4. If yes, what type of cannabis-related courses have you taught?
    - Plant-touching (e.g., cultivation, biology)
    - Ancillary (e.g., law, business, policy, regulation)
    - Both
5. How familiar are you with cannabis regulations and industry standards?
    - (Rate on a scale of 1-5, with 1 being “Not familiar” and 5 being “Very familiar.”)
6. What type of post-secondary institution are you affiliated with?
    - Community College
    - University
    - Certificate-based program
    - Other [Specify]

Core Questions:

7. Can you briefly describe your experience teaching cannabis-related curricula, especially ancillary courses?
8. What role do you think cannabis education programs play in preparing students for careers in the cannabis industry?
    - **Probing Questions:**
        - Could you share an example of how your program has helped students secure jobs or succeed in the industry?
        - ***For example,* I** think these programs play a foundational role. For example, one of our courses focuses on compliance, and I know a recent graduate who leveraged that knowledge to land a role as a compliance officer for a dispensary. They've told us it made all the difference in understanding the regulatory landscape.
9. How do you perceive the alignment of your institution's cannabis curricula with the industry's sustainability needs?
    - **Probing Questions:**
        - Are there any specific areas where you think your program addresses sustainability well or areas where it falls short?
        - ***Example -*** Some programs address sustainability by teaching eco-friendly cultivation practices, such as reducing energy consumption in grow facilities. However, I feel we could do more in social areas, especially when preparing students to understand and advocate for inclusive industry policies.

10. Do you feel that the current courses provide students with the necessary knowledge and skills for sustainability in the cannabis sector? Can you give an example?
11. What aspects of the current curricula align with industry expectations, particularly regarding sustainability and compliance?
12. In what ways do you perceive the current coursework is adequate or inadequate in preparing students for sustainable roles in the cannabis industry?
13. What specific skills or knowledge areas are well-covered or lacking in the existing cannabis programs?
    - **Probing Questions:**
        - How well do you think the curriculum addresses the historical and regulatory context of cannabis, such as its legalization and evolving laws?
        - What skills must students develop to meet workforce demands and adapt to regulatory changes?
        - *Example*- Some programs might cover the history of cannabis legislation extensively but fail to teach students about evolving compliance and regulatory requirements that are key to the current industry.
14. What key challenges do students face in gaining practical, industry-relevant skills from cannabis education programs?
    - **Probing Questions:**
        - Are there gaps between the theoretical knowledge taught in the classroom (e.g., regulatory compliance, historical context) and the practical skills required in today's workforce?

    - How do you think the curriculum can better prepare students for the hands-on roles in the industry and the regulatory challenges they will face?
    - *Example* - For instance, students might understand the legal framework but need help applying it when they enter roles that require day-to-day compliance management in cultivation or dispensary operations.

15. What improvements or changes would you suggest for post-secondary cannabis curricula to meet the industry's evolving needs better?
    - **Probing Questions:**
        - How can the curriculum better integrate historical, regulatory, and workforce development content to equip students for future roles in the cannabis industry?
        - What additional skills or topics should be introduced to address the evolving industry landscape and regulatory requirements?
        - *Example* - For example, a course that combines cannabis entrepreneurship with regulatory compliance could help students launch businesses that adhere to local and federal laws while also understanding industry trends and innovations.
16. How do you think educational institutions can contribute to the long-term sustainability, regulatory compliance, and workforce development of the cannabis industry?
    - **Probing Questions:**
        - How can educational institutions help balance historical knowledge, regulatory awareness, and workforce readiness to ensure students are fully prepared for the industry's future?

- In what ways could programs better support the industry's goals for sustainability, compliance with regulations, and building a skilled workforce?
- *Example*- For instance, institutions could develop partnerships with cannabis regulatory bodies, giving students real-time insights and updates on compliance standards and how they intersect with sustainable practices in the cannabis sector.