

FOSTER YOUTH ACHIEVEMENT IN POST-SECONDARY EDUCATION

by
Dang H. Huynh

A dissertation submitted to Johns Hopkins University in conformity with the requirements for
the degree of Doctor of Education

Baltimore, Maryland
March 2023

© 2023 Dang H. Huynh
All rights reserved

Abstract

This study explores the achievement gap of foster youth at a community college with one of the largest populations of foster students in a western state of the United States. This author used a mixed-methods design to identify the most salient factors that could contribute to the achievement of foster youth in context. The study included 109 foster students. The results showed that on average, 58% of foster youth experienced economic hardships. Eighty percent of them lacked social support. Most only accessed the Financial Aid and Scholarships Office and the Counseling Center, while the community college had at least 16 campus services. Unexpectedly, 76% of foster youth indicated they did not access the Guardian Scholars Foster Youth program when this service was designed for them. The qualitative data reflected similar findings. The lack of social support among foster youth was the most common challenge that foster students faced when they pursued their educational goals at the community college. To address this barrier, this author proposed a faculty learning community (FLC) to create a more supportive learning environment for all learners. The FLC focuses on the brain-targeted teaching model while including aspects of multicultural education and the universal design for learning in the emotional climate.

Keywords: foster youth, achievement gap, community college, faculty learning community, the brain-targeted teaching model

Primary Reader and Advisor: Bob Hughes, Ed.D. and Deanna Sands, Ed.D.

Secondary Reader: Christine Eith, Ph.D.



Doctor of Education Program
Dissertation Approval Form

Student's Name: Dang Huynh

Date: 3/14/23

Dissertation Title:

Foster youth achievement in post-secondary education

The student has made all necessary revisions, and we have read and approve this dissertation for submission to the Johns Hopkins Sheridan Libraries as partial fulfillment of the requirements for the Doctor of Education degree.

Dr. Deanna J Sands

Deanna Sands

March 14, 2023

Adviser

Signature

Date

Dr. Bob Hughes

Signature

March 14, 2023

Committee Member

Date

Dr. Christine Eith

Signature

March 14, 2023

Committee Member

Date

Committee Member

Signature

Date

Dedication

To my parents, Phieu and Thien, and my Mama Bear, Susan.

Acknowledgments

I want to thank my advisor, Dr. Deanna Sands, for her patience and guidance. I am thankful to receive advice from my committee members: Dr. Christine Eith and Dr. Bob Hughes. I am also grateful to have an extremely supportive executive sponsor: Dr. Jill Zimmerman. Likewise, I want to thank Dr. Barbara Fredette for her support. Similarly, I am forever indebted for the unending support and guidance of my former adviser, Dr. Donald Jacobs. However, the path I am traveling on would have been impossible without Dr. Susan Lowry, my Mama Bear, who introduced me to the world of teaching, where I have found my passion. Additionally, I want to thank my friends in this program. Lastly, I am extremely fortunate to receive my family's unending love and support.

Table of Contents

Abstract.....	ii
Dedication.....	iv
Acknowledgments.....	v
List of Tables	x
List of Figures.....	xi
Executive Summary	1
Problem of Practice.....	1
Contributing Factors	1
Context.....	2
Needs Assessment	2
Faculty Learning Community on Creating Supportive Learning Environments.....	3
Reflection on the Doctoral Journey and Future Plan.....	4
Chapter 1 Problem of Practice and Literature Review	5
Problem of Practice.....	10
Theoretical Framework.....	11
Factors Contributing to Foster Youth Achievement.....	16
Foster Care Placements and Associated School Moves	17
Trauma and Foster Youth.....	20
Mental Health Issues in Foster Youth	23
Coping Mechanisms With Trauma and Mental Health Illnesses	25
Economic Hardships and Foster Youth	29
Early Parenthood and Foster Youth	32
Family Support and Foster Youth	34
Social Support of Youth in Care	36

College-Readiness of Youth in Foster Care	39
Summary.....	40
Conceptual Framework.....	42
Conclusion.....	43
Chapter 2 Needs Assessment.....	44
Context of the Study	44
Statement of the Purpose	46
Research Questions (RQs).....	48
Research Design	48
Methods	49
Participants	49
Instrumentation.....	52
Procedure	54
Data Collection.....	54
Data Analysis.....	55
Findings and Discussion	58
Academic Background	58
Economic Barriers	59
Social Support	65
The Most Useful Services	67
The Least Useful Services	69
The Desired Services	70
Limitations.....	73
Conclusion.....	74
Chapter 3 Supportive Learning Environments	76

Creating Supportive Learning Environments for Adult Learners	79
Multicultural Education.....	79
Universal Design for Learning	86
The Brain-Targeted Teaching Model	92
Procedure for the Faculty Professional Development	103
Content	107
Process	109
Summary.....	111
Conclusion.....	111
Reflection on Doctoral Journey and Future Plan.....	112
The Doctoral Journey	112
Future Plans	114
References.....	115
Appendix A Descriptions of School Services.....	143
Appendix B Survey Questions.....	145
Background Information.....	145
Experiences and Perceptions of Campus Services	146
Appendix C The Codebook for the Most Useful, Least Useful, and Desired Services Perceived by Foster Youth.....	148
Appendix D Content and Activities of the Faculty Learning Community on Creating Supportive Learning Environments for Adults	155
Appendix E Agendas and Contents of the Modules	160
Module 1	160
Module 2.....	164
Module 3.....	167
Module 4.....	170

Module 5	172
Module 6	175
Module 7	178
Appendix F Samples of Presentations for Modules 1, 3, and 7	180
Slides for Module 1	180
Slides for Module 3	191
Slides for Module 7	197
Appendix G Evaluating the Implementation of the Brain-Targeted Teaching Model (BTTM) Forms	202
Appendix H Faculty’s Experiences with the ME, UDL, and BTTM Frameworks	208

List of Tables

Table 2.1. Participant Demographics.....	51
Table 2.2. Academic Majors of Foster Youth.....	52
Table 2.3. Descriptive Statistics for the Perceived Economic Hardships of Foster Youth	60
Table 2.4. Descriptive Statistics for College Services That Foster Youth Used	61
Table 2.5. Difference Between Current and Former Foster Youth on Perceived Economic Hardships and Perceived Social Support.....	63
Table 2.6. Difference Between Married and Single Foster Youth on Perceived Economic Hardships and Perceived Social Support.....	63
Table 2.7. Difference Between Female and Male Foster Youth on Perceived Economic Hardships and Perceived Social Support.....	63
Table 2.8. Difference Between African American and Hispanic or Latino Foster Youth on Perceived Economic Hardships and Perceived Social Support	64
Table 2.9. Difference Between African American and White (non-Hispanic) Foster Youth on Perceived Economic Hardships and Perceived Social Support	64
Table 2.10. Difference Between Hispanic or Latino and White (non-Hispanic) Foster Youth on Perceived Economic Hardships and Perceived Social Support	64
Table 2.11. Descriptive Statistics for the Perceived Social Support of Foster Youth	65
Table 2.12. Spearman Rho Correlation for Perceived Economic Hardships and Perceived Social Support of Foster Youth.....	67
Table 2.13. The Top Three Services That Foster Youth Found Most Useful, Least Useful, and Wanted to Have.....	68
Table 3.1. The Universal Design for Learning Framework.....	87

List of Figures

Figure 1.1. The Ecological Systems Theory for Foster Youth	11
Figure 1.2. Factors That Contribute to the Achievement of Foster Youth	43
Figure 3.1. The Multicultural Education Framework	81
Figure 3.2. The Brain-Targeted Teaching Model Framework.....	93
Figure 3.3. The Creating Supportive Learning Environments for Adult Learners Framework	104

Executive Summary

Foster youth are one of the most marginalized groups nationally and internationally (Boddy et al., 2020; Clemens et al., 2018; Hansson & Gustafsson, 2020; Hogan, 2018; Morton, 2016; Okpych & Courtney, 2018a, 2018b, 2019; Olsen & de Montgomery, 2018; Watt et al., 2019). Within the United States, foster youth achievement gaps exist in the K–12 system and higher education (Clemens et al., 2018; Hogan, 2018; Morton, 2016; Okpych & Courtney, 2018a, 2018b, 2019; Watt et al., 2019). This dissertation focuses on foster youth’s achievement gaps at a community college in a western state of the United States. The study’s objective is to improve foster students’ learning outcomes. The following sections provide an overview of the problem of practice, the factors that can contribute to foster youth achievement, the context of the study, the needs assessment, and a discussion of a faculty learning community on creating supportive learning environments for adult learners.

Problem of Practice

In this study, foster youth have one of the largest achievement gaps at community colleges. For example, their retention rate (82.25% vs. 86.91%) and success rate (56.75% vs. 70.31%) for credit courses were lower than their peers, respectively (California Community Colleges Chancellor’s Office [CCCCO], 2019b, 2019d). Passing credit courses is essential for foster youth to obtain a certificate, graduate, or transfer to a 4-year institution.

Contributing Factors

The literature shows that the number of foster care placements and school moves, trauma, mental health, coping mechanisms, economic hardships, early parenthood, family support, social support, and college readiness can contribute to the achievement of foster youth. Although the foster care system aims to protect children from harm, it can unintentionally hurt foster students’

learning outcomes due to numerous foster care placements (Chambers et al., 2018) and the associated school moves (Clemens et al., 2016). Additionally, the tragic events that foster youth experience can lead to trauma (Steenbakkers et al., 2019). With traumatic experiences, many foster students face mental health issues (Morton, 2018; Okpych & Courtney, 2018a). The different mechanisms that foster students choose to cope with their mental health conditions can impact their academic performance (Morton, 2018; Steenbakkers et al., 2019).

Moreover, foster youth can encounter financial hardships (Clemens et al., 2017a; Heyman et al., 2020; Kelly, 2020; Okpych & Courtney, 2018a; Skobba et al., 2018; Tobolowsky et al., 2019). They can also experience early parenthood (Combs et al., 2018; Shpiegel & Cascardi, 2018). Most foster students lack family support (Chambers et al., 2018; Cheung et al., 2019; Hill & Peyton, 2017; Skobba et al., 2018) and social support (Best & Blakeslee, 2020; Clemens et al., 2017a; Heyman et al., 2020). Due to the many challenges that foster youth encounter, they may not be ready for college (Okpych & Courtney, 2018a; Sandh et al., 2020; Unrau et al., 2017).

Context

The context of this study is a community college in a western state. According to the data of CCCCCO (2019c), the community college serves one of the state's largest populations of foster youth. The college has at least 16 campus services to enhance students' educational experiences. One program designed for foster students is the Guardian Scholars Foster Youth program. This program connects foster youth to other services on campus and resources in local areas.

Needs Assessment

The needs assessment was done to identify the most salient factors that could influence foster youth's achievement. The needs assessment explored the academic background, the

perceived economic hardships, the perceived social support, and the experiences of foster youth with 16 campus services. I used a mixed-method design (Johnson & Onwuegbuzie, 2004; Lochmiller & Lester, 2017) for the needs assessment. The quantitative strand of the data covered the academic background, perceived economic hardships, and perceived social support of foster students. The qualitative strand of the data included the experiences of foster students with campus services.

The data from the needs assessment showed that foster youth had lower GPAs than their peers (2.4 vs. 2.8; Antelope Valley College [AVC], 2021a, 2021b). Sixty-three percent, 62%, 59%, 53%, and 52% of foster students needed additional resources for purchasing clothes, utility bills, rent, transportation, and food, respectively. Eight percent of them lacked social support. Except for the Financial Aid and Scholarships program and the Counseling Center, less than 50% of foster youth used other campus services. Furthermore, 76% of foster youth still needed to access the Guardian Scholars Foster Youth program.

Overall, the qualitative data were consistent with the quantitative data. In general, foster youth viewed services that provided financial assistance and guidance were most useful. However, the qualitative and quantitative data revealed that foster youth might be unaware of the college's many campus services or choose not to use them.

Faculty Learning Community on Creating Supportive Learning Environments

The needs assessment showed that the lack of social support was the most common barrier foster students faced when attending community college. One way to reduce this barrier is to create welcoming learning environments for them. Here, I proposed to organize a faculty learning community (FLC) on creating supportive learning environments for STEM faculty. This FLC is a year-long event comprising 14 hours of faculty professional development. The FLC

comprises seven modules centered around Hardiman's (2012) brain-targeted teaching model (BTTM). However, it also includes components from multicultural education (ME; Banks et al., 2001; Gay, 2015; Wink, 2011) and the universal design for learning (CAST, 2018; Meyer et al., 2014) in the emotional climate of the BTTM. The process for this FLC is based on the transformative learning theory (Mezirow, 1998), the sociocultural learning theory of Vygotsky (1978), active learning (Bonwell & Eison, 1991), and improvement science (Lewis, 2015).

Reflection on the Doctoral Journey and Future Plan

My doctoral journey has been arduous; I was unfamiliar with the problem of practice on foster youth and the materials covered in this program due to my background as a biochemist. However, the literature on foster youth and this program changed my frame of reference about learning and teaching. I had transitioned from an inexperienced instructor to an informative instructor who realized that learning and teaching involved embodied cognitions (e.g., Fugate et al., 2019). After the first semester in this program, I changed my problem of practice from the underrepresentation of female and minority students in STEM to the achievement gap of foster youth in higher education. This shift in focus is another example of my intellectual growth in this journey.

In the future, I plan to implement and request funding for the FLC to recruit STEM faculty to participate in this year-long event. I also want to scale this FLC to include faculty from other disciplines. I want to transform teaching practices in higher education to improve all students' learning outcomes.

Chapter 1

Problem of Practice and Literature Review

The U.S. foster care system began in the 17th century, was formalized in the late 19th century, and has continuously evolved since (Rymph, 2017). The first recorded case of foster care in the United States occurred in 1636 when Mrs. Benjamin, a widow, gave their son to another family for an apprenticeship. In 1830, Charles Loring Brace established the Children's Aid Society to let farmers in the Midwest adopt homeless children in the Northeast (Rymph, 2017; Sethi, 2019). Although Charles Long Brace had good intentions, those in the society often did not perform background checks on the adopters. Many children became slave laborers (The National Voice of Foster Parents, n.d.; Rymph, 2017; Sethi, 2019).

Perhaps to resolve this lack of oversight, in 1885, Pennsylvania passed a law that required foster parents to have a license if they adopted more than one child (The National Voice of Foster Parents, n.d.; Sethi, 2019). By the early 20th century, background checks on foster parents had become common (Sethi, 2019). The U.S. Children's Bureau and the Child Welfare League of America were established during this time. The Children's Bureau was a federal agency that focused on the welfare of children and helped to make laws directed at children (Rymph, 2017). The Child Welfare League of America was a nongovernmental agency specializing in the placement and published some of the first standards on foster care (Rymph, 2017). Both organizations advocate for the benefit of children and remain in operation today.

During the early to middle of the 20th century, the government also removed children from their original homes to protect them from abuse and neglect. It began funding these services (Rymph, 2017; Sethi, 2019). In 1980, the federal government passed the Adoption Assistance and Child Welfare Act (1980). This act formalized the funding for services that supported foster

youth in the United States. In 1997, the government passed the Adoption and Safe Families Act (1997) to reduce how long children remained in foster care.

The early foster care system in the United States often excluded children of color and children with special needs (Rymph, 2017). Before the Civil War, enslavers owned African American adults and children (Rymph, 2017). After the Civil War, African American adults within the community often cared for the children through extended kinships (Rymph, 2017). When these children had no one to care for, they were usually placed in jail rather than in foster care due to racism and few foster families willing to house them (Rymph, 2017). Native American children were also treated differently than White children (Rymph, 2017). The Bureau of Indian Affairs forced Native American children to enter boarding schools to assimilate, and this practice did not end until the 1950s (Rymph, 2017). Children with disabilities also faced different destinies than their able peers: They were separated from their families and institutionalized (Rymph, 2017). In modern times, structural discriminations still exist, and children from disadvantaged backgrounds are often overrepresented in the foster care system (Rymph, 2017).

Today, children are placed in foster care when the juvenile court takes custody because they cannot live safely at home (California Department of Social Services, 2016). Abuse and neglect are the top reasons for the court to remove children from their original families (Children's Bureau, 2020a). The federal government identifies physical abuse, sexual abuse, and emotional abuse as the three major types of abuse children may experience (Child Welfare Information Gateway, 2019). The federal government defines neglect as "the failure of a parent or other caregiver to provide for a child's basic needs" (Child Welfare Information Gateway, 2019, para. 2). After a child enters the foster care system, leaders of the system aim to find a

permanent family for the child (Child Welfare Information Gateway, 2020). The Children's Bureau (2020a) lists the top case plans for foster children as reuniting with their original families, living with their relatives, and being adopted. In 2019, 47%, 6%, and 26% of 248,669 foster youth exited the foster care system to reunite with their families, live with their relatives, and be adopted, respectively (Children's Bureau, 2020a). State policy requires the resolution of familial problems before the children can return to their original families (California Department of Social Services, n.d.). In 2019, there were 423,997 foster youth in the United States (Children's Bureau, 2020a). Fifty-five percent were minorities, mainly African Americans (23%) and Hispanics (21%). Fifty-two percent of them were males, and 48% were females.

Before 2008, in the United States, children under 18 years old and served in the foster system were defined as a foster youth. In 2008, the federal government allowed the states to extend the foster youth age to 21 by passing the Fostering Connections to Success and Increasing Adoptions Act (2008). In response to federal law, California passed California Fostering Connections to Success Act (2010). The California Fostering Connections to Success Act extends the foster youth age in California to 21. However, foster youth must be in foster care when they turn 18. They also must meet one of the following criteria: (a) finishing a high school degree or the equivalent, (b) enrolling in a vocational program, (c) pursuing higher education, (d) working for at least 80 hours per month, or (e) having a disability. Leaders of extended foster care aim to help foster youth transition out of the foster care system when they reach adulthood. In 2019, about 3% of foster youth were between 18 and 21 (Children's Bureau, 2020a). This group of older foster youth is the target population of this dissertation.

Regardless of their ages, foster youth are one of the most disadvantaged populations in the United States and worldwide (Boddy et al., 2020; Clemens et al., 2018; Hansson &

Gustafsson, 2020; Hogan, 2018; Morton, 2016; Okpych & Courtney, 2018a, 2018b, 2019; Olsen & de Montgomery, 2018; Watt et al., 2019). For example, although foster youth only make up 0.13% of the total U.S. population (Children's Bureau, 2020a), they usually have some of the most substantial achievement gaps in both secondary and postsecondary education (Clemens et al., 2018; Hogan, 2018; Morton, 2016; Okpych & Courtney, 2018a, 2018b, 2019; Watt et al., 2019). This current researcher defines an achievement gap as having a low graduation rate or passing rate for individual courses. According to the national data, 69% of foster youth completed high school or the equivalent (Children's Bureau, 2019) when the national high school graduation rate was 86% (National Center for Education Statistics, 2020b). Within California, the California Department of Education (2020) reported that only 56% of foster youth graduated from high school within 4 years compared to 85% of their non-foster peers.

Foster youth achievement gaps are common in secondary education but continue in higher education. In 2019, Watt et al. reported that out of 3,855 former foster youth in Texas, only 3.5% earned a college degree or a certificate by age 24, compared to 49% in the general population (National Center for Education Statistics, 2020a). Likewise, Okpych and Courtney (2019) found that in a sample of 732 former foster youth in the Midwest, by the age of 25, only 8% of these youth had associate degrees or higher. This result supported the national data that only 7% of foster youth earned a vocational certificate or a college degree by age 21 (Children's Bureau, 2019). In the newest study with a national sample of 6,945 foster youth, Kelly (2020) indicated that only 2.5% of foster youth graduated from college.

When foster youth matriculate into higher education, they most frequently attend community colleges (Courtney et al., 2018; Okpych & Courtney, 2018a, 2019; Sandh et al., 2020). Approximately 24% of foster youth in a sample of 590 foster adolescents in the Midwest

pursued higher education (Courtney et al., 2007, 2018). Of those, 72% attended community colleges rather than 4-year institutions (Courtney et al., 2018). In the most recent study involving 401 foster students in California, 89% chose to attend 2-year colleges, mostly community colleges (Okpych et al., 2020). Community colleges are usually more affordable but less selective than 4-year colleges (Okpych et al., 2020; Whitman, 2018). The academic challenges that foster youth can have and the cost of postsecondary education suggest that most foster youths prefer community colleges over 4-year institutions (Whitman, 2018).

Since most foster youths enroll in community colleges, knowing how students' achievement is measured in the community college system is essential to understanding the existence, nature, and scope of achievement gaps and supporting efforts to reduce those gaps for foster youth. Within community college systems, the retention rate, success rate, transfer rate, rate of earning an associate degree, and rate of obtaining a certificate are used to measure the achievements of their students. For example, the California Community Colleges Chancellor's Office (CCCCO, n.d.) defined the retention rate as the percentage at which students did not withdraw from their courses. The CCCCCO (n.d.) also defined the success rate as passing a class with an A, B, C, or P. Students must pass most of their credit classes to complete their certificates, graduate from community colleges, or transfer to 4-year colleges. Credit courses are courses that do not use the pass/fail system. A student must earn an A, B, or C grade to pass a credit class.

Regardless of how a community college determines the success of its students, helping foster students to succeed in college enhances their abilities to become self-sufficient after they leave foster care. Researchers have found that a college degree is associated with better earnings and happier, healthier lives (Greenfield et al., 2020; Kim & Tamborini, 2019; Ma et al., 2019;

Nikolaev, 2018). The U.S. Bureau of Labor Statistics (2020) indicated that employees with an associate degree earned \$114 more per week and had a 1% lower unemployment rate than those with only a high school diploma. Okpych and Courtney (2014) reported that foster youth with a 2-year college degree had a 33% higher employment rate and earned \$9,000 more annually than those with a high school degree. This example illustrates that, if foster youth can complete a community college education, their chances of having a stable income and a stable career will increase, which can reduce the financial burdens that they may have on society (Ma et al., 2019). Consequently, educators, philanthropists, and policymakers have considered solutions to assist foster youth in successfully transitioning out of foster care to improve their academic achievement in higher education (Lenz-Rashid, 2018; Okpych et al., 2020; Piel et al., 2020).

Problem of Practice

This researcher focuses on one community college that serves one of the highest numbers of foster youth in a western state. Within this context and all indicators that measure academic achievement, foster youth have lower retention and success rates than their non-foster peers. The CCCCCO (n.d.) defined retention rate as “the rate at which students completed courses and did not drop or withdraw from them” (para. 2) and success rate as the rate at which students passed their courses with at least a C or a P. For example, their retention rate for credit courses was 82.25% versus 86.91% of their peers (CCCCO, 2019b, 2019d). Their success rate for credit courses was 56.75% versus 70.31% for students at the college (CCCCO, 2019b, 2019d). The rates at which foster youth passed courses that counted toward an associate degree, or a certificate, or transferred to 4-year institutions were 57.89%, 64.15%, and 57.41% compared to 71.24%, 75.84%, and 70.45%, respectively, of their peers (CCCCO, 2019b, 2019d). This literature review aims to examine the major factors that may contribute to these outcomes.

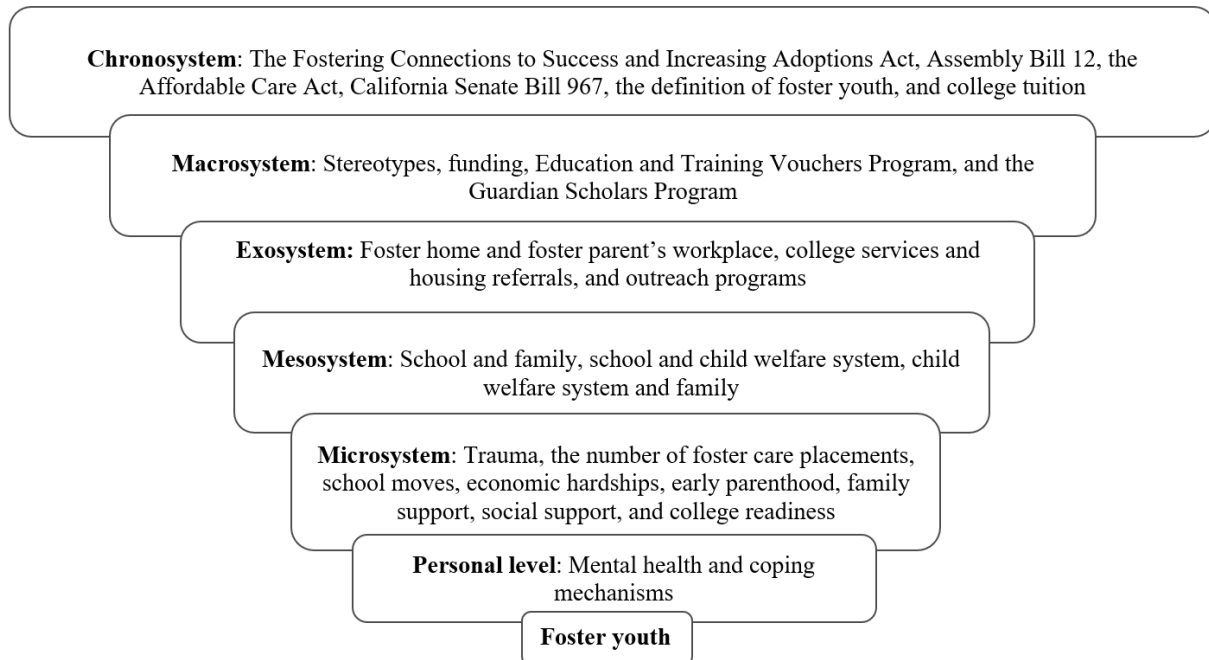
Theoretical Framework

The nested ecological systems theory (EST; Bronfenbrenner, 1994) is used to explore factors that may contribute to the academic achievement challenges foster youth encounter as they navigate the post-secondary landscape. The EST explores environmental factors that influence the development of an individual, in this case, a foster youth. Environmental factors could be immediate and direct, such as factors connected to school or family environments, or more distant, such as societal beliefs. Bronfenbrenner (1994) grouped the levels into five systems to describe the relationships among these factors at varying levels: the chronosystem, macrosystem, exosystem, mesosystem, and microsystem. These systems reside inside one another, like the layers of an onion, with the focal person at its core (Bronfenbrenner, 1994).

Figure 1.1 captures these connections.

Figure 1.1

The Ecological Systems Theory for Foster Youth



The outermost layer of the onion is the chronosystem. The chronosystem examines factors that change over time and may be historical in the developing person's environment (Bronfenbrenner, 1994). For example, this context includes national or state policies, such as the McKinney-Vento Homeless Assistance Act (2000; i.e., the McKinney-Vento Act in short) and the Fostering Connections to Success and Increasing Adoptions Act of 2008. In 1987, the federal government passed the Stewart B. McKinney Homeless Assistance Act. This law provided funding for services that supported the homeless. These services included food, shelter, mental care, medical care, education, and training for the homeless. In 2000, the law was amended and renamed the McKinney-Vento Homeless Assistance Act.

Another major federal law was the Fostering Connections to Success and Increasing Adoptions Act of 2008. Before 2008, federal law defined foster youth as individuals under 18. After 2008, federal law allowed states to extend foster care services and supports to foster those beyond 18 years. Following this law, California passed California Fostering Connections to Success Act in 2010. This bill extended foster care services and supported foster youth until age 21.

Due to changes in federal law and the State of California law, the definition of a foster youth has altered. With this new definition, foster youth can remain in foster care while acquiring skills that will allow them to transition out of the foster system successfully. The definition of *foster youth* is also a factor in the chronosystem. Another big piece of legislation directly affecting foster youth is the Affordable Care Act (U.S. Centers for Medicare & Medicaid Services, 2014). With this federal law, foster youth can receive free medical coverage up until the age of 26 years. This law ensures that foster youth do not acquire huge medical debts if they become ill in college. Shifts in responsibility for covering college tuition are another component

of the chronosystem. Before 2018, foster students had to pay college tuition if they attended college in California. In 2018, California Senate Bill 967 required California community colleges and public universities to provide free college tuition to eligible and former foster youth under 25, eliminating the need to worry about one of the biggest financial burdens they could face.

The next layer of the nested structure is the macrosystem (Bronfenbrenner, 1994). The macrosystem includes societal and cultural factors such as stereotypes people often hold of foster youth (Johnson et al., 2020; Tobolowsky et al., 2019). These stereotypes can involve negative views that assume foster youth are criminals, nonconforming, or mentally ill (Johnson et al., 2020; Tobolowsky et al., 2019). Because of stereotypes, foster students are often victims of bullies and harassers in school (Benbenishty et al., 2018; Johnson et al., 2020; Tobolowsky et al., 2019). A participant in a series of interviews conducted by Johnson et al. (2020) reported that they experienced verbal abuse from a friend. Within the same study, a different foster student mentioned that their teacher addressed them as a “foster kid” rather than using their name. Bullying and harassment can negatively impact the achievements of foster youth as they can become less engaged in their courses (Benbenishty et al., 2018; Johnson et al., 2020; Tobolowsky et al., 2019). For example, foster students may skip classes (Benbenishty et al., 2018; Johnson et al., 2020).

Government programs and funding are other factors that belong to the macrosystem. The Education and Training Vouchers (ETVs) program (Okpych et al., 2020) is one such program. The ETV program is a federal program that gives foster youth up to \$5,000 annually to pay for tuition and living expenses (Dworsky, 2018; Okpych et al., 2020). A criticism of this program is that living expenses have risen since 2001, but the funding has remained the same (Okpych et al., 2020). Because the funding has not kept up with rising living expenses, the author of this work

and their adviser surmise that foster youth may have to work additional hours or take out additional loans to compensate for the differences in living expenses. No investigation has been launched to consider the loan borrowing patterns of foster youth (Geiger & Beltran, 2017).

In addition to federal programs, California has government programs that target foster students. The Guardian Scholars Program (Lenz-Rashid, 2018) aims to provide one-stop services for foster students attending colleges in California. It connects foster students to services like housing, food supplies, healthcare, financial aid, and academic counseling (Lenz-Rashid, 2018). Even with all these services and programs in place, the achievement gap of foster youth still exists, showing potential cracks in these services.

The exosystem follows the macrosystem in the EST framework. The exosystem represents factors based on interactions in at least two contexts, but one setting does not involve the focal person (Bronfenbrenner, 1994). An example is the workplace of a foster parent and the foster home. Although the workplace of the foster parent does not involve the foster adolescent, it can indirectly affect the development of the foster teenager. If the foster parent's job is demanding, they may spend less time with the foster teenager, who may need help with homework. A pre-college outreach program (Day et al., 2018) is another example of an exosystem factor. As mentioned, only one in five foster youth pursues higher education (Courtney et al., 2007, 2018). A precollege outreach program like one at Michigan State University aimed to increase the number of foster youth enrolled in higher education by providing foster high school students with college experience, financial advice, and academic advice (Day et al., 2018). Additionally, the interaction between a college service and referral to housing resources can fall under the exosystem if a foster youth chooses to live in some place other than what was referred to or assigned to them.

The next two levels of EST are the mesosystem and the microsystem. The mesosystem contains interacting factors that involve two different microsystems; for instance, a mesosystem is constituted by school and family environments (Bronfenbrenner, 1994). Both school and family include the focal person, a foster youth, and both influence the development of the foster youth. The school and the child welfare system comprise an additional mesosystem as foster youth are involved in both contexts. The interaction between the child welfare system and the foster family is another example of factors at the mesosystem level. Concurrently, school is a microsystem, as is family. The child welfare system is also a microsystem. Microsystems comprise all settings directly involving the participant (Bronfenbrenner, 1994).

Like all theories, EST has its strengths and weaknesses. One of its advantages is its emphasis on environmental and societal factors that directly and indirectly influence the development of participants over time (i.e., foster youth; Bronfenbrenner, 1994). The theory does not depict the development of foster youth as a static process. As foster youth respond to their environments, which Bronfenbrenner (1994) called “proximal processes” (p. 1644), they can change, adapt, and evolve with time. Foster youth can have complex lives, and their experiences can shape who they are and the people they will become. The EST provides a clear view of how different factors can impact the lives of foster youth and how these factors can relate to one another.

The EST is simple yet comprehensive; however, covering all the factors within the five systems is beyond the project’s scope. A complication of EST is that some factors, such as stereotypes, can belong to multiple systems (Neal & Neal, 2013). Stereotypes can fit under a microsystem because foster youth can experience stereotypes from their teachers and friends. Stereotypes can still belong to a macrosystem, as they are represented in societal beliefs. To

further complicate the matter, stereotypes can fall under the chronosystem due to changes in societal norms. Thus, stereotypes do not fit neatly within a given system but can reside across multiple systems; this finding indicates the inter-relatedness of the various systems as one considers the entirety of the topic, issue, or problem of practice that serves when the theory is applied to a particular focal point (Bronfenbrenner, 1994).

Examining foster youths' perceptions of the barriers, use, and quality/type of experiences with resources and supports specific to or available to them on the campus of one large community college serves as the purpose and context of this study. The ongoing achievement gap of foster youth in this context presents a problem of practice for college administrators (CCCCO, 2019b, 2019d). When considering the myriad of factors that can contribute directly or indirectly to this problem of practice, as evidenced through the application of EST, those most salient and actionable within the context of this dissertation are situated at the microsystem and mesosystem levels. Factors in family and school microsystems are the main foci of this literature review and their interaction at a mesosystem level. The following subfactors are examined in the following sections to understand how the factors of family and school can contribute to the academic outcomes of foster youth: trauma, the number of foster care placements, school moves, mental health, coping mechanisms, economic hardships, early parenthood, family support, social support, and college readiness.

Factors Contributing to Foster Youth Achievement

For foster youth, family and school can be tightly connected, directly affecting their learning outcomes (Clemens et al., 2018). Due to unique family circumstances, foster youth can experience numerous foster care placements, which can accompany multiple school moves. Foster youth also often experience various types of trauma, which can lead to mental health

disorders (Hogan, 2018; Miller et al., 2020; Morton, 2018; Okpych & Courtney, 2018a, 2019; Steenbakkers et al., 2019). Foster youth may develop coping mechanisms to cope with past traumas and mental health conditions (Morton, 2018; Steenbakkers et al., 2019). Without familial support, foster youth can face economic hardships (Skobba et al., 2018; Tobolowsky et al., 2019) and early parenthood (Combs et al., 2018; Shpiegel & Cascardi, 2018). Additionally, they may have insufficient social support (Best & Blakeslee, 2020; Chambers et al., 2018; Clemens et al., 2017a; Johnson et al., 2020; Olsen & de Montgomery, 2018; Steenbakkers et al., 2019) and inadequate college preparation (Okpych & Courtney, 2018a; Sandh et al., 2020; Unrau et al., 2017). All these adversities can interfere with the academic achievement of foster students. In the following sections, each of these factors will be explored in-depth.

Foster Care Placements and Associated School Moves

As indicated in the introduction, the overarching purpose of the foster care system is to protect children from harm. The most common dangers that children experience before entering the system are neglect and abuse (Children's Bureau, 2020a). The Children's Bureau (2020a) reported that 63% and 17% of children in 2019 entered the foster care system due to neglect and abuse (physical and sexual), respectively. The shortest period a foster youth stays in foster care is less than a month, and the longest is over 5 years (Children's Bureau, 2020a). The average number of placements for 15,606 surveyed foster youth at age 17 was four (Children's Bureau, 2020b). There are many potentially adverse consequences of foster placements.

Foster care placements can have unwanted, negative consequences (Chambers et al., 2018; Mitchell, 2018; Morton, 2018; Steenbakkers et al., 2019). A participant interviewed by Mitchell (2018) described that being separated from their loved ones was like attending a funeral, but instead of burying the dead, they were burying their emotions. Another foster youth

stated that being separated from their sibling was like “losing the other half of my life” or “having a leg broken off” (Mitchell, 2018, p. 3). These descriptions of the emotional and physical pains associated with family separations capture the intensity and severity of losses children in foster care can endure. The constant fluctuation of placements strains the already fragile feelings that a foster youth can have. A foster youth commented,

In foster care, you don't keep friends, like you go from school to school, you go from house to house. You don't keep nobody. Which is why when you get out of foster care, you know, you don't have anybody. (Mitchell, 2018, p. 4)

No one should be alone or travel alone, yet this youngster already experiences that loneliness. Their statement captures the woe that foster youth may endure in addition to the maltreatment they could experience before entering the foster care system. Experiencing one loss is enough. Experiencing multiple losses back-to-back can be excruciating, yet U.S. society often overlooks the emotional losses associated with the numerous placements that foster youth may encounter (Mitchell, 2018). Of the 43 foster youth Chambers et al. (2018) interviewed, 70% had 10 or more placements. Foster students can emotionally lose friends and loved ones with multiple placement changes (Chambers et al., 2018; Steenbakkens et al., 2019).

Foster youth with high rates of foster care placements can also have high percentages of school moves, which can negatively affect their learning outcomes (Chambers et al., 2018; Clemens et al., 2016, 2017b, 2018; Hansson & Gustafsson, 2020; Olsen & de Montgomery, 2018). Clemens et al. (2016) documented that out of 3,357 foster youth enrolled in Colorado high schools, 59% had more than three school moves. Hansson and Gustafsson (2020) found that foster youth's grades were reduced by 5% for every school move. School moves can affect students' grades for several reasons. Whenever foster students change schools, they must adapt

to the new environment and establish new social networks (Chambers et al., 2018; Clemens et al., 2017a; Johnson et al., 2020; Olsen & de Montgomery, 2018). Different schools have different curricula, so not all courses transfer from one school to the next (Chambers et al., 2018; Clemens et al., 2017a; Olsen & de Montgomery, 2018). If students transfer in the middle of a semester, they may miss out on important concepts (Clemens et al., 2017a; Johnson et al., 2020; Olsen & de Montgomery, 2018).

In a case study by Clemens et al. (2017a), one foster youth commented that they never learned how to add, divide, or subtract because of school changes. Within the same study, another foster teenager said they could lose an entire semester with one school move. Losing academic records or delays in transferring academic transcripts between schools can cause adolescents in foster care to lose credits (Clemens et al., 2017a; Hansson & Gustafsson, 2020; Olsen & de Montgomery, 2018). Many repeated a grade or could not graduate on time (Chambers et al., 2018; Clemens et al., 2017a; Olsen & de Montgomery, 2018). In a more recent study, Clemens et al. (2018) showed that when foster youth concurrently changed foster home placements and schools, their math, reading, and writing academic growth decreased by 3.0% to 3.7%. Thus, numerous placements and school moves can impede foster youth's academic achievement.

However, not all foster youth perceive foster placements and school moves negatively. Some individuals believed the challenges of foster placements made them stronger (Chambers et al., 2018; Cheung et al., 2019; Steenbakkens et al., 2019). They had better learning outcomes than those who viewed changing placements negatively (Mihalec-Adkins et al., 2020). They were more engaged in schools, found schools interesting and enjoyable, and got along well with their classmates and teachers (Fawley-King et al., 2017; Mihalec-Adkins et al., 2020). Foster

youth with positive views of their placements also had high hopes for the future (Chambers et al., 2018; Mihalec-Adkins et al., 2020). More interestingly, Fawley-King et al. (2017) suggested that home relocations and school moves could improve children's mental health. They demonstrated that youth with less contact with their birthmothers exhibited fewer mental health problems. The researchers argued that when youth moved to better schools and neighborhoods, those students perceived the changes more positively. These researchers posited that foster youth who did not want others to know their foster-care histories could have fresh beginnings by changing living locations and schools. Nevertheless, Fawley-King et al. (2017) did not measure the academic outcomes of their participants; the researchers only studied the perceptions of these students toward their new schools.

Trauma and Foster Youth

Although being placed in foster care can be traumatic to children, the placements are sometimes necessary to prevent children from being exposed to more traumas (California Department of Social Services, 2016). The Child Welfare Information Gateway (2014) defined trauma as “an emotional response to an intense event that threatens or causes harm” (para. 2). Plumb et al. (2016) cited acute trauma, chronic trauma, and complex trauma as the three types of traumas that often adversely affected children. In acute trauma, the child experiences a single distressful event, such as a parent's death (Plumb et al., 2016). In 2019, about 1% of foster youth entered the foster care system due to their parents' deaths (Children's Bureau, 2020a). Losing a parent can create a sense of loss in a foster youth, but witnessing the murder of one can be even worse (Steenbakkers et al., 2019). For example, a foster youth who participated in Steenbakkers et al.'s (2019) study described the difficulty of eating when using a knife because the participant witnessed their mother's murder by one. Chronic trauma can occur when a child repeatedly

endures the same horrific event. This trauma is common with abuse and neglect (Plumb et al., 2016).

Researchers have grouped abuse and neglect under maltreatment (Child Welfare Information Gateway, 2019; Steenbakkers et al., 2019). If the primary caregiver maltreats their child, the child can suffer from complex trauma (Plumb et al., 2016). Complex trauma is repeated maltreatment caused by a primary caregiver (Plumb et al., 2016). Over 90% of foster youth enter foster care due to maltreatment (Children's Bureau, 2020a). Additionally, foster youth may endure multiple traumas that have caused the court to remove them from their original families (Children's Bureau, 2020a).

The impacts of trauma can lead to emotional, physical, cognitive, behavioral, and existential problems for the victims (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014). Emotional problems include anger, anxiety, depression, shame, and fear of repeated maltreatment (SAMHSA, 2014). One foster participant in Steenbakkers et al.'s (2019) study described being angry at their aunt because the aunt knew the person who sexually assaulted the victim but did nothing. This same victim mentioned the difficulty in having an intimate relationship later in life because they were fearful that sexual assault would reoccur. This individual indicated they could not trust men. Losing trust in others may interfere with the person's ability to function productively in the real world, where nearly half of the population is male. Nationally, about 4% of the 251,359 children in the foster care system in 2019 entered due to sexual abuse, and about 13% suffered from physical abuse (Children's Bureau, 2020a). Victims of physical abuse may fear arguments as these remind them of past arguments that resulted in physical abuse (Steenbakkers et al., 2019). In addition to having emotional issues, victims of maltreatment can experience physical problems such as

nausea, shivering, faintness, insomnia, nightmares, a weakened immune system, and heart disease (SAMHSA, 2014). In both the works of Morton (2018) and Steenbakkers et al. (2019), foster youth reported having insomnia and nightmares even though they no longer experienced abuse.

Trauma can also change the brain's chemistry and structure, making the victims more susceptible to mental illnesses (SAMHSA, 2014). Elzinga et al. (2003) found that the amount of cortisol in the brain increased by 122% in post-traumatic stress disorder (PTSD) clients when exposed to situations that mimicked their traumatic experiences. Opel et al. (2019) reported that maltreatment victims had a reduced cortical surface area associated with depression. Trauma can also interfere with the victims' cognitions, such as concentration difficulties, memory problems, suicidal ideations, flashbacks, and self-blame (SAMHSA, 2014). A foster student participant in Morton's (2018) study stated, "I used to skip class because I couldn't find a reason to live after the daily abuse at home" (p. 78). Abuse victims can also exhibit undesirable behaviors such as withdrawal, aggressive behaviors, self-harm, and increased use of substances (SAMHSA, 2014). Both Morton (2018) and Steenbakkers et al. (2019) documented that some foster youth with maltreatment histories cut themselves to release their pain and anger. Maltreated individuals may also have existential responses ranging from hopelessness to increased self-confidence and having new life values (SAMHSA, 2014). In the work of Steenbakkers et al. (2019), foster youth mentioned that their traumatic pasts helped them become better people by enhancing their compassion toward others.

Although foster youth may exhibit differential effects of maltreatment, trauma can lead to lower academic performance (Ferrara & Panlilio, 2020; Morton, 2018; Steenbakkers et al., 2019). In a study involving 337 maltreated adolescents, Cage (2018) found that these teenagers

had a 15% lower rate of completing a high school degree or a GED than their peers. This finding is unsurprising as the literature indicates that maltreated individuals have concentration and memory problems (Morton, 2018; SAMHSA, 2014; Steenbakkers et al., 2019). Students who cannot concentrate during classes may not encode and store new information effectively. Because of memory problems, they may be unable to recall learned materials. The current educational system often requires students to recall learned information through testing. With memory issues, foster youth can fail their exams and classes, leading to lower graduation rates. More interestingly, Ferrara and Panlilio (2020) argued that the types of maltreatment and having a foster care history did not lead to lower academic performance. The researchers posited that the symptoms derived from maltreatment were the culprits of the achievement gap, specifically low reading comprehension. The symptoms of maltreatment included “insomnia, nightmares, [and] memory problems” (Ferrara & Panlilio, 2020, p. 20). Poor memory alone can significantly influence foster youths’ academic achievement (Morton, 2018; Steenbakkers et al., 2019).

Mental Health Issues in Foster Youth

Research results show that foster youth can have more mental health problems than their peers due to their traumatic pasts (Hogan, 2018; Miller et al., 2020; Morton, 2018; Okpych & Courtney, 2018a, 2019; Steenbakkers et al., 2019). In a quantitative study involving 329 foster youth, 79.8% reported having mental health problems while attending college (Okpych & Courtney, 2018a). Foster youth often indicate that the most common diagnoses they receive are anxiety, depression, and PTSD (Hogan, 2018; Morton, 2018; Okpych & Courtney, 2018a; Steenbakkers et al., 2019). SAMHSA (2014) documented these diagnoses as common mental health illnesses associated with individuals who have experienced trauma.

Even though multiple researchers have addressed mental health illnesses among foster youth, the qualitative work of Morton (2018) is descriptive and detailed. Morton interviewed 21 foster youth, and 11 shared that they had anxiety, depression, suicidal ideation, and PTSD. These foster youth narrated their struggles in pursuing higher education while also having mental health illnesses. From their stories, the reader gains insight into the lives of foster youth and the challenges they may encounter daily. Morton documented that some foster students mentioned they could not recall learned information while taking exams because of anxiety. Other foster youth reported that anxiety about financial hardships prevented them from focusing on their classes. At least nine foster youth reported having depression and suicidal thoughts; one foster student said, “I had no will or motivation to live” (Morton, 2018, p. 78). These findings aligned with the work of Steenbakkers et al. (2019), whose foster participants also expressed suicidal ideation. Suicidal ideation is common among abuse victims (SAMHSA, 2014). Perhaps these individuals wanted to end their lives to escape the physical and emotional pains they had suffered. Suicidal thoughts frequently link to depression (American Psychiatric Association [APA], 2013). Depression can be debilitating as it draws energy from its victim. For example, participants interviewed by Morton (2018) stated they often felt too exhausted to attend classes. Missing classes can harm students as they may miss important information, deadlines, or exams.

Besides depression, foster youth often have PTSD (Miller et al., 2020; Morton, 2018; SAMHSA, 2014). PTSD is a mental disorder associated with experiencing or witnessing a traumatic event (APA, 2013). Individuals with PTSD often have flashbacks of traumatic incidents, especially when new events remind them of their traumatic pasts (APA, 2013). When individuals experience flashbacks, they can behave as if the events are occurring and lose control of their emotions (APA, 2013). For example, one foster youth shared that they started to cry

uncontrollably when a teacher mentioned sexual violence during a lecture (Morton, 2018). Even happy stories can hurt foster youth (Morton, 2018). A foster student revealed that happy stories reminded them of their unfortunate life (Morton, 2018). These mental health issues can interfere with the abilities of foster youth to complete higher education. For example, a participant in Morton's (2018) study described having a nervous breakdown right in the middle of an exam and having to leave the classroom. Due to flashbacks, foster youth may be unable to control their feelings and not concentrate in classes. Both factors can reduce their academic performance (Morton, 2018). By the end of the study, Morton (2018) recorded that at least 30% of the participants dropped out of college.

Coping Mechanisms With Trauma and Mental Health Illnesses

To conduct daily activities, foster youth who have experienced traumas and mental health disorders often develop numerous coping mechanisms (Morton, 2018; Steenbakkers et al., 2019). One mechanism is referred to as *avoidant attachment*. Avoidant attachment is the tendency of an individual to avoid developing a close relationship with another person or avoid seeking assistance, even when they need it (Mikulincer & Shaver, 2003). Other coping mechanisms include skipping classes or quitting school (Miller et al., 2020; Morton, 2018; Souers & Hall, 2016). Furthermore, foster youth may use alcohol and drugs to control flashbacks and mental health conditions (Steenbakkers et al., 2019). These factors are explored in the following sections.

Avoidant Attachment

Avoidant attachment derives from the attachment theory developed by Bowlby (1969, 1973) and Ainsworth (1979). In the attachment theory, Bowlby posited that children develop close relationships with their caregivers for survival purposes, especially when they are too

young to fend for themselves. However, childhood adversities can change these relationships (Okpych & Courtney, 2018b). Instead of developing close relationships with others, these individuals may close themselves to those around them to minimize the potential reoccurrence of maltreatment (Mikulincer & Shaver, 2003). Avoidant attachment behaviors can include distrusting others, avoiding intimate relationships, and being self-reliant even when help is needed (Mikulincer & Shaver, 2003).

Avoidant attachment is associated with depression and PTSD (Mikulincer & Shaver, 2003). Because of the overlapping symptomology of avoidant attachment and other mental health disorders, the literature on foster youth and trauma has not identified avoidant attachment as a distinct mental disorder. However, one can argue that avoidant attachment can fall under avoidant attachment disorder (APA, 2013). The *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition (*DSM-5*) identifies avoidant attachment disorder as “a pattern of social inhibition, feelings of inadequacy, and hypersensitivity to negative evaluation” (APA, 2013, p. 20). Avoidant attachment meets at least the first criterion of the diagnosis for avoidant attachment disorder.

Regardless of whether an avoidant attachment is a formal mental illness, it can interfere with the academic performance of foster youth (Morton, 2018; Okpych & Courtney, 2018b, 2019; Steenbakkens et al., 2019). Youth with high avoidant attachment are more likely to drop out of college for several reasons (Okpych & Courtney, 2018b). First, if they have psychological issues, they usually do not seek counseling because of the stigma associated with mental illnesses (Miller et al., 2020). Second, they may feel they can solve their problems (Miller et al., 2020; Okpych & Courtney, 2018b). Third, they may not ask for academic accommodations even if they qualify, knowing accommodations can benefit them (Miller et al., 2020). They may fear

that other people may think foster youth with mental health issues ask colleges to lower their academic standards (Miller et al., 2020). Third, if they need academic assistance like tutoring, they may ignore it, thinking they can solve their problems. However, abstract concepts in science and math can be hard to understand, and new information builds on prior knowledge. If they do not comprehend basic concepts, they can fall further behind as the semester progresses. Fourth, because of avoidant attachment, foster youth may not trust people around them, so they may maintain a small social network, if any at all (Okpych & Courtney, 2018b). As a result, when they need guidance, they may have few people to ask for help. Though having someone who understands and sympathizes with the pressure of college life can make foster youth feel better, they may still choose to be alone. These four reasons indicate that foster youth may not seek help from other people, even if receiving psychological, academic, and social support can benefit them academically. Avoidant attachment can leave foster youth vulnerable because no one can help them without knowing their needs. If these needs remain unmet, foster youth may fall behind their classmates.

Skipping Classes and Quitting School

Foster youth may skip classes (Morton, 2018) and quit school as coping mechanisms to control mental disorders and stress (Miller et al., 2020). Foster students in multiple studies indicated that they had to leave the classroom or skip classes to avoid the emotional fallout of PTSD (Miller et al., 2020; Morton, 2018; Souers & Hall, 2016). Their approaches to controlling their mental health disorders can negatively impact their academic performance. First, missing classes can harm students' grades because they have not learned the key concepts that the teachers have covered. Second, the instructors and their classmates may misinterpret these behaviors as rebelliousness or lack of participation. For example, one foster youth mentioned

they felt awkward when they had to leave a classroom due to PTSD, and the entire class looked at them as if the foster student did not want to be there (Miller et al., 2020). The demands of attending college can also pressure foster youth (Hogan, 2018; Miller et al., 2020). Some foster students commented that having a mental illness, surviving college, lacking familial support, and experiencing financial insecurity stressed them (Hogan, 2018; Miller et al., 2020). These foster youth said they considered quitting college to cope with the accumulated stress (Miller et al., 2020). This coping mechanism may explain the high dropout rate among foster students (Okpych & Courtney, 2018a).

Substance Abuse

The use of alcohol and illicit drugs constitutes other approaches foster youth can employ to control past trauma and mental health illnesses (SAMHSA, 2014; Steenbakkens et al., 2019). Researchers have shown substance abuse to decrease the academic performance of college students regardless of foster-care histories (Bolin et al., 2017; Meda et al., 2017; Okpych & Courtney, 2019). Students with high substance use have lower GPAs (Bolin et al., 2017; Meda et al., 2017) and lower retention rates than their peers (Okpych & Courtney, 2019). Contrary to Okpych and Courtney's (2018a) results, Okpych and Courtney (2019) reported a significant correlation between substance use and degree completion of foster youth in higher education. However, the sample sizes and the participants in the studies of Okpych and Courtney in the 2019 and 2018a studies were not identical. In their earlier article, the sample only included 329 foster youth who resided in the Midwest. The more recent study's sample size was nearly 5 times as large. The study consisted of data on 732 youth who lived in the Midwest and 727 youth who resided in California. In the older work, Okpych and Courtney (2018a) noted that, after enrolling in college, 50.9% of youth reported having alcohol and substance use problems, compared to

25.8% of youth having the same issues before college enrollment. These data suggest that youth may use alcohol and other substances to cope with the accumulated stress they may experience in college. The most common substances college students use include alcohol and marijuana (Bolin et al., 2017). Neuroscience research has shown that heavy alcohol drinking may have a lasting effect on the brain by reducing the gray matter volume (Meda et al., 2018), changing the brain structure (Hua et al., 2020), and causing cognitive impairment (Banz et al., 2019). Negatively changing the brain's structure can decrease the individual's academic performance and lifetime productivity (Banz et al., 2019; Hua et al., 2020; Meda et al., 2018).

Economic Hardships and Foster Youth

Foster youth can encounter economic hardships, numerous foster care placements, trauma, and mental health illness. Unlike other college students, foster youth may not receive financial assistance from their families (Skobba et al., 2018; Tobolowsky et al., 2019). Foster youth can experience homelessness because of lacking funding (Clemens et al., 2017a; Kelly, 2020; Skobba et al., 2018; Tobolowsky et al., 2019). Multiple foster students expressed challenges in affording clothing, transportation, utilities, and other needs while attending institutions of higher education (Heyman et al., 2020; Okpych & Courtney, 2018a; Skobba et al., 2018; Tobolowsky et al., 2019). Without meeting these basic needs, foster youth can find pursuing a college degree extremely challenging, if not impossible. Additional details about these hardships follow.

Homelessness

The National Youth in Transition Database Outcome File Codebook defines homelessness as having “no regular or adequate place to live,” which “includes situations where the youth is living in a car, on the street, or staying in a homeless or other temporary shelter”

(National Data Archive on Child Abuse and Neglect, 2019, p. 38). Using this definition, Kelly (2020) found that one in three suffered homelessness in a national sample of 6,874 foster youth by the age of 21. This study confirmed the finding of Dworsky et al. (2013), who observed that at least 31% to 46% of foster youth became homeless by age 26 compared to 4% of youth in the general population. Sometimes, youths in foster care leave homes to avoid abuse; others voluntarily leave the foster care system early and later become homeless (Kelly, 2020; Tobolowsky et al., 2019). In most cases, they just aged out of the foster care system. In 22 states, excluding the District of Columbia, adolescents in foster care age out by the time they are 18 years old (Clemens et al., 2017a; Kelly, 2020). In such cases, the foster care system may fail to equip youth with the skills to live independently, leaving them more susceptible to homelessness than others (Rosenberg & Kim, 2018). California, the District of Columbia, and 27 other states raised the foster youth age to 21 to ease the transition for foster youth (Kelly, 2020). However, these individuals must enroll in an educational program, a vocational school, work part time, or have a disability to remain in the system (Assembly Bill 12, 2010). Preparing foster youth with the tools needed to live independently served as the goal for extending the age of foster youth and the requirement that these youths continue their educations or receive vocational training. Even so, one in four adolescents in foster care still experiences homelessness (Courtney et al., 2018). Overall, foster youth with criminal records and substance abuse histories were most likely homeless (Kelly, 2020). Individuals who were susceptible to homelessness also faced food insecurity (Kelly, 2020). These data show that youth who usually experience the most economic hardships can have food and shelter instabilities.

Having enough food and safe shelter are humans' basic needs (Maslow, 1943), yet foster youth can lack fulfilling both needs (Kelly, 2020). Without these basic needs, foster youth can

struggle academically. Kelly (2020) pointed out that 28.7% of foster youth needed public food assistance for survival. When the basic needs of foster youth remain unmet, their fear of going hungry and being homeless can divert their attention from schoolwork (Clemens et al., 2017a). For instance, how can they focus on a lecture or do their homework when hungry or unsure where to sleep at night? When their non-foster peers enjoy sleeping nicely in their warm beds, foster youth may sleep in their cars or on the street (Dworsky et al., 2013; Kelly, 2020). If foster youth cannot safely sleep at night, their sleep quality decreases. Low sleep quality can reduce productivity (Gingerich et al., 2018). Gingerich et al. (2018) studied 598,676 employees and found that productivity negatively correlated with sleep quality. Individuals with fewer than 8 hours of sleep felt more tired and had more absences than those with 8 hours of sleep (Gingerich et al., 2018). Thus, the achievement gap of foster youth in school is predictable if one considers the food and housing insecurity they can experience. As a foster youth commented, “How am I supposed to succeed when I have nothing? I’m working from nothing” (Clemens et al., 2017a, p. 71). True, foster youth may not have the safety net of a traditional family and may not have someone to go home to if they encounter economic hardships or other challenges (Tobolowsky et al., 2019).

Other Financial Hardships

Aside from being homeless, not having enough financial resources to pay for clothing, transportation, utility bills, and other items can make youth’s lives in college harder (Heyman et al., 2020; Okpych & Courtney, 2018a; Skobba et al., 2018; Tobolowsky et al., 2019). Although most states offer free tuition for foster youth to attend college, other needs may remain unmet (Okpych & Courtney, 2018a). Most foster students work while in college, some holding multiple jobs, to meet those needs (Boddy et al., 2020; Hill & Peyton, 2017; Kinarsky, 2017; Okpych &

Courtney, 2018a; Skobba et al., 2018; Tobolowsky et al., 2019). Most foster youths hold low-paying jobs (Skobba et al., 2018; Tobolowsky et al., 2019). Sometimes, they work full time (Okpych & Courtney, 2018a), which can deleteriously affect their grades. Furthermore, in a case study by Skobba et al. (2018) involving 33 foster youth, one participant described walking 10 blocks and catching two buses every morning to go to school, often causing them to arrive late for classes.

Foster youth usually wish books, college tuition, daycare, and school supplies are more affordable (Okpych & Courtney, 2018a; Tobolowsky et al., 2019). In another case study with 16 former foster youth by Clemens et al. (2017a), one participant mentioned deciding between buying toothpaste or a book. Some foster students also identify the need for financial resources to secure reliable internet access to schoolwork as a barrier (Tobolowsky et al., 2019). Students with more economic hardships have lower academic performances and a lower college degree or certificate completion rate than their peers (Okpych & Courtney, 2018a).

Early Parenthood and Foster Youth

Researchers have defined early parenthood as having a child by age 21 (Combs et al., 2018; Shpiegel & Cascardi, 2018). Youth in foster care have higher rates of early parenthood than their peers (Combs et al., 2018; Shpiegel & Cascardi, 2018). At least 44 to 49% of them become parents by age 21, which is more than twice the percentage of early parenthood in general (Combs et al., 2018; Shpiegel & Cascardi, 2018). Early parenthood is associated with lower academic and financial outcomes due to challenges across their roles as parents, students, and employees (Combs et al., 2018; Okpych & Courtney, 2018a; Shpiegel & Cascardi, 2018; Wladis et al., 2018). Due to parental responsibilities, foster students may choose to discontinue

their studies, which may explain their high dropout rates (Combs et al., 2018; Okpych & Courtney, 2018a; Shpiegel & Cascardi, 2018; Wladis et al., 2018).

Regardless of foster-care histories, student-parents can find going to college challenging (Kensinger & Minnick, 2018; Roy et al., 2018; Sallee & Cox, 2019; Wladis et al., 2018). Students must fulfill their parental responsibilities before they can do schoolwork (Kensinger & Minnick, 2018; Roy et al., 2018; Sallee & Cox, 2019; Wladis et al., 2018). In a study of student-parents at community colleges in the United States and Canada, more than half reported having full-time jobs while in college (Sallee & Cox, 2019). They work full time to support themselves and their offspring, which may imply they have less time to study.

Researchers have also shown that student-parents often identify affordable and safe childcare centers as one of the biggest obstacles to college success (Kensinger & Minnick, 2018; Roy et al., 2018; Sallee & Cox, 2019; Wladis et al., 2018). Some colleges and universities have childcare centers, though many have long waitlists (Roy et al., 2018; Sallee & Cox, 2019). Student-parents often do not know that their institutions have childcare centers (Roy et al., 2018; Sallee & Cox, 2019). Even if they can use the childcare centers, they can only leave their children there when in class, meaning they have less time to do college work (Sallee & Cox, 2019).

Not only do student-parents have less time to study, but their children can also influence the quality of their study time (Wladis et al., 2018). For example, parent-students reported that children often interrupted them or they had to pause studying to look after the needs of young children (Wladis et al., 2018). Unlike other student-parents, foster youth may have fewer options for parents or other family members who can look after their children (Roy et al., 2018). Therefore, youth in foster care may have more barriers to overcome than other student-parents.

Too often, when foster youth can study, it is late at night, and they can be too tired to learn productively (Wladis et al., 2018).

Student-parents can face additional challenges in their academic pursuits based on university policies and access to technology (Sallee & Cox, 2019). For example, when student-parents attempted to use libraries and computer labs to do their schoolwork, they faced a major hurdle: These places did not allow children to enter (Sallee & Cox, 2019). With limited financial resources, student-parents may not have computers and printers at home (Sallee & Cox, 2019). Without having access to technological tools, these students can struggle to complete their assignments. Because of these limitations, more than half of student-parents, regardless of foster-care histories, do not finish their educational goals (Wladis et al., 2018).

Family Support and Foster Youth

On top of numerous foster care placements, school moves, trauma, mental disorders, economic hardships, and early parenthood, foster youth may have unsupportive biological and foster families. Without familial support, foster youth may find navigating higher education taxing (Chambers et al., 2018; Cheung et al., 2019; Hill & Peyton, 2017; Skobba et al., 2018). That said, some foster youth are fortunate enough to have supportive foster families, and these lucky foster students thrive academically (Morton, 2016; Skobba et al., 2018). In this section, each of these situations is addressed in more detail.

Unsupportive Biological and Foster Families

Although most college students believe their families provide them with the safety nets they need to succeed academically, foster youth often receive little to no support from their biological or foster families (Chambers et al., 2018; Cheung et al., 2019; Hill & Peyton, 2017; Skobba et al., 2018). Hill and Peyton (2017) found that in a sample size of 71 foster youth who

pursued higher education, 83% and 80% did not receive emotional support from their biological and foster families, respectively. In 2018, Chambers et al. also found that foster youth felt rejected by their biological and foster parents. Likewise, Cheung et al. (2019) and Lane (2017) reported that foster students expressed frustrations toward their families, and they viewed family members as obstacles to their college transitions. For example, these foster students explained that family members looked down on them and discouraged them from earning a college degree (Cheung et al., 2019; Lane, 2017). Without the support of their families, foster youth may turn to other people who can help them grow (Chambers et al., 2018; Cheung et al., 2019). Even so, Chambers et al. (2018) reported that some foster youth left school because they did not perceive any parent-figure support.

Supportive Foster Parents

Not all foster youth have negative views toward their biological and foster parents. Across three studies involving 117 foster youth in the West, Midwest, and Southeast, some acknowledged receiving love and care from their biological and foster parents (Hill & Peyton, 2017; Morton, 2016; Skobba et al., 2018). For example, Hill and Peyton (2017) reported that 4% and 20% of the 73 foster youth they studied indicated that their biological parents and foster parents, respectively, provided them with emotional support when they attended college. In a qualitative study by Morton (2016), foster youth even called their foster parents “mom” and “dad” (p. 104). In studies, foster youth reported that their guardians loved them unconditionally and provided them with the necessary tools to achieve academically (Morton, 2016; Skobba et al., 2018). Foster youth pointed out that their caregivers encouraged them to read and do their homework daily, helping establish norms for them to do well in school (Morton, 2016; Skilbred et al., 2017). Other youth credited their foster parents for persuading them to pursue higher

education (Skobba et al., 2018). Foster youth with supportive parents often have better learning outcomes than those without supportive parents (Morton, 2016; Skilbred et al., 2017; Skobba et al., 2018).

Social Support of Youth in Care

Foster youth may desire social support, particularly when they have minimal familial support. According to a study by Best and Blakeslee (2020), youth seek three types of social support: emotional, concrete, and informational. Foster youth describe emotional support as having a caring and trusting person with whom to talk (Best & Blakeslee, 2020; Clemens et al., 2017a; Heyman et al., 2020). However, concrete support is associated with having a reliable person who can provide foster youth with material needs, such as food and shelter (Best & Blakeslee, 2020). Additionally, foster youth may want to have someone who can offer them informational support or advice (Best & Blakeslee, 2020). When foster youth lack familial and social support, they may feel lonely in school and life (Benbenishty et al., 2018; Chambers et al., 2018; Cheung et al., 2019; Clemens et al., 2017a; Johnson et al., 2020; Miller et al., 2020; Tobolowsky et al., 2019). The following sections will discuss the different types of social support that foster youth may want to receive and the feeling of loneliness they can experience.

Emotional and Concrete Support

Although emotional support can satisfy foster youths' psychological needs, concrete support can provide foster youth with material needs. Psychologically, anyone in a foster student's social network can be an emotional supporter. Foster youth may have small social networks due to numerous relocations and school changes (Chambers et al., 2018; Clemens et al., 2017a; Johnson et al., 2020; Olsen & de Montgomery, 2018; Steenbakketers et al., 2019). Even

if foster youth have social networks, they may not trust the people in those groups (Chambers et al., 2018; Heyman et al., 2020).

Trust is the key theme that foster youth, their caregivers, and social workers often underscore as essential to building strong relationships with foster students (Heyman et al., 2020). Without trust, foster youth may keep their thoughts and feelings to themselves; by doing so, they may feel lonely. Besides emotional needs, foster youth can yearn for concrete support. Best and Blakeslee (2020) stated that foster youth described concrete support as having someone there for them when they need help, thus overlapping with family support. In this situation, their foster parents or social workers can be the best individuals to serve their needs (Best & Blakeslee, 2020).

The feeling of isolation can harm anyone; when unresolved, it can lead to depression (Erzen & Çikrikci, 2018). Nonetheless, foster youth feel isolated (Benbenishty et al., 2018; Chambers et al., 2018; Cheung et al., 2019; Clemens et al., 2017a; Johnson et al., 2020; Johnson et al., 2020; Miller et al., 2020; Tobolowsky et al., 2019). With constant relocations and school changes, foster youth cannot build stable relationships with those around them (Chambers et al., 2018; Johnson et al., 2020). In some cases, foster youth give up wanting to make new friends because foster youth believe they will eventually leave their friends behind (Chambers et al., 2018; Johnson et al., 2020).

In focus groups with 46 foster students, Johnson et al. (2020) documented that foster students wanted to blend in with their classmates, but their histories of foster care held them back. Johnson et al. confirmed the findings of other researchers that foster youth worried about the stigmas associated with the foster care system, so they chose not to have close friends (Benbenishty et al., 2018; Tobolowsky et al., 2019). The types of stigmas can include being

considered criminals, pregnant, and mentally ill (Benbenishty et al., 2018; Johnson et al., 2020; Tobolowsky et al., 2019). One teenager described being a foster youth as “like carrying a ton of bricks” (Johnson et al., 2020, p. 5). Some foster students do not disclose their status to avoid negative stereotypes (Johnson et al., 2020; Kinarsky, 2017). Because they do not reveal their backgrounds, they may not receive the support needed, so their lives can become even more challenging (Cheung et al., 2019). Foster youth can disengage from classes through absenteeism due to feeling unwanted at school (Benbenishty et al., 2018; Johnson et al., 2020), which may widen their achievement gaps.

Informational Support

Lack of academic-related information can pose major challenges to foster youth’s abilities to navigate various cultural aspects of postsecondary education successfully, exacerbating their efforts to accomplish learning goals and outcomes (Best & Blakeslee, 2020). Tobolowsky et al. (2019) conducted a mixed-method study with 56 former foster youth and 28 foster parents, social workers, and community service providers to explore the barriers foster youth faced while in college. This study was comprehensive, as Tobolowsky et al. included multiple perspectives from foster youth and their care providers on the factors that could contribute to their academic achievement in higher education. From this study, 77% and 52% of foster youth reported that no one in their biological and foster families graduated from college. Without having a biological family member or a foster family member who completed college, these foster youth seemed not to receive appropriate academic guidance or financial advice to help them to succeed in higher education (Tobolowsky et al., 2019). For example, 55% needed academic counseling, such as direction on the courses they needed to take to achieve their educational goals (Tobolowsky et al., 2019). Almost half (48%) needed help registering for

classes (Tobolowsky et al., 2019). With little informational support, foster students may not know how to access resources that can benefit them (Skobba et al., 2018; Tobolowsky et al., 2019). At least 63% and 55% did not know they could apply for federal financial aid and educational training voucher funds, respectively, to pay for tuition and living expenses while in college (Tobolowsky et al., 2019). These foster youth also showed frustration accessing institutional resources because of the lack of coordination among different services and uninformed staff (Tobolowsky et al., 2019). Their care providers also acknowledged structural issues within these services (Tobolowsky et al., 2019). Because college staff usually may not understand foster youths' needs or the benefits foster youth can qualify to receive, a delay in the dispersals of funding may occur (Tobolowsky et al., 2019). Without receiving the funding on time, foster youth may find attending college more cumbersome than it should be (Tobolowsky et al., 2019).

College-Readiness of Youth in Foster Care

On top of lacking family and social support, foster youth pursuing a college education may not be college-ready (Okpych & Courtney, 2018a; Sandh et al., 2020; Unrau et al., 2017). Indicators for college readiness often include good high school GPAs, strong math, reading, and writing skills, and completion of a high number of advanced placement (AP) courses before entering higher education (Okpych & Courtney, 2018a; Sandh et al., 2020; Unrau et al., 2017). Foster youth can underperform in all these criteria. In a sample of 329 foster youth, Okpych and Courtney (2018a) reported that 26.4% repeated a grade before enrolling in postsecondary schools. Additionally, students with foster-care histories can have lower average high school GPAs than their classmates (Okpych & Courtney, 2018a; Unrau et al., 2017).

Similarly, other researchers documented that foster students had lower math, reading, and writing levels than non-foster students before college (Okpych & Courtney, 2018a; Sandh et al., 2020). Sandh et al. (2020) surveyed 500 foster youth in one of the largest school districts in the United States to understand the college preparation of foster youth, with discouraging results. Sandh et al. found that only 9.4% of foster youth took AP courses, and only 27.9% passed the AP exams compared to 33.2% and 65.9%, respectively, of their non-foster peers (Davis, 2014). Courses like AP classes are supposed to prepare students for college-level work, but over 90% of foster youth have not taken these courses (Sandh et al., 2020). AP classes are more challenging than other courses, and the underrepresentation of foster youth in these classes reflects that they may be less prepared for college than their peers (Sandh et al., 2020). Not only did most foster youth not enroll in AP courses, but 82% were not in a dual-enrollment program where they could simultaneously take college courses (Sandh et al., 2020). Consequently, students with foster-care histories may not have the academic preparation of other college students, indicating that the achievement gap of foster youth likely exists long before they attend college (Okpych & Courtney, 2018a; Sandh et al., 2020; Unrau et al., 2017).

Summary

A synthesis of this literature review revealed factors contributing to foster youth's achievement in postsecondary education as varied, complex, multifaceted, and interdependent. At the mesosystem, one sees that family- and school-related factors are tightly connected, and both can contribute to the achievement of foster youth. For example, one cannot mention the number of foster placements and ignore the number of school moves that foster youth may endure because the two events are tightly connected (Chambers et al., 2018; Clemens et al., 2016, 2017b, 2018; Hansson & Gustafsson, 2020; Olsen & de Montgomery, 2018). One cannot

discuss the lack of familial support for foster youth (Chambers et al., 2018; Cheung et al., 2019; Hill & Peyton, 2017; Skobba et al., 2018) without discussing the importance of social support that foster youth want to receive (Best & Blakeslee, 2020; Clemens et al., 2017a; Heyman et al., 2020; Tobolowsky et al., 2019). Moreover, foster youth may not be college-ready (Okpych & Courtney, 2018a; Sandh et al., 2020; Unrau et al., 2017). However, factors contributing to this under-preparedness stem from multiple daily challenges foster youth can encounter. These barriers can range from early parenthood (Combs et al., 2018; Shpiegel & Cascardi, 2018), economic hardships (Clemens et al., 2017a; Kelly, 2020; Skobba et al., 2018; Tobolowsky et al., 2019), and family support (Chambers et al., 2018; Cheung et al., 2019; Hill & Peyton, 2017; Skobba et al., 2018) to mental health (Hogan, 2018; Miller et al., 2020; Morton, 2018; Okpych & Courtney, 2018a, 2019; Steenbakkers et al., 2019), coping mechanisms (Morton, 2018; Steenbakkers et al., 2019), foster care placements (Chambers et al., 2018; Mitchell, 2018; Morton, 2018; Steenbakkers et al., 2019), and trauma (Morton, 2018; Steenbakkers et al., 2019).

Within the family microsystem, one sees the interplay among family-related factors such as trauma, mental health, and coping mechanisms. Within the school microsystem, one cannot explore the lack of social support that foster youth may have without attributing the high number of school moves as a potential contributing factor (Chambers et al., 2018; Johnson et al., 2020). Furthermore, the life of each foster youth is unique, and the challenges each one encounter may differ. One foster youth may have an unsupportive foster parent, while another may enjoy their caregiver's love and guidance (Hill & Peyton, 2017; Morton, 2016; Skobba et al., 2018). These differences and interconnectivity suggest that no single solution can address the achievement gap of foster youth. However, the literature highlights the common barriers foster youth face while pursuing higher education. From these common factors, the author designed a needs assessment

to ascertain foster students' perceptions of the usefulness of available organizational supports and resources in one higher education context.

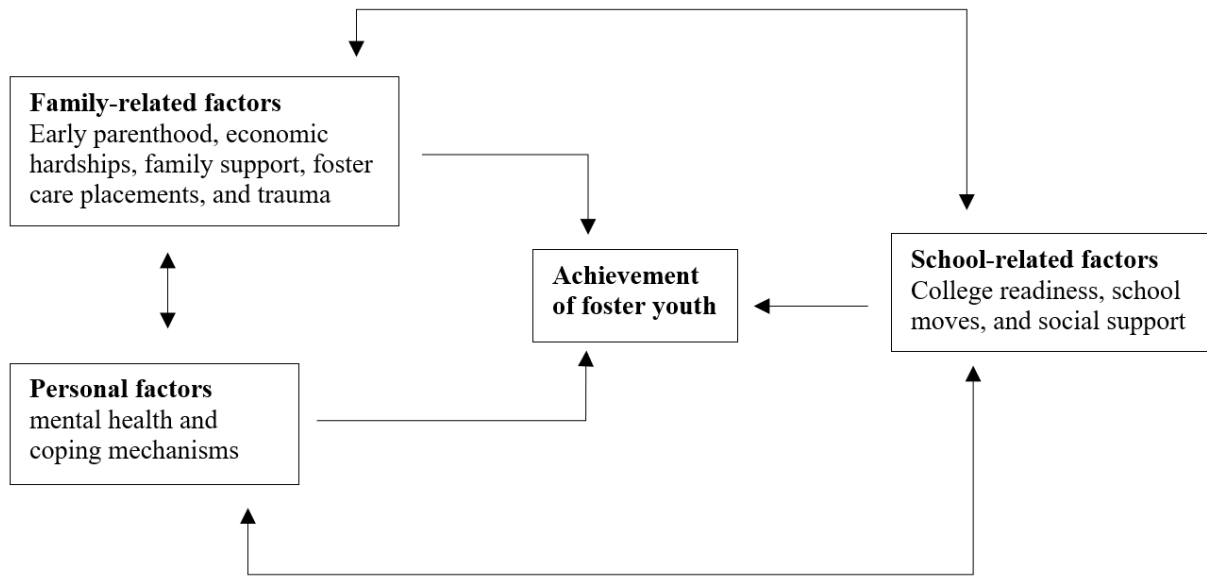
Conceptual Framework

The above literature review showed the contributing factors to the achievement gaps of foster at a community college in a western state. Figure 1.2 captures the interactions among major factors from both the microsystem and mesosystem of EST and illustrates the conceptual framework used to guide the inquiry of the resources and supports available to foster youth within the context of one community college. The factors are grouped into school-related factors, family-related factors, and personal factors. School-related factors include college readiness, school moves, and social support. Family-related factors cover early parenthood, economic hardships, family support, foster care placements, and trauma. Family-related factors include the factors that reside in the family network of both biological and foster care families. Personal factors include mental health and coping mechanisms.

In Figure 1.2, the left-right arrow captures the two-way interactions between each group of factors. Each group of factors can affect the achievement of foster youth, and this one-way relationship is depicted with a single arrow. The college offers many services that serve foster youth and other students to alleviate barriers as they pursue their educational goals at the community college. The goal of the forthcoming needs assessment in the subsequent chapter is to identify the barriers that foster youth encounter and their perceived experiences with the services the community college provides to address/support factors that may hinder their achievement.

Figure 1.2

Factors That Contribute to the Achievement of Foster Youth



Conclusion

Information presented at the beginning of this chapter identified foster youth as one of the most marginalized populations in this country and worldwide. Then, a problem of practice was introduced regarding foster youth’s achievement gaps at one west-coast community college. Information on EST was then presented as a theoretical framework for organizing possible factors that contributed to the problem. The literature on the 10 main factors contributing to foster youth’s achievement gaps was then reviewed. Although foster care placements, school moves, trauma, mental health, coping mechanisms, economic hardships, early parenthood, family support, social support, and college readiness can influence foster youths’ academic performance, not all factors can feasibly be explored in the needs assessment subsequently described. That said, familial, social support, and economic hardships stand out as factors that can be examined in the needs assessment because the context can address these factors through the college’s student services.

Chapter 2

Needs Assessment

A literature review was presented in Chapter 1, in which potential factors contributing to the achievement gap of foster students were identified. In this second chapter, a needs assessment study is described. The objective of this inquiry, guided by the results of the literature review, was sixfold: (a) to understand foster youth's academic backgrounds, (b) to determine the factors that foster students perceived as barriers to achieving their educational goals, (c) to investigate the foster students' experiences with services that a community college provided to address those barriers, (d) to identify services that foster youth found most useful to them, (e) to identify services that foster youth found least useful to them, and (f) to identify services that foster youth wished to receive. The following sections comprise the needs assessment context, the purpose of the needs assessment, research questions, research design, methods, procedure, findings, and discussion.

Context of the Study

A community college in a western state served as the context for this study. The college had approximately 14,144 students (California Community Colleges Chancellor's Office [CCCCO], 2019a). Of those 14,144 students, 639 were foster youth, making up one of the state's largest foster youth populations at the community college level (CCCCO, 2019c). The college offered 93 associate degrees, 60 certificates, and one bachelor's degree (Antelope Valley College [AVC], 2020b). The college offered 37 services to serve its students better (AVC, 2018). However, the researcher only chose to investigate 16 services, as these services aligned with the factors the literature indicated contributed to the achievement gap of foster youth.

These services were the Associated Student Organization (ASO) Hearts and Hands program, the At Risk Community for Homeless Educational Services (ARCHES) program, the California Work Opportunity and Responsibility to Kids (CalWORKs) program, the Campus Connect (Bus Pass) program, the Career Center, the Extended Opportunity Programs and Services (EOPS), the Financial Aid and Scholarships program, the Guardian Scholars Foster Youth program, the Health Services, the Office for Students With Disabilities program, the Students Raising Children program, the Student Transition Academic Retention (STAR) program, the Books Help Enhance Learning Possibilities (Books H.E.L.P.) program, the Counseling Center, the Job Placement Center (JPC), and the Learning Center (AVC, 2018, 2020a, 2020c, 2020d, 2020e). A short description for each service is listed in Appendix A. Out of those services, only the Guardian Scholars Foster Youth program was designed to support foster youth. The Guardian Scholars Foster Youth program was a comprehensive program that provided foster youth with academic counseling, financial guidance, academic supplies, fresh food, used clothes, and bus passes (AVC, 2020c). It also connected foster youth to other services, such as childcare, housing, health, and communal services (AVC, 2020c).

Even with the current programs, the achievement gap of foster youth attending this community college still exists. In the fall of 2020, foster students' success rate for credit courses was 13.56% lower than that of students in general (CCCCO, 2019b, 2019d). The CCCCCO (n.d.) defined success rate for credit courses as passing the courses with at least a C. Passing credit courses was essential for foster youth to complete a certificate or an associate degree successfully or to transfer to a 4-year institution. Thus, this study aimed to understand possible barriers, such as college readiness, social support, and economic hardships that foster youth

could face in community college. The study also focused on the perceived experiences they had with college services aimed to address those barriers.

This researcher defined a barrier to education as a personal or social issue that would prevent students from achieving their educational goals (C. Eith, personal communication, April 17, 2020). Service was defined as a program or set of resources the school offered its students. Though the results of this study may not directly impact foster youth who attended college at that time, the results can help to enhance college services and subsequently improve the academic performance of future foster youth. Other community college students may benefit from this work, as 15 of 16 services studied served all students.

Statement of the Purpose

In Chapter 1, 10 factors that can influence the academic performance of foster youth in college emerged from an in-depth literature review. These factors included trauma, the number of foster care placements, school moves, mental health, coping mechanisms, economic hardships, early parenthood, family support, social support, and college readiness. When foster youth arrive at a community college, most are academically behind their classmates (Ferrara & Panlilio, 2020; Okpych & Courtney, 2018a; Sandh et al., 2020). Foster youth have lower high school GPAs and SAT/ACT scores than their non-foster peers (Sandh et al., 2020; Unrau et al., 2017). Foster youth may not have adequate reading, math, and writing skills that can allow them to succeed in college (Ferrara & Panlilio, 2020; Sandh et al., 2020).

Many foster youths are young parents. With parental responsibilities, they often do not have enough time to do college work (Kensinger & Minnick, 2018; Roy et al., 2018; Sallee & Cox, 2019; Wladis et al., 2018). They can experience economic hardships throughout their lives (Clemens et al., 2017a; Heyman et al., 2020; Kelly, 2020; Okpych & Courtney, 2018a; Skobba et

al., 2018; Tobolowsky et al., 2019). Some foster youths are homeless, while others can face food insecurities (Clemens et al., 2017a; Kelly, 2020; Skobba et al., 2018; Tobolowsky et al., 2019). Some work full time to keep up with their living expenses (Okpych & Courtney, 2018a), while others may hold multiple low-paying positions (Skobba et al., 2018; Tobolowsky et al., 2019). Unlike their peers, foster youth can lack family support (Chambers et al., 2018; Cheung et al., 2019; Skobba et al., 2018).

Additionally, mental health issues are common among foster youth that results from past traumatic events (Hogan, 2018; Miller et al., 2020; Morton, 2018; Okpych & Courtney, 2018a, 2019; Steenbakkens et al., 2019). Moreover, youth in care often feel lonely due to having limited social networks, if at all (Benbenishty et al., 2018; Chambers et al., 2018; Cheung et al., 2019; Clemens et al., 2017a; Johnson et al., 2020; Miller et al., 2020; Tobolowsky et al., 2019). Some have alcohol and substance abuse issues (Greeno et al., 2019; Okpych & Courtney, 2019). Foster youth can also experience multiple displacements in schools and foster homes (Chambers et al., 2018; Clemens et al., 2016, 2017b, 2018; Hansson & Gustafsson, 2020; Steenbakkens et al., 2019; Olsen & de Montgomery, 2018). Lastly, they can encounter various types of trauma (Ferrara & Panlilio, 2020; Morton, 2018; Steenbakkens et al., 2019). All these factors can negatively influence foster students' academic performances.

The purpose of this study was to conduct a needs assessment of foster youth regarding factors that could influence their academic achievement while pursuing an education in one particular community college. The factors were organized within three larger constructs: college readiness, perceived social support, and perceived financial hardships. The researcher evaluated the quality of the college services and resources they received and the additional services they wanted the college to offer. The goal of this needs assessment study was to gather the

information that would ultimately inform what interventions by the community college might advance services that would better support foster youth in their academic achievement. .

Research Questions (RQs)

The study attempted to answer the following six research questions to assess foster youth factors:

RQ1: What is the academic background of foster youth at the community college?

RQ2: What are the perceived economic hardships facing foster youth?

RQ3: What are the perceptions of foster youth regarding their perceived levels of social support?

RQ4: Which college services do foster youth find most useful?

RQ5: Which college services do foster youth find least useful?

RQ6: What additional types of school services do foster youth wish to have?

Research Design

A mixed-methods design was used to conduct this study. Mixed-methods research is an approach that combines both quantitative and qualitative data collection and analyses into the same study (Johnson & Onwuegbuzie, 2004; Lochmiller & Lester, 2017). Mixed-methods research bridges the gap between quantitative and qualitative research and selects the best qualities from both (Johnson & Onwuegbuzie, 2004; Lochmiller & Lester, 2017). Although quantitative data allowed the researcher to identify patterns in a study, qualitative data helped the researcher to understand the meaning behind the data (see Johnson & Onwuegbuzie, 2004; Lochmiller & Lester, 2017). Further, mixed-methods research was used, as the research questions aligned with quantitative and qualitative methodologies. For example, RQ1 to RQ3

addressed the quantitative strand of the data, and RQ4 to RQ6 covered the qualitative aspect of the study.

Methods

This section details the characteristics of the participants and the instruments used to collect data. The recruitment process and demographic data of participants are described. In addition, the protocols and processes for collecting data are defined.

Participants

The community college's definition of "foster youth" was used to identify 1,197 potential participants for this empirical research. According to a personal conversation with the organizational sponsor, foster youth at the college were coded as current and former foster youth (J. Zimmerman, personal communication, January 30, 2021). Former foster youth had been a part of the foster system at one point in their lives but left the system early or aged out of it. That said, this study excluded foster students under 18 years old. The college identified foster students based on their answers to the college admissions application questions and Free Application for Federal Student Aid forms. Foster students who chose not to indicate their foster status on those two applications could not be included in the study as the researcher had no means by which to identify and reach them.

One-thousand-one-hundred-ninety-seven foster youth were invited by email to take an anonymous online survey. However, according to the data available for Spring 2021, only 444 foster students actively enrolled at the college (AVC, 2021b). Thus, this number was used for data analysis. A staff member suggested that the email invitation contained these statements: "Your voice matters. Your opinion matters." These statements aimed to empower foster youth to take part in the survey. The invitation email also indicated that if foster youth chose to participate

in the survey, they would receive a “Books H.E.L.P. Golden Ticket” and the chance to win one of five \$10 Starbucks gift cards. The Books H.E.L.P. Golden Ticket allowed foster youth to pick up their rental textbooks early. The email contained a link to an anonymous online survey administered through Qualtrics.

One-hundred-sixty-five individuals (37.16%) responded to the survey. Of those, 10 foster youth were underaged, and 13 participants identified as non-foster youth. Those prospective participants were routed to the end of the survey as they were unqualified to participate. The remaining 142 participants met the criteria of age and foster youth status; therefore, they could continue to complete the survey. However, after they self-identified as foster youth, only 109 (24.55%) chose to continue taking the survey. This sample had 90 females (83.33%), 16 males (14.81%), 1 non-binary/third gender (0.93%), 1 person who preferred not to indicate their gender identification (0.93%), and 1 person who skipped the question on gender identity (0.93%). Participants included 42 (38.53%) African Americans, 36 (33.03%) Hispanics (Latino), 24 (22.02%) Whites (non-Hispanics), 6 (5.50%) American Indians or Alaska Natives, and 1 (0.92%) Asian. Most participants were single (88.99%, $n = 97$). The demographics of the participants are tabulated in Table 2.1. Their majors are shown in Table 2.2.

Table 2.1*Participant Demographics*

Variable	Number	%
Foster youth status (<i>n</i> = 107)		
Former	80	74.77
Current	27	25.23
Gender (<i>n</i> = 108)		
Female	90	83.33
Male	16	14.81
Non-binary/third gender	1	.93
Prefer not to say	1	.93
Race (<i>n</i> = 109)		
African American	42	38.53
Hispanic/Latino	36	33.03
White (non-Hispanic)	24	22.02
American Indian/Alaska Native	6	5.50
Asian	1	.92
Marital status (<i>n</i> = 109)		
Single	97	88.99
Married	12	11.01

Table 2.2*Academic Majors of Foster Youth*

Variable	Number	%
Psychology	15	13.76
Administration of Justice	14	12.84
Nursing	14	12.84
Education	9	8.26
Sociology	8	7.34
Aircraft Fabrication and Assembly	6	5.50
Business	6	5.50
Liberal Arts and Sciences	5	4.59
Clinical Medical Assistant	4	3.67
Undeclared	4	3.67
Real Estate	3	2.75
Air Conditioning Specialist	2	1.83
Biology	2	1.83
Electrical Technology	2	1.83
English	2	1.83
Film, TV, and Electronic Media	2	1.83
Kinesiology	2	1.83
Mathematics	2	1.83
Airframe and Powerplant	1	0.92
Business Administration	1	0.92
Computer Science	1	0.92
Electrical Engineering	1	0.92
Engineering	1	0.92
Photography	1	0.92
Political Science	1	0.92
Total	109	100

Response rates varied by question, as participants could skip and not answer every survey question. For example, on the closed-ended question about food security, the response rate dropped to 95.42% ($n = 104$). For the open-ended question on college services foster youth wanted to receive, the response rate was only 61.47% ($n = 67$).

Instrumentation

Data were collected via two sources: pre-existing data and an online survey. Although the survey collected quantitative and qualitative data, pre-existing data contained only quantitative data. Quantitative data aimed to uncover the barriers that foster youth might experience when in college. Qualitative data were obtained to gain a deep understanding of foster students'

experiences with the services they found most useful, least useful, and services they wished to have. Both data sources are described fully in this section.

Pre-existing Data

The academic background of foster youth came from a campus database. Academic background was measured using the average college GPA. Academic background showed whether foster students were college ready. College readiness was one of the 10 factors the literature emphasized could contribute to the achievement gap of foster youth who pursued a college education. This information helped to answer the first research question of this needs assessment study.

Online Survey

An anonymous online survey was developed to collect data on factors the literature revealed to contribute to foster youth's achievement and their experiences with the community college's services and resources. The beginning of the survey contained a consent statement. The survey (see Appendix B) had 14 items; two were answered through a Likert scale. Seven questions were closed ended, and five questions were open ended. The first portion of the survey contained background information. The questionnaire included demographic information, the major, and the number of courses a foster student had taken at the college. The next two questions sought information on economic hardships and social support experienced by foster youth. These two questions were adapted from the work of Okpych and Courtney (2018a).

Economic hardships were measured using foster students' abilities to afford clothes, rent, food, utility bills, and transportation in the past year. Foster youth could choose between "I had sufficient resources," and "I could have used additional resources." The response to this item helped to answer the second research question. Social support was measured with a question

addressing how often one felt there was someone to rely on for help. The options were *none of the time, a little of the time, some of the time, most of the time, and all of the time*. Information from this question addressed the third research question.

The second portion of the survey focused on the experiences of foster youth with college services. This second section measured their perceptions of the usefulness of the programs that the school provided to its foster students. The survey on school services was derived from Cooper et al. (2008). School services included 15 programs the college provided to all its students and one program specifically designed for foster youth. Foster students were asked if they had used these services. Additionally, foster students were requested to list the three most useful services, the three least useful services, and three others they wanted to receive. The indicators for school services helped identify the most helpful services for foster youth and discover potential gaps in the current programs. The second portion of the survey helped to answer the last three research questions.

Procedure

Institutional Review Board approvals were obtained from the researcher's doctoral institution and the site institution in the fall of 2020. Data collection occurred in the spring of 2021. A detailed description of the procedures used for data collection and analyses are discussed in the following sections.

Data Collection

This section contains information about data collection. The section includes the average college GPA and survey information. The next section consists of information about data analysis.

Average College GPA

The average GPAs of all foster youth in the spring of 2021 were obtained from data the community college published on Tableau Public (AVC, 2021b). The data were de-identified, and no names or contact information were included. The data were reported in an aggregate form.

Survey

At the beginning of the third week of spring 2021, all foster youth registered with the college were invited to participate in the study via email. The author drafted the email, and a staff member who reported to the organizational sponsor sent out the invitation email. After the initial email invitation, the same staff member sent out two reminder emails. Each reminder email was sent out a week apart. After 3 weeks, the researcher closed the survey. After completing the survey, foster youth were prompted to email the organization's sponsor to enter the drawing to win. This procedure ensured that the researcher had no means to track the participants, and the organizational sponsor had no access to the responses. After the organizational sponsor gave out the prizes, they destroyed the list of the winners, and the list could no longer be reviewed.

Data Analysis

After the survey was closed, the researcher downloaded the data from Qualtrics and analyzed the data. Because the survey contained qualitative and quantitative data, the researcher separated the original file into two files: qualitative and quantitative. The researcher analyzed the two data files separately. A detailed description of the data analyses follows.

Quantitative Data

Before data analysis, pairwise deletion was used to remove missing data (Lochmiller & Lester, 2017). Then, descriptive and inferential statistics were conducted using IBM SPSS

version 26. Inferential statistics entailed creating a composite variable, economic hardships, by combining the scores of the five criteria that measured the level of economic hardships (1 = *I could have used additional resources*, and 2 = *I had sufficient resources*) experienced by foster youth. The independent variables were foster youth status, marital status, gender, and race. The dependent variables were economic hardships and social support. Social support was measured as the perceived level of social support that foster youth had (0 = *none of the time*, 1 = *a little at the time*, 2 = *some of the time*, 3 = *most of the time*, and 4 = *all of the time*). The social support scale was based on Okpych and Courtney (2018a).

To determine the type of statistics needed for the data analysis, the Levene's test, Z scores, histograms, skewness, Kurtosis, Shapiro-Wilk test, and Q-Q plot were used to check the data for normality, homogeneity of variance, and homoscedasticity (Ghasemi & Zahediasl, 2012; Johns Hopkins University Dissertation Clinic, 2017). In all cases, the p values in the Shapiro-Wilk test for economic hardships and social support showed values that were less than statistically significant ($p < .01$; Ghasemi & Zahediasl, 2012; Johns Hopkins University Dissertation Clinic, 2017). Thus, the data were likely not normally distributed, and no other tests for normality were needed.

In analyzing the data, nonparametric statistics were utilized. The Mann-Whitney U test was chosen to compare the differences between current and former, between single and married, between female and male, between African American and White (non-Hispanic), between Hispanics/Latino and White (non-Hispanic), and between African American and Hispanic/Latino foster students on the perceived the levels of economic hardships and social support. The researcher used the Mann-Whitney U test to identify the difference between two independent groups (Knapp, 2017). That said, Asian foster students ($n = 1$) and American Indian/Alaska

Native foster students ($n = 6$) were excluded from the inferential analyses due to their small sample sizes. The Spearman-Rho test was used to identify the relationships between the perceived level of economic hardships and the perceived level of social support among foster youth. The Spearman-Rho test allowed the researcher to analyze data that were not normally distributed (see Knapp, 2018).

Qualitative Data

For the qualitative data, I used thematic analysis to identify the patterns in the replies of foster youth to the open-ended questions. Braun and Clarke (2006) defined thematic analysis as “a method for identifying, analyzing, and reporting patterns (themes) within data” (p. 79). I chose thematic analysis because it allowed me to see patterns in the data. To search for themes, I first coded the data. I used in vivo coding, descriptive coding, magnitude coding, and an inductive approach to develop the codes concurrently. I found this coding scheme more natural for me to analyze the data. In vivo coding is a procedure where a researcher uses a participant’s actual word or phrase as a code (Miles et al., 2013). In descriptive coding, an investigator uses a word or phrase to summarize a participant’s response (Miles et al., 2013). In magnitude coding, however, a researcher can capture a particular code’s intensity and frequency by counting each code and giving it a magnitude (Miles et al., 2013). For example, the most useful services were assigned a positive sign, the least useful services were assigned a negative sign, and the desired services were given an asterisk symbol. Magnitude coding helped me identify the top services that foster youth reported as most useful, least useful, and desirable.

In this work, a particular service was used as a code if a word or a phrase was most closely associated with that service. For example, the participants mentioned that they wanted a “free meal” or “Cal Fresh benefit” (Cal Fresh is a state program that provides free, fresh food to

food-insecure families). These phrases implied that foster students needed food, so the terms were coded ASO Hearts and Hands. The ASO Hearts and Hands program is a college program that provides students with free fresh food. The codes for the most useful services, least helpful services, and desirable services are listed in Appendix C. The codebook (see Appendix C) included codes, definitions of codes, magnitudes, examples, subcodes, frequencies, and themes. The results and respective discussion from the data analyses are discussed in the next section.

Findings and Discussion

The findings and discussion for each research question are explored in this section. The results are organized sequentially according to the research questions proposed earlier. The section starts with the academic background of foster youth. Then, it covers the economic and social barriers that foster youth thought they had. Next, it addresses the college services that foster youth found most useful, least helpful, and wanted to receive. Lastly, the limitations of the study are discussed.

Academic Background

Like other reports in the literature, foster youth in this study had indicators of lower academic performance than their peers. They had a lower average college GPA (2.4) than the average college GPA of other students (2.8; AVC, 2021b). Even before foster youth entered college, Sandh et al. (2020) and Unrau et al. (2017) documented a lower average GPA than their non-foster peers. This information suggests that the achievement gap of foster youth likely exists before they enter postsecondary school. As they attend college, they are likely already behind their classmates. Okpych and Courtney (2018a) found no correlation between foster students' high school academic performance and college degree completion. This finding suggests that academic background alone cannot dictate the achievement of foster youth in higher education.

Indeed, these researchers reported that social support, being a parent, and economic hardships could influence the learning outcomes of foster youth in college.

Most foster youths in this study had been in college for about three semesters and majored in mental health, social justice, and health care. Foster youth reported that, on average, they had taken approximately 14 college courses, equivalent to 3.5 semesters if they attended the college fulltime for each semester (the author assumed that each course was three units, and 12 units were the full course load for each semester). The top three most popular majors that foster youth chose were Psychology, Administration of Justice, and Nursing (see Table 2.2). As noted by Steenbakkens et al. (2019), in a study of foster youth in the Netherlands, foster youth can seek to turn trauma into positive life impacts. The selection of these fields of study may result from that effect. The next section covers the perceived economic hardships that foster youth face to identify the needs of foster youth.

Economic Barriers

On the research question of the perceived economic hardships, foster students reported they experienced multiple barriers. Economic hardships were widely documented in the literature on foster youth (Clemens et al., 2017a; Heyman et al., 2020; Kelly, 2020; Okpych & Courtney, 2018a; Skobba et al., 2018; Tobolowsky et al., 2019). In the five criteria that measured economic hardships, such as buying clothes, paying utility bills, paying rent, paying for transportation, and paying for food, 63%, 62%, 59%, 53%, and 52% of the participants indicated they needed additional resources, respectively (see Table 2.3). Heyman et al. (2020) identified clothing as a basic need, yet many of the foster youth in the authors' study and this study indicated they did not have adequate clothing. Having adequate clothing is essential for survival, as clothing can keep an individual warm, especially during the winter (Denton, 1990). Additionally, dressing

adequately for a job interview could determine whether an individual receives an offer (Doyle, 2019).

Table 2.3

Descriptive Statistics for the Perceived Economic Hardships of Foster Youth

Variable	Total	Had sufficient resources		Needed additional resources	
		<i>n</i>	%	<i>n</i>	%
Clothes	106	39	36.8	67	63.2
Utility	106	40	37.7	66	62.3
Rent	106	44	41.5	62	58.5
Transportation	107	50	46.7	57	53.3
Food	104	50	48.1	54	51.9

Not only did foster youth want more resources for clothing, but they also desired more housing support. Approximately 62% of foster youth thought they needed more financial support to pay for utilities, and 59% would like to have received more resources to pay for rent. Both rent and utilities fall under the umbrella of housing. Housing insecurity is common among foster youth (Clemens et al., 2017a; Kelly, 2020; Skobba et al., 2018; Tobolowsky et al., 2019). In addition to housing insecurity, 52% and 53% of foster students believed they needed more resources to pay for food and transportation, respectively. Perhaps because of economic hardships, foster youth identified the Financial Aid and Scholarships program as the most useful service on campus (see Table 2.4). When Okpych and Courtney (2018a) used these five criteria (buying clothes, paying rent, paying for food, paying utility bills, and paying for transportation) to measure economic hardships among foster youth, they found that the hardships were negatively correlated with foster youth’s college graduation rate.

Table 2.4*Descriptive Statistics for College Services That Foster Youth Used*

Service ^a	Frequency	%
Financial Aid & Scholarships	94	94.00
Counseling Center	52	52.00
Books H.E.L.P.	43	43.00
EOPS	36	36.00
Learning Center	35	35.00
Guardian Scholars Foster Youth	24	24.00
ASO Hearts and Hands	24	24.00
OSD	22	24.00
Campus Connect	21	21.00
CalWorks	20	20.00
Job Placement Center	18	18.00
Health Services	17	17.00
Career Center	16	16.00
STAR	9	9.00
Students Raising Children	3	3.00
ARCHES	1	1.00

^a*n* = 100 for each service.

To address all five criteria of economic hardships that foster youth might experience, the college had programs like the ASO Hearts and Hands program, the ARCHES program, the Guardian Scholars Foster Youth program, and the Campus Connect program. The ASO Hearts and Hands program provided students with free fresh food and used clothes. Both the ARCHES program and the Guardian Scholars Foster Youth program had services that connected foster youth to housing resources. The Campus Connect program offered eligible college students free bus passes within local areas to assist them with transportation. On average, 58% of foster youth still mentioned that their needs had not been met in all five criteria of financial hardships (see Table 2.3). These unmet needs had two possible explanations. One explanation could be that the services offered did not have enough resources to meet foster youth's demands, for example, the Financial Aid and Scholarships program. Ninety-four percent of foster youth reported using this service (see Table 2.4) but still reported financial hardships. A second explanation could be that foster youth were uninformed of other college services and could not access resources that could

supplement their financial aid awards. This explanation was plausible as fewer than 43% of foster youth used services other than the Financial Aid and Scholarships program and the Counseling Center (see Table 2.4). For example, only one participant accessed the ARCHES program when it aimed to assist them with housing resources. Similarly, only 24% of foster youth had used the Guardian Scholars Foster Youth program.

Although the researcher hoped to identify specific needs unique to each foster youth group based on their foster youth status, their marital status, their gender, and their race, the results did not yield significant variations between the different groups on the perceived economic hardships (see Tables 2.5 to 2.10). The only exception was between African American and Hispanic/Latino foster students ($z = -2.85; p < .01$). Hispanic/Latino foster youth reported higher perceived levels of financial hardships than African American foster youth (see Table 2.8). One explanation may be that Hispanic/Latino students are usually newer immigrants than African American students. As new immigrants, Hispanic/Latino students may not be familiar with the U.S. educational system (Schneider et al., 2006), so they may not know the college resources that can lessen their financial burdens. Additionally, as new immigrants, individuals within their support networks may have language barriers (Schneider et al., 2006), minimizing their abilities to access campus resources. In all other cases of perceived economic hardships, the differences were not statistically significant ($p \geq .05$). However, the mean ranks of female and male foster youth on the perceived economic hardships were different by 11 points (see Table 2.7). This trend might indicate that female foster students reported more financial barriers than male peers. One possibility can be that females may have to spend more resources on necessary, female-related items, like tampons, when males do not.

Table 2.5

Difference Between Current and Former Foster Youth on Perceived Economic Hardships and Perceived Social Support

	Current	Former		
	Mean rank	Mean rank	Z-value	p
Economic hardships	55.73	48.66	1.09	.28
Social support	54.19	53.94	-.04	.98

Note. The sample sizes for economic hardships included 26 current and 74 former foster youth.

The sample sizes for social support included 27 current and 80 former foster youth.

Table 2.6

Difference Between Married and Single Foster Youth on Perceived Economic Hardships and Perceived Social Support

	Married	Single		
	Mean rank	Mean rank	Z-value	p
Economic hardships	44.55	52.34	-.84	.41
Social support	59.13	54.49	-.49	.62

Note. The sample sizes for economic hardships included 11 married and 91 single foster youth.

The sample sizes for social support included 12 married and 97 single foster youth.

Table 2.7

Difference Between Female and Male Foster Youth on Perceived Economic Hardships and Perceived Social Support

	Female	Male		
	Mean rank	Mean rank	Z-value	p
Economic hardships	51.80	40.66	-1.45	0.15
Social support	52.07	61.53	-1.17	0.25

Note. The sample sizes for economic hardships included 83 female and 16 male foster youth.

The sample sizes for social support included 90 female and 16 male foster youth.

Table 2.8*Difference Between African American and Hispanic or Latino Foster Youth on Perceived**Economic Hardships and Perceived Social Support*

	African American	Hispanic/Latino	Z-value	p
	Mean rank	Mean rank		
Economic hardships	29.99	43.78	-2.85	.00*
Social support	38.40	40.78	-.48	.64

Note. The sample sizes for economic hardships included 38 African American and 34

Hispanic/Latino foster youth. The sample sizes for social support included 42 African American and 36 Hispanic/Latino foster youth. * $p < .01$.

Table 2.9*Difference Between African American and White (non-Hispanic) Foster Youth on Perceived**Economic Hardships and Perceived Social Support*

	African American	White (non-Hispanic)	Z-value	p
	Mean rank	Mean rank		
Economic hardships	28.39	35.30	-1.52	.13
Social support	30.02	39.58	-2.01	.05

Note. The sample sizes for economic hardships included 38 African American and 23 White

(non-Hispanic) foster youth. The sample sizes for social support included 42 African American and 24 White (non-Hispanic) foster youth.

Table 2.10*Difference Between Hispanic or Latino and White (non-Hispanic) Foster Youth on Perceived**Economic Hardships and Perceived Social Support*

	Hispanic/Latino	White (non-Hispanic)	Z-value	p
	Mean rank	Mean rank		
Economic hardships	31.16	25.80	-1.22	.23
Social support	27.79	34.56	-1.53	.13

Note. The sample sizes for economic hardships included 34 Hispanic/Latino and 23 White (non-

Hispanic) foster youth. The sample sizes for social support included 36 Hispanic/Latino and 24

White (non-Hispanic) foster youth.

Table 2.11*Descriptive Statistics for the Perceived Social Support of Foster Youth*

Time	Frequency	%
A little of the time	28	25.7
All of the time	11	10.1
Most of the time	11	10.1
None of the time	27	24.8
Some of the time	32	29.4
Total	109	100

Social Support

About 80% of foster youth reported that they had no one to rely on most of the time and all of the time (see Table 2.11). That said, the differences between the different groups of foster youth based on their foster youth statuses, their marital statuses, their genders, and their races on the perceived levels of social support were not statistically significant ($p \geq .05$; see Tables 2.5 to 2.10). Nonetheless, according to Table 2.9, the difference between African American and non-Hispanic White foster students on the perceived social support was approaching significance ($p = .05$). The trend may exemplify that African American foster students may experience less social support than their non-Hispanic White classmates. This situation may be true, especially when the findings from Gallup’s surveys showed that African American students felt less supportive than their non-Hispanic White peers in college (Harlan & Marken, 2020).

Another noteworthy pattern is the perceived social support between female and male foster students. Even though this difference was not statistically significant, the mean rank of the perceived social support in male foster students was 10 points higher than their female counterparts (see Table 2.7). This pattern might corroborate the trend that female foster youth reported more financial hardships than males. When students experience multiple economic hardships, they may feel helpless and attribute financial burdens to a lack of social support.

Nevertheless, social support and economic hardships can influence one another. Skobba et al. (2018) and Tobolowsky et al. (2019) documented that financial burdens could result from limited social networks. Another explanation can be that female students may experience more stress in college than male peers (Graves et al., 2021). When female foster students feel stressed, they may attribute it to lacking a social network, which can exacerbate their perceived level of social support.

Hispanic/Latino foster youth reported higher perceived levels of financial hardships than African American foster youth when both groups had similar perceived levels of social support (see Table 2.8). These findings contradict each other, as the literature often shows that the lack of social support can lead to economic hardships (Skobba et al., 2018; Tobolowsky et al., 2019). These results indicate that other factors can influence the perceived economic hardships of foster youth.

Another unexpected finding was the relationship between the perceived levels of economic hardships and the perceived levels of social support among foster youth. According to Table 2.12, the results of the Spearman Rho test indicated that there was a significant, positive correlation between the perceived levels of economic hardships and the perceived levels of social support among foster youth, $r(100) = .40, p < .01$. In other words, foster youth who thought they had an extensive social network believed they experienced more economic hardships than others. This situation could occur in a social network that mainly consisted of individuals who lived in poverty. Approximately 90% of the students enrolled at the college received financial assistance (National Center for Education Statistics, 2019). Consequently, although foster youth might have high levels of social support, their views of financial hardships could compound. This finding contradicted the pattern between economic hardships and social support of female and male

foster youth. This mixed finding may be due to the difference in sample sizes of female foster students ($n = 83$) and male foster students ($n = 16$; see Table 2.7).

Table 2.12

Spearman Rho Correlation for Perceived Economic Hardships and Perceived Social Support of Foster Youth

Variable ^a	1	2
Economic hardships	—	.40*
Social Support	.40*	—

^a $n = 102$ for each variable.

* $p < .01$, two-tailed.

The Most Useful Services

The three top services that foster youth indicated they had used were the same as those they described as most beneficial (see Table 2.4 and Table 2.13). The Financial Aid and Scholarships program, the Counseling Center, and the Books H.E.L.P. program included these services. From the quantitative data (see Table 2.4), 94% of the participants mentioned using the Financial Aid and Scholarships program. Fifty-two percent had used the Counseling Center, and 43% had used the Books H.E.L.P. program.

Table 2.13

The Top Three Services That Foster Youth Found Most Useful, Least Useful, and Wanted to Have

Service	Frequency	Percentage
Most useful services (<i>n</i> = 94)		
Financial Aid & Scholarships	55	58.51
Counseling Center	29	30.85
Books H.E.L.P.	26	27.66
Least useful services (<i>n</i> = 41)		
Health Services	9	21.95
Students Raising Children	9	21.95
CalWORKs	8	19.51
Campus Connect (bus pass)	8	19.51
Wanted services (<i>n</i> = 35)		
ARCHES	8	22.86
Counseling Center	7	20.00
ASO Hearts and Hands	4	11.43
Financial aid & scholarships	4	11.43
Health services	4	11.43
New courses ^a	4	11.43

Note. The percentages did not add up to 100% because each foster youth could list a different number of services for each answer.

^aServices that were not included in the survey.

The qualitative data for this research question yield two major themes: financial support and guidance. The theme of financial support echoed earlier works that foster youth faced economic hardships (Clemens et al., 2017a; Heyman et al., 2020; Kelly, 2020; Okpych & Courtney, 2018a; Skobba et al., 2018; Tobolowsky et al., 2019). Perhaps due to their financial insecurities, almost 60% identified that the Financial Aid and Scholarships program was the most useful college service. That said, under the theme of financial support, there were nine different services (see Appendix C). The type of financial services that foster youth viewed as helpful, unhelpful, and desirable could vary based on their needs and backgrounds. Among these nine services, the Books H.E.L.P. program was one. Textbooks can be expensive, and every college student needs textbooks, whether the books are physical books or ebooks. Consequently, the

Books H.E.L.P. program was among the top three services that foster students thought benefited them the most.

Aside from financial support, guidance was another central theme of the qualitative data. This theme reaffirmed other researchers' findings that foster youth desired guidance due to a lack of a traditional family and social network (Best & Blakeslee, 2020; Clemens et al., 2017a; Heyman et al., 2020). Under the theme of guidance, there were nine services (see Appendix C), and foster youth seemed to value all nine services. None of these services were among the top three least useful (Table 2.13). Moreover, foster youth identified the Counseling Center as the second most helpful service. Because foster youth indicated that the Financial Aid and Scholarships program, the Counseling Center, and the Books H.E.L.P. program were most useful, the college might want to allocate more resources to these services as the services served not only foster youth but also all students at the college.

The Least Useful Services

For the least useful college services, foster youth reported the Health Services, the Students Raising Children Program, the CalWORKs program, and the Campus Connect program (see Table 2.13). The CalWORKs program and the Campus Connect program had the same ranking. The code for health care was Health Services, and the Health Services provided basic medical, dental, and mental health treatments for all students at the college. About 22% of the respondents identified the Health Services and the Students Raising Children Program as the least useful services (see Table 2.13). For the Health Services, perhaps foster students did not need this program because they qualified for Medi-Cal. Medi-Cal is a health care program run by California that offers free medical and dental treatments for low-income families.

Additionally, family plans could cover foster youth if they were under 26 years old. As for the Students Raising Children Program, foster students would not use this service if they were not parents. According to Table 2.1, 89% of the participants identified themselves as being single, which might imply that they were less likely to be parents. One foster student said, “I live with my dad and don’t have kids.” The same explanation could apply to the CalWORKs program.

The most surprising results of all came from the question of whether the foster student had accessed the Guardian Scholars Foster Youth program. Seventy-six percent of the participants answered, “No.” At first, the results seemed inaccurate, considering this college service was specifically designed for foster youth. However, when analyzing the qualitative data on foster youth’s perceived experiences with college services, the researcher found that only one youth mentioned the Guardian Scholars Foster Youth program in their responses. They did not call out the program by name; they just wrote that the “foster youth assistance” was useful to them. In other words, most foster students were unfamiliar with this service or chose not to associate themselves with it. Although the Guardian Scholars Foster Youth program results were unexpected, they aligned with the literature. The literature has shown that foster youth often were unaware of the services they could receive (Skobba et al., 2018; Tobolowsky et al., 2019). In some cases, they chose to opt out of campus services for fear of being stigmatized (Cheatham et al., 2021; Kinarsky, 2017).

The Desired Services

When foster youth were asked to identify college services they wanted to receive, they listed the ARCHES program, the Counseling Center, the ASO Hearts and Hands program, the Financial Aid and Scholarships program, the Health Services, and new courses, in descending

order (see Table 2.13). The ASO Hearts and Hands program, the Financial Aid and Scholarships program, the Health Services, and new courses had the same frequency of four counts.

Under the theme of financial support, there were some discrepancies in the results. For instance, none of the participants identified ARCHES as a useful program, yet ARCHES was at the top of the list under the category of college services that foster youth wished to have (23%; see Table 2.13). The finding that foster youth wanted housing support confirmed other studies that foster youth faced homelessness (Clemens et al., 2017a; Kelly, 2020; Skobba et al., 2018; Tobolowsky et al., 2019). Similarly, foster youth did not report the ASO Hearts and Hands program as among the top helpful services, but this program was among the top college services that foster youth wanted (see Table 2.13). Food insecurity is a sad but common topic documented in the literature that foster youth may encounter (Clemens et al., 2017a; Kelly, 2020). These results confirmed the findings of Skobba et al. (2018) and Tobolowsky et al. (2019) that foster youth might not know how to access many available resources. For example, one foster youth from this study wanted to college to provide “additional help/communication with foster youth about help/benefits they can receive or apply for.” A different foster youth commented that the information the college sent out to its students should be “something that will reach out to students rather than send them confusing and long-winded emails about stuff they’ll never have hope of understanding.” The responses showed that the college should find better communication approaches with its foster students. Additionally, a foster youth recommended that the college should have “more scholarships and knowledge about scholarships if possible.” Another foster youth wished the college to provide “books and other resources like more money for books.” These comments revealed that foster youth desired to

learn more about the financial resources available to them so that they could pursue higher education.

Another theme under the desired services was guidance. Nonetheless, the type of guidance that foster youth identified extended beyond academic support. For example, four of the seven individuals who preferred the college to offer more counseling mentioned life guidance. One foster youth wrote “life help,” while another specified “credit help.” The author of this work grouped life guidance under the Counseling Center as they felt that the college could extend its counseling services to include life advice. Currently, the college does not have a designated counselor for them. Without a counselor who knows the issues that foster youth may encounter daily, they may find it challenging to navigate the college’s educational landscape. The lack of a designated counselor may contribute to the achievement gap of foster youth as they may feel disjoined when they receive counseling from multiple counselors. Research shows that when foster youth have assigned counselors in higher education, their academic performance significantly improves (Lenz-Rashid, 2018; Unrau et al., 2017). This result suggests the college needs a designated counselor who works specifically with foster students.

Furthermore, four foster youths desired mental health services (see Appendix C). One participant mentioned “therapy,” while another foster youth indicated “suicide prevention.” These results imply that these foster youth were unaware of the health services the college provided or expressed that the current services required modifications. As another foster youth commented, “better mental health counseling,” perhaps modifications were needed. This foster youth used the college’s mental health services but was unsatisfied with the therapy received. These findings were also concerning, in that at least one foster youth had thought of suicide or had known someone who killed themselves because they put down “suicide prevention” as a

desired/needed service from the college. The theme of mental health runs deep in the literature on foster youth (Hogan, 2018; Miller et al., 2020; Morton, 2018; Okpych & Courtney, 2018a, 2019; Steenbakkens et al., 2019). Chapter one extensively covered mental health issues and their impacts on the academic performance of foster students.

Although foster youth may experience multiple barriers, they can be ambitious. At least four foster students wanted the college to offer a new curriculum (see Table 2.13). One wanted the college to develop a “culinary arts program.” Another one suggested “more composition classes.” A different foster student had a more practical idea of how the college could support its students by recommending that the college provide them with “driving lessons.” Another foster youth preferred a “completely online” degree or certificate. Even though the new curriculum theme only appeared under the recommended services, it underscores the view that foster youth want to succeed regardless of their foster backgrounds.

Aside from the new curriculum theme, foster youth also expressed the desire to receive additional services for part-time students. Compared to the themes of financial support, guidance, and health care, the theme of support for part-time students was minor, with only one count. However, this finding could have an important implication. In spring 2021, 67% of foster youth enrolled at the community college were part-time students (AVC, 2021b). In general, many college services serve both full- and part-time students. However, this foster youth did not mention specific services. Nonetheless, part-time students might not qualify for various scholarships. Perhaps, this foster youth meant more financial support for part-time students.

Limitations

Although the study showed foster youth’s views accurately, especially when most, if not all, of its results aligned with the literature, it had limitations. Due to its small sample size, the

results might not be generalized to other settings. The perceptions of foster youth who chose to participate in the survey might differ from those who decided not to participate. More importantly, the needs assessment was done during the pandemic. Therefore, foster youth might have experienced more economic hardships and less social support than in normal circumstances. Additionally, the community college had to offer most of its services online because of the pandemic. Suddenly converting face-to-face services to online services could have created potential gaps in these services. Also, the college might have experienced challenges advertising services to its students in an online learning environment. Similarly, foster youth might have had more difficulty accessing these services online. An interesting study would be to conduct this survey a year later to detect the changes in foster youth's perceptions of the topics covered in this survey.

Conclusion

This needs assessment indicated that foster youth at the college often encountered economic hardships, lacked social support, and might be uninformed of the available college services. Although the community college offered at least 16 services to its students, foster youth had not accessed most of these services, particularly the Guardian Scholars Foster Youth program. Most foster youths indicated that they had never used this service, even though this program was specifically designed for them. Except for the Financial Aid and Scholarships program and the Counseling Center, less than half of the participants reported using other college services. In some cases, foster youth might not know that the service existed, for example, the ARCHES program. Only one foster youth had used it. Nevertheless, when foster youth were asked to recommend three services they wished the college offered, the ARCHES program was at the top.

In many cases, foster youth could not call out the names of the programs but the specific services the programs offered. For example, foster youth mentioned that they wanted more resources related to housing. This author coded these responses as the ARCHES program. The ARCHES program aimed to link homeless students to housing resources.

Moreover, the results suggested potential gaps in current services, for example, the Counseling Center and the Health Services. Within the Counseling Center, foster youth wished to receive life guidance. For the Health Services, students recommended that the college could improve its current mental health services. Furthermore, based on students' recommendations, more resources should be allocated to the Financial Aid and Scholarship program, the Counseling Center, and the Book H.E.L.P. program, as foster youth reported that these services were most useful. The college should also find better methods to communicate and advertise its services to its students.

In sum, the results from the needs assessment indicated that the college might need an institutional change in the methodologies of how it serves its foster youth population. That said, a literature review on potential interventions should be done to identify the best approaches to address the needs identified through this study and improve the achievement of foster youth. The author also wants to emphasize that most of the services in the survey served all students. Therefore, improving these services could benefit all students. The following chapter explores interventions that can address the identified contributing factors to the achievement of foster youth at the college. Literature on interventions that can enhance social support for foster youth is explored.

Chapter 3

Supportive Learning Environments

Findings from the needs assessment in Chapter 2 showed that foster youth experienced economic hardships, lacked social support, and seldom used campus services to address their needs. Across all five indicators that measured financial hardships ranging from the ability to pay for food, clothing, rent, and transportation to the ability to pay for utilities, on average, 58% of foster youth reported needing additional resources. Eighty percent of foster youth felt they had little social support, and 76% did not use the Guardian Scholars Foster Youth program. Out of these three factors, the lack of social support seemed to be the most dominant barrier that foster students face while they pursue their educational goals.

Lack of social support can negatively impact the academic achievement of higher-education foster youth (Okpych & Courtney, 2018a; Tobolowsky et al., 2019). In a 10-year longitudinal study, Okpych and Courtney (2018a) found that the lack of social support was negatively correlated with the graduation rate among foster youth who attended college. Without social support, foster youth may find navigating the complexity of higher education challenging (Tobolowsky et al., 2019). For example, they may not know the available resources and the associated deadlines to access these resources promptly (Tobolowsky et al., 2019). Additionally, when foster students encounter challenges, they may have no one to rely on (Skobba et al., 2018; Tobolowsky et al., 2019). This situation is most pronounced for foster students who may experience homelessness (Kelly, 2020). Unlike traditional students, these foster students cannot go home to live with their parents (Tobolowsky et al., 2019). Successful campus programs that can improve the academic performance of foster youth entail extensive social support for these students (Huang et al., 2019; Lenz-Rashid, 2018; Unrau et al., 2017).

Within a community college context, instructors can provide their students with social support by just being present for them. Each semester, a full-time student spends approximately 192 hours with their instructors. This information emphasizes the critical roles that instructors can play in students' lives, especially foster students. The evidence suggests that instructors are among the few adults foster students are most likely to interact with at the college. Kelly (2020) found that foster youth who had a close relationship with an adult were less likely to be homeless than those foster students who did not. The literature on foster youth also shows that teachers or instructors can positively impact the lives of foster youth by providing them with social support (Cheung et al., 2019; Heyman et al., 2020).

Aside from providing students guidance, instructors can improve the academic performance of their students by creating a welcoming learning environment for all learners. Hardiman (2012) named this warm environment the emotional climate in the brain-targeted teaching model (BTTM). The BTTM is a pedagogical framework where Hardiman (2012) translated evidence-based research from neuroscience to teaching practices that instructors can use in their classrooms. Although Hardiman (2012) did not explicitly state multicultural education (ME; Banks et al., 2001) and the universal design for learning (UDL; CAST, 2018) in their work, the BTTM has components in which the tenets of ME and UDL apply.

Here, I present information on my development and support of a year-long faculty learning community (FLC) experience entitled "Creating Supportive Learning Environments for Adult Learners." An FLC is a year-long event where faculty members work collaboratively to improve teaching practices (Ward & Selvester, 2012). The community college in this study uses this definition. This event requires a year-long commitment to ensure that the participants can implement these teaching practices and receive feedback from others and the researcher. This

professional development experience focused on teaching practices based on these three frameworks, with a particular emphasis on BTTM. This FLC aimed to encourage instructors in a community college to use these teaching methods in their classrooms. An advantage of using these teaching practices is that it does not require foster students to disclose their statuses as a foster youth. Cheatham et al. (2021) and Kinarsky (2017) documented that some foster youth did not want to seek out help when they needed it for fear of being stigmatized when they had to self-identify as foster students. This intervention may help foster youth without their knowledge.

The FLC may also address the current issue of low enrollment at the community college. Due to COVID-19, the community college experienced a 13.1%-28.3% drop in full-time equivalent students (FTES) compared to the Fall of 2019, before the pandemic began (Institutional Effectiveness, Research & Planning [IERP], 2022c). This situation is common throughout the entire community college system in California. The FTES of the community college system in California dropped by 12.8%-19.4% compared to the Fall of 2019 (California Community Colleges Chancellor's Office [CCCCO], 2021a, 2021b). The loss in FTES at the community college in this work translated to a potential loss of \$3-\$7 million in future funding for the college (CCCCO, 2022b). In the same period, the retention rates remained relatively the same (86.9%-88.0%; IERP, 2022a), similar to the average retention rates of all community colleges in California (CCCCO, 2021c). Due to low enrollment, the CCCCCO (2021a) indicated the need to retain its students as a potential solution to improve enrollment.

The suggested FLC can enhance the students' retention rate and prevent the enrollment rate from dropping further, especially when 75% of the students at the college come from historically marginalized groups (IERP, 2022b). Currently, 61.4% and 13.3% of the students at the college are Hispanic and African American, respectively. These students have lower

retention rates than their Asian and White Non-Hispanic peers (CCCCO, 2021c). The FLC can enhance the achievement of marginalized students as it helps instructors modify their teaching practices to meet their students' needs. This researcher reviews pertinent literature on conceptual frameworks that guide the FLC in the following sections. This researcher then describes the procedure for implementing it.

Creating Supportive Learning Environments for Adult Learners

One way to retain students is to provide supportive learning environments where all learners can thrive (Hardiman, 2012). As aforementioned, the FLC was drawn from three frameworks: the ME, the UDL, and the BTTM. In the following sections, this researcher reviews the literature on these three frameworks and how they can make education inclusive for all, especially the BTTM. The ME and BTTM have been associated with the K–12 system (Banks et al., 2001; Hardiman, 2012), but the current research suggests that they can be applied to higher education.

Multicultural Education

U.S. society has become increasingly diverse (Pedersen, 2000). As of 2021, 18.9%, 13.6%, 6.1%, and 1.3% of the U.S. population were Hispanic, African American, Asian, and Native American, respectively (U.S. Census Bureau, 2021). In other words, about 40% of the U.S. total population was non-White. This trend will likely continue upward (Vespa et al., 2020). Consequently, educators should remain sensitive to the diverse backgrounds of their students and should adapt their teaching practices to make education inclusive for all (Banks et al., 2001; Gay, 2015; Wink, 2011).

In higher education, it is important to provide a culturally sensitive curriculum of instruction where students begin to learn content that focuses on their future careers.

Additionally, the global economy has become increasingly interconnected (Organization for Economic Co-operation and Development, 2019). The U.S. economy needs a workforce who can work with diverse individuals and understand the value of diversity to remain competitive on the world stage (Pedersen, 2000; Wink, 2011).

Wink (2011) pointed out that good teaching entailed helping students acquire, apply, and create knowledge in the real world, referring to this process as the transformative teaching model. Nonetheless, current teaching practices often follow transmissive and generative models. In the transmission model, an instructor lectures in front of a classroom, and students passively learn the information (Wink, 2011). In the generative model, students become active learners by working in groups to explore concepts under the guidance of their instructor (Wink, 2011). By working together in a safe learning environment, students may realize that regardless of their different backgrounds, they usually share the same values, such as fairness and kindness (Banks et al., 2001). The generative model may have taught students to be tolerant of one another, but it may not teach students to value each other. However, the transformative model moves students beyond being tolerant of another group to understanding and advocating for justice when they see injustice. One way is to ensure that the curriculum and textbooks include the perspectives of diverse learners (Banks et al., 2001; Gay, 2015; Wink, 2011).

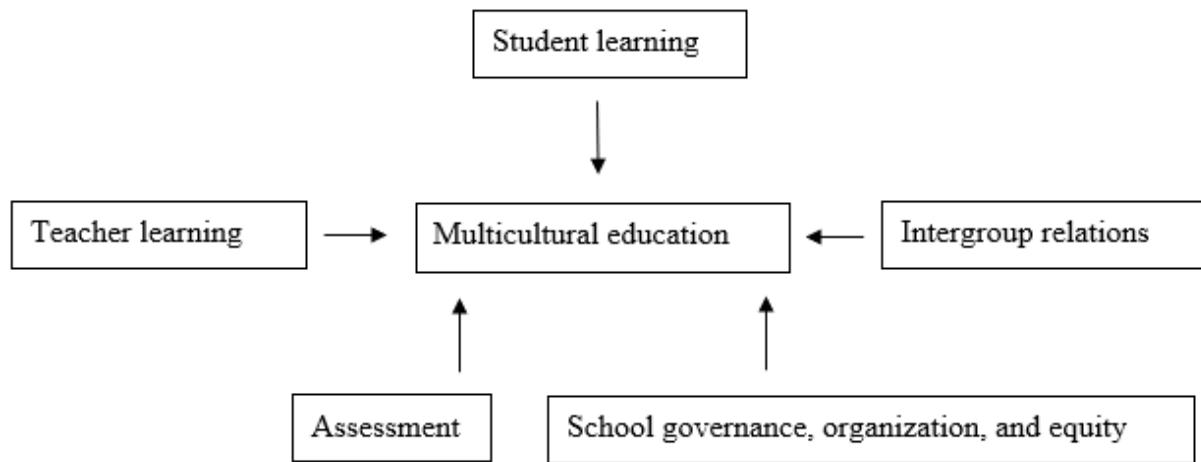
As U.S. demographics change, social justice becomes even more essential. According to Young (1990, as cited in North, 2006), “social justice” (p. 16) is the proper distribution of social benefits and burdens among society’s citizens. One approach that can promote social justice in a society is education. Downey and Condron (2016) highlighted that for students from low socioeconomic backgrounds, like foster youth in this context, education is a vehicle for them to move out of poverty and up the social ladder. Education “gives voice to the voice less, gives

power to the powerless” (Wink, 2011, p. 6). Educators can give power to those who are least privileged through multicultural education.

Multicultural education is a set of best practices that educators can use in their context to promote inclusiveness (Banks et al., 2001). Banks et al. (2001) outlined five major areas where educators can advocate for social justice within their contexts: (a) teacher learning; (b) student learning; (c) intergroup relations; (d) school governance, organization, and equity; and (e) assessment. Figure 3.1 captures this framework.

Figure 3.1

The Multicultural Education Framework



Teacher Learning

Banks et al. (2001) suggested that academic institutions should offer professional development programs that help instructors know their students’ backgrounds and how their backgrounds can influence learning. Instructors also need to know that their students may represent intersectionality. Crenshaw (2017) coined *intersectionality* to describe a person’s multiple identities. These multiple identities can lead to multiple inequalities (Walby et al., 2012). For example, a foster student can be a Hispanic female with a disability. Being a female is

already a disadvantage in society: The Pew Research Center documented that for every dollar a man made, a woman only earned 84 cents in 2020 (Barroso & Brown, 2021). The center also found that 52% of Hispanic Americans experienced discrimination at some point (Krogstad & López, 2016). Being a foster youth and having a disability can create additional challenges for the student (Johnson et al., 2020; Tobolowsky et al., 2019). These compounded barriers can negatively impact the academic performance of this foster student. An understanding of intersectionality can help an instructor assist this foster student by connecting the student to the multiple campus resources that can help the student to succeed. The instructor can also provide appropriate accommodations, such as extended exam time and due date, when they know the student has unique needs.

Wink (2011) mentioned that a part of good teaching is learning from the students. I learned that at least 60% of my students are Hispanic, so I sometimes link a concept in biology from English to Spanish. For instance, when I talk about aquaporin, I ask my students what “aqua” means in Spanish. Then, they tell me that it means water. In return, I explain to them that aquaporin is a protein channel that allows water to enter a cell. This simple connection can help my students to remember the information better. Gay (2015) called this teaching practice *culturally responsive teaching* (CRT). Gay stated that CRT is a branch of multicultural education. In CRT, educators use their students’ backgrounds to tailor their teaching practices (Gay, 2015). Wink (2011) recommended the same practices. Both Gay (2015) and Wink (2011) pointed out that teachers with positive perspectives of marginalized students often create learning environments where these students feel that they can achieve. Wink described their experience when their students went from underachievers to overachievers by changing their teaching practices and fostering a growth mindset within the classroom. A growth mindset is a belief that

people can achieve if they put in the effort (Dweck, 2000). In a national study involving 12,490 high school students, Yeager et al. (2019) found that teachers who believed in a growth mindset produced more high-achieving students than those who did not. In a similar study at a 4-year institution involving 4,357 first-year students, Broda et al. (2018) reported that the growth mindset intervention greatly benefited Hispanic students. These examples show that multicultural education can change students' mindsets and can motivate students to learn.

Student Learning

In addition to teacher learning, student learning is an area where educators can provide students equal opportunities to learn and understand that knowledge is controlled by those with power (Atwater, 2010; Banks et al., 2001; Gay, 2015; Wink, 2011). Banks et al. (2001) recommended that academic institutions hire qualified instructors, ensure safe learning environments, provide students with extra curriculum, and have sophisticated equipment to provide students with equal learning opportunities. These recommendations imply that academic institutions in poor neighborhoods should receive appropriate funding. These suggestions are more appropriate for leaders and funders rather than instructors. However, within this area, Banks et al. also suggested that the curriculum should emphasize to students that individuals from the dominant culture shape knowledge. Gay (2015) went a step further, invoking tenets of CRT and stating, "Knowledge is power" (p. 20), and people with power would often want to retain their authority by controlling the information being distributed (Atwater, 2010). Distributed knowledge often lacks the voices of those who are less privileged, and instructors should address this lacking in their lectures (Atwater, 2010; Banks et al., 2001; Wink, 2011).

During an interview with Atwater (2010), Gay said that knowledge was not neutral, even in the natural sciences. As a scientist, I believe that science is neutral, but the views of those who

create it and transfer it may not be neutral. For example, people often cite that one of humanity's greatest discoveries was the structure of DNA. They usually credit this discovery to James Watson, Francis Crick, and Maurice Wilkins. Nevertheless, these scientists used the X-ray picture of Rosaline Franklin to support their findings without Franklin's knowledge (Maddox, 2003).

Today, many scientists believe that Franklin has not received the deserved credit because Franklin was a woman who lived in a world dominated by White-European men. The same story can be found in other disciplines, like the history of foster care. It was not always inclusive: The system failed to protect minority children until the 1950s (Rymph, 2017). Covering such information helps students to have a complete picture of history. It provides a voice to those who cannot speak for themselves and recognize the bias that one may have toward a particular group. Wink (2011) pointed out that textbooks should mirror their readers, especially when most students come from marginalized populations. Suppose the textbooks lack the views of the marginalized. In that case, instructors should fill in the void so that students have a more holistic understanding of a particular topic regardless of the discipline being taught (Atwater, 2010). A more holistic view of knowledge can promote social transformation by helping students from diverse backgrounds better understand one another (Gay, 2015; Wink, 2011).

Additionally, if the curriculum mirrors its learner, it may enhance a sense of belonging for marginalized students (Gay, 2015). These students may feel more connected to the information that they learn. Walton and Cohen (2011) defined belonging as the feeling of being connected to other group members. Multiple studies have shown that an enhancement in the sense of belonging correlates positively with the academic achievement of students (LaCosse et al., 2020; Murphy et al., 2020; Walton & Cohen, 2011).

Intergroup Relations

Banks et al. (2001) also highlighted the importance of intergroup relations. As mentioned, students should be able to work together to construct knowledge (Banks et al., 2001; Wink, 2011). For example, an instructor can encourage students to work in a science lab group. These opportunities can help students dispel the stereotypes they may have of other individuals when they closely interact (Banks et al., 2001). Another example is when I cover the topic of evolution, I often underscore the importance of genetic diversity and the survival of the human species. From a biological perspective, the more diverse a gene pool is, the more likely the species can adapt and survive (Johnson, 2021; Pedersen, 2000). I also emphasize that genetically, we are more similar than different. For instance, a blood type matters when a person needs a blood transfusion, not the blood donor's skin color or gender.

School Governance, Organization, Equity, and Assessment

Banks et al. (2001) pointed out that including the voices of stakeholders from diverse backgrounds in governance, organization, and adequate funding for all public institutions is essential for inclusiveness. These recommendations are important for education leaders. However, their suggestion on assessment is more appropriate for the FLC that I proposed. Banks et al. (2001) and Wink (2011) emphasized that instructors should use multiple assessment methods to evaluate their students to account for the diverse backgrounds and learning styles that the students may have. Multiple types of assessment can include but are not limited to presentations, oral exams, written exams, and observations (Banks et al., 2001; Wink, 2011).

Summary

In summary, ME is a set of teaching practices that can make education inclusive for foster youth. ME suggests that educators can profoundly influence student learning by changing

teaching strategies. Banks et al. (2001) highlighted the needs for (a) teacher learning; (b) student learning; (c) intergroup relations; (d) school governance, organization, and equity; and (a) assessment. However, Gay (2015) focused on aspects of CRT. Although Wink (2011) did not explicitly state ME in the work, Wink recommended similar teaching practices to Banks et al. (2001) and Gay (2015). These teaching strategies can foster a growth mindset belief in students and can make students feel more belonging in an educational context. For foster youth, who often lack social support, being heard and valued can make a big difference in their academic life. The UDL (CAST, 2018) is another framework that aims to attain a similar objective: improving the learning outcomes of all learners.

Universal Design for Learning

In the 1990s, Meyer et al. created the UDL framework to assist students with disabilities (CAST, 2022). Nonetheless, the framework has evolved over the years to include all learners. Table 3.1 shows the major components of this framework. The framework focuses on three facets of learning: “multiple means of engagement (the ‘why’ of learning), representation (the ‘what’ of learning), and action and expression (the ‘how’ of learning)” (CAST, 2018, para. 2). The “why” of learning involves motivating students using multiple means. The “what” of learning covers multiple ways instructors can present information to students. Lastly, the “how” of learning includes the use of multiple methods of assessment. In this section, this researcher provides an overview of UDL.

Table 3.1*The Universal Design for Learning Framework*

Engagement (the why of learning)	Representation (the what of learning)	Action and expression (the how of learning)
Recruiting interest	Perception	Physical action
Optimize individual choice and autonomy	Offer ways of customizing the display of information	Vary the methods for response and navigation
Optimize relevance, value, and authenticity	Offer alternatives for auditory information	Optimize access to tools and assistive technologies
Minimize threats and distractions	Offer alternatives for visual information	

Note. Excerpted from Universal Design for Learning Guidelines version 2.2, *CAST*, 2018

(<https://udlguidelines.cast.org/>). Copyright 2022 by CAST, Inc.

Engagement

One way to motivate students is by recruiting interest (CAST, 2018, Kohnke et al., 2022). Recruiting interest involves giving learners a choice, autonomy, relevance, value, and authenticity while minimizing threats and distractions. For instance, students should be able to choose the formats of their homework if the answers are labeled clearly. Kohnke et al. (2022) pointed out that allowing students to select reading text versus watching a video that covered the same topic gave them the flexibility of choosing the formats they wanted to learn. Other means of engagement are relevance and value (CAST, 2018). Learners need to know why they must learn a particular topic to engage and the value of the information. For example, most students want to enter medicine, particularly nursing. With that information, I found that an effective way to keep my students engaged was to relate biological concepts, such as mitosis, to medical conditions like cancer. This information can be valuable to all learners as cancer is one of the leading causes of death in modern times (National Cancer Institute, 2020). Kohnke et al. (2022) documented that linking science topics to careers could help to keep students engaged. I also learned that my students are usually fascinated by breaking science news like genes turning on after animals die (Leslie, 2016) or successful transplantation of human brain cells into rats

(Reardon, 2022). These two examples reaffirm that authenticity can stimulate learning (CAST, 2018). One way to capture students' attention is to start a lecture with science news before delving into a related topic, as making new information relevant aligns with the transformative model of Wink (2011). Students should know how knowledge is applied and created in the real world, especially when science textbooks are often a few steps behind empirical journals.

Moreover, instructors should provide students with learning environments that reduce threats and distractions (CAST, 2018). A norm that I establish in my classroom is that no question is a stupid question, and the stupidest question is the question that a student does not ask. I emphasize to my students that the question they fail to ask may be an exam question. This practice helps all students feel more comfortable participating in the class. Having all students contribute during a class discussion is a recommendation of the UDL guidelines (CAST, 2018). The guidelines also highlight using a schedule to minimize threats and distractions by making the class more predictable (CAST, 2018). For every class I have, I list the schedule of all topics covered in the syllabus. This way, students can be more prepared when they come to class, as I suggest they read the lecture notes before.

Representation

In addition to engagement, using multiple types of representation can help students learn new information more effectively. Multiple types of representation include displaying and providing information using multiple modalities (CAST, 2018). For displaying information, the UDL guidelines highlight the importance of digital materials (CAST, 2018; Meyer et al., 2014). Digital materials such as digital documents allow the readers to enlarge visual information if needed. The guidelines also emphasize the need to ensure that textual information is highly contrasted with its background. For example, a light background should have dark text or vice

versa. The sizes of displayed information should also be easily viewable (CAST, 2018). As for the usage of colors, instructors should remain mindful of the colors they use (CAST, 2018). Individuals who are red-green color blind cannot distinguish between red and green colors (Johnson, 2021). If an instructor wants to show a graph with different data, they should use colors other than red and green to depict two data types. Using red and green colors on the same graph can confuse someone who is red-green color blind. Additionally, instructors should provide closed captions for all audio materials (CAST, 2018). Closed captions can help students who are hard of hearing or English learners feel included as they do not have to disclose their limitations. As an English learner, I have found closed-captioned videos extremely useful. I can look up a word if I need to know its definition. Without the closed caption, I may never know what that word means.

Providing students with multiple modalities of the same information can enhance their understanding of complex conceptions (CAST, 2018; Kohnke et al., 2022; Meyer et al., 2014). For instance, when I talk about CRISPR (clustered regularly interspaced short palindromic repeats), I use educational videos to describe it. CRISPR is a powerful gene editing technique that can revolutionize modern medicine: It can fix and turn genes on or off (Johnson, 2021). Using pictures to capture complex concepts can also help students visualize these concepts (CAST, 2018). From my teaching experiences, pictures about translation (the making of protein), transcription (the expression of a gene), and replication (the copying of DNA-deoxyribonucleic acid) are beneficial for students to understand and distinguish these processes. Kohnke et al. (2022) stated that using videos and images to illustrate abstract concepts could enhance students' learning. Meyer et al. (2014) also pointed out that instructors should be mindful of their students' backgrounds when they present information. For example, a student may find solving a math

problem about poker challenging when they never play the game. This suggestion coincides with the recommendation of Gay (2015) that teaching practices should account for students' backgrounds.

Action and Expression

Student learning differences can influence students' academic performances. Due to these variations in learning, students may act and express themselves differently. Like Gay (2015) and Wink (2011), Meyer et al. (2014), who developed UDL, believed that instructors should use multiple types of assessments to evaluate students. A traditional paper-pencil test can work well for one individual but not another. Allowing students multiple options to demonstrate their knowledge can account for the preferred learning styles of students (Meyer et al., 2014). Kohnke et al. (2022) gave an example of an alternative assessment where students could either give a PowerPoint presentation in class or use Flipgrid to create a video. This flexibility allows students to choose their preferred assessment method to demonstrate learned information (Kohnke et al., 2022). Students uncomfortable with public speaking may opt for creating a video, while students who like public speaking may find giving a presentation in class enjoyable.

Offering students alternative assessments can help students with special needs shine. I once attended an anatomy lab where the class had a student with blindness. For the practicum, my colleague allowed the student to touch and feel the specimens and vocalize their answers when other students could only observe the specimens and write down the responses. Without such accommodations, the student who was blind might not have been able to demonstrate their knowledge. Meyer et al. (2014) also mentioned that when students encounter stressful environments, such as high-stakes tests, students might not be able to perform well. A stressful environment can negatively impact the executive function of the brain leading to lower academic

performance in a student (Carrion & Wong, 2012; Meyer et al., 2014). Providing students with multiple types of assessments can reduce this level of stress. The BTTM also covers the impact of stress on students' achievements (Hardiman, 2012), as discussed in later sections.

Besides offering multiple types of assessments, providing students with tools and assistive technologies can enhance their learning experiences (CAST, 2018). For instance, instructors should show students how to create a PowerPoint presentation or video clip (Meyer et al., 2014). Meyer et al. (2014) reported that students became more creative in making presentations after students used these tools fluently. Within my context, I use Canvas extensively. Helping students navigate Canvas effectively can facilitate their access to lecture notes and assignments. The UDL guidelines also emphasize the need for instructors to make the lessons accessible to students who may use assistive technologies.

An example is speech recognition software (Meyer et al., 2014). Speech recognition software is essential to the blind student mentioned previously. However, this software can benefit all learners as students without disabilities can quickly access information without a keyboard (Meyer et al., 2014). Other assistive technologies that instructors should consider include but are not limited to alternative keyboards and customized overlays for touch screens (CAST, 2018). Equipping students with tools and appropriate assistive technologies can provide students with equal opportunities to achieve (CAST, 2018).

Summary

The UDL framework provides instructors with an additional set of guidelines on how to make their lessons more inclusive. The framework centers around three major aspects: (a) engagement, (b) representation, and (c) action and expression. Engagement concerns capturing student interests, which can apply directly to foster youth. Due to their experiences with the

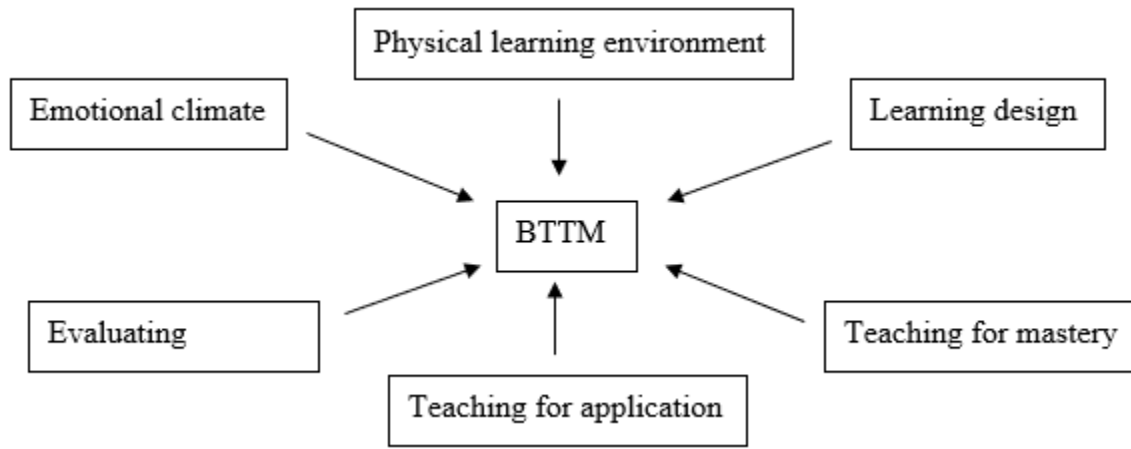
foster care system, foster youth may not feel valued or heard (Barber, 2021). If instructors can capture and foster students' interests, the students may feel valued and included. Such a feeling of value can motivate them to learn and stay in college. As for representation, each student may have a preferred learning method. Providing students with multiple types of representation can help diverse learners learn more effectively, especially students with disabilities. Due to learning differences, students may need different ways to demonstrate their understanding. Action and expression can account for these differences. These teaching strategies, in many ways, parallel the BTTM. The following sections include in-detail descriptions of the BTTM, as it is the focus of the FLC.

The Brain-Targeted Teaching Model

Like the objectives of ME and UDL, the BTTM aims to improve the academic performance of all learners. The BTTM is a product of neuroeducation (Hardiman, 2012). Neuroeducation is a new discipline translating neuroscience research into teaching practices (Hardiman, 2012; Hardiman et al., 2012). Best teaching practices should be based on neuroscience and cognitive science because learning occurs in the brain. When learning happens, the brain's biochemistry and structure change (Fields, 2020). Educators can understand how the brain works to develop appropriate teaching strategies. Using evidence from brain science, Hardiman (2012) developed six targets for the BTTM: (a) the emotional climate, (b) the physical learning environment, (c) learning design, (d) teaching for mastery, (e) teaching for application, and (f) evaluating learning. Figure 3.2 captures this framework. An overview of all six BTTM targets is provided in this section.

Figure 3.2

The Brain-Targeted Teaching Model Framework



Note. Adapted from *The Brain-Targeted Teaching Model for 21st-Century Schools* (p. xvii), by M.M. Hardiman, 2012, Corwin Press. Copyright 2012 by Corwin.

Before this section includes the six objectives of the BTTM, the current study covers neuromyths. These myths are important to know so that instructors are more informed in their teaching practices. A neuromyth is a false claim that a finding from neuroscience supports a particular teaching practice when no such finding exists (Gardner, 2020). A common neuromyth often perpetuated in education is that learners are left-brained or right-brained thinkers (Gardner, 2020; Hardiman, 2012). Research from neuroscience shows that the brain functions as an integrated unit, so stating that someone is left-brained or right-brained is inaccurate (Gardner, 2020; Hardiman, 2012). Another common neuromyth is that an instructor should teach their students according to the students' learning styles (Gardner, 2020; Hardiman, 2012). However, Rogowsky et al. (2020) demonstrated that such teaching practices did not enhance learning. A different popular neuromyth is that an adult's brain does not have neurogenesis (Hardiman, 2012). This idea contradicts evidence from neuroscience, such as the hippocampal volumes of taxi drivers are larger than those in the control group and are positively correlated to the drivers'

driving experiences (Maguire et al., 2000). Aware of neuromyths, Hardiman (2012) avoided using them in the BTTM.

Emotional Climate

The first target of the BTTM is the emotional climate (Hardiman, 2012). Research from neuroscience shows that emotion impacts learning (Carrion & Wong, 2012; Immordino-Yang & Damasio, 2007; Tyng et al., 2017). Carrion and Wong (2012) reported that children who experienced traumatic stress had elevated cortisol production. Cortisol is a stress hormone (Dow & Kozlowski, 2020). High cortisol levels can reduce the hippocampal and prefrontal cortex volumes (Carrion & Wong, 2012). These brain regions are essential for memory formation and executive functioning (Carrion & Wong, 2012; Tyng et al., 2017). Damages in these areas can impede learning (Carrion & Wong, 2012).

Emotion can impact learning regardless of age (Immordino-Yang & Damasio, 2007; Tyng et al., 2017). Positive emotions, such as motivation, stimulate seeking behavior, such as the desire to learn and explore new information (Tyng et al., 2017). For example, scientists may spend their entire lives studying natural phenomena because they want to explore the unknown. When a person is fascinated by a particular topic, their brain releases dopamine, a neurotransmitter that corresponds to creative thinking (Dow & Kozlowski, 2020). However, excessive dopamine in the brain can cause psychosis (Kesby et al., 2018). Too little dopamine can lead to a lack of motivation and depression (Cleveland Clinic, 2022). Although positive emotions can facilitate learning, negative emotions (e.g., toxic stress) impede learning (Carrion & Wong, 2012). Emotions contribute to memory formation and retrieval: People remember emotional events better than neutral ones (Tyng et al., 2017). These findings illustrate the

profound influence of emotion on learning. If instructors want to enhance student learning, they should consider their students' emotional states in their classes.

Based on this information, Hardiman (2012) recommended that instructors create welcoming learning environments for students. For foster students, who often have had tragic lives, being in a classroom where they feel trustful and comfortable can change their learning outcomes. Using positive language when interacting with students is an example of creating a warm learning environment (Hardiman, 2012). Hardiman (2012) stated that this practice was akin to fostering a growth mindset developed by Dweck (2000). Another recommendation for creating a safe learning environment is setting classroom routines, so students know what to expect (Hardiman, 2012). This suggestion is similar to the UDL guidelines on engagement (CAST, 2018). Providing students with choices in selecting assignments and assessments is another case where the UDL guidelines and the BTTM overlap. Using humor to enhance learning is an additional approach where an instructor can make learning enjoyable. Hardiman (2012) also emphasized the need to promote social and emotional learning where students learn to interact with each other civilly. This idea fits well with ME, where Banks et al. (2001) underscored the importance of building intergroup relations in a classroom. CRT, developed by Gay (2015), can also make all students feel included and create a nurturing learning atmosphere. That said, a classroom's emotional climate can impact learning and the physical environment.

Physical Environment

The physical environment of learning is the physical characteristics of a classroom or a building (Hardiman, 2012). Tanner (2008) found that schools with user-friendly designs positively contributed to students' academic performances, regardless of the schools' socioeconomic statuses. One could imagine they felt more comfortable walking into a bright,

organized classroom than a dark, messy classroom. Within the community college context, instructors may not be able to control the physical environment as they often move from one classroom to the next or one building to the next.

Nonetheless, they should optimize it whenever possible. For instance, they should keep the room well-lit (Hardiman, 2012). Instructors may tend to turn the lights off when they use projectors. Rather than turning off all the lights, they should leave a few on so students do not fall asleep. Darkness can stimulate the pineal gland to release melatonin, a hormone for sleep (Masters et al., 2014). Sleepy students cannot learn effectively (Menna-Barreto & Wey, 2008). The physical learning environment can influence students' emotions. A beautiful classroom can capture students' attention and interests, stimulating learning (Hardiman, 2012). Although the physical environment can influence student achievement, learning design can contribute to students' success.

Learning Design

Learning design aims to give students a big picture, an overview of how different topics connect (Hardiman, 2012). Hardiman (2012) analogized learning design to giving students a completed picture of a large jigsaw puzzle before asking students to put the pieces together. Research shows that concept mapping helps students recall information better than repeated study (Blunt & Karpicke, 2014; Chiou, 2008). Chiou (2008) reported that concept mapping enhanced students' interest in learning advanced accounting. Chiou reiterated the idea that emotions could influence student achievement. Building on these studies and others, Hardiman (2012) proposed that instructors use graphic presentations, such as concept mapping, to help students link new information to known information and see the relationships among different

concepts. Hardiman also pointed out providing students with a big picture of important concepts aligned with schema theory.

According to schema theory, the brain categorizes information into groups called schemata (Anderson et al., 1977). A schema is a knowledge structure that holds information and the characteristics of that information (Anderson et al., 1977; Bartlett, 1932). The schema theory shows that one remembers a new concept better if it relates to known knowledge (Anderson et al., 1977; Bartlett, 1932). The theory explains why CRT (Gay, 2015) can improve the academic achievement of marginalized students, such as foster youth. In other words, students learn better if the information is relevant to them, which is also a recommendation of the UDL framework (CAST, 2018). The use of graphic presentation is also related to the multiple ways of representing information that the UDL guidelines support (CAST, 2018). Although learning design can enhance student achievement, teaching for mastery remains equally important.

Teaching for Mastery

The focus of teaching for mastery is helping students remember learned information. Hardiman et al. (2019) demonstrated that integrating arts into science courses could enhance student performance. The art types used in this study were dance, singing, drawing, and tableau. Hardiman (2012) argued that using arts instruction motivated students to rehearse the information, facilitating memory formation. Arts such as dancing or singing can also make learning fun, creating a warm learning environment for students. As stated, emotions can enhance the retention of new concepts (Tyng et al., 2017). Artworks, such as drawing or creative writing, can facilitate elaboration (Hardiman, 2012). Producing pictures or poems requires students to elaborate, question themselves, and provide explanations. Roediger and Pyc (2012) stated that retrieval practice, spacing, interleaving, elaborative interrogation, and self-explanatory

improved long-term retention. Hardiman (2012) also pointed out that students could elaborate on a concept by relating it to their lives. This idea is in line with CRT (Gay, 2015).

Similarly, Hardiman (2012) indicated that enactment and production could promote memory formation. Embodied cognition supports these recommendations. Embodied cognition recognizes that the body and the mind contribute to thinking (Fugate et al., 2019). Research shows that when a participant thinks about a tool, it activates the same area of the motor cortex as the person uses it (Fugate et al., 2019). Perhaps because of embodied cognition, my students have reported that they understand new concepts better in the lab than in the lecture. My students actively conduct experiments in the lab but passively receive the information in the lecture. Embodied cognition also acknowledges that students may learn and think differently due to their cultures (Fugate et al., 2019). Once again, one sees how CRT (Gay, 2015) can positively impact learning.

Like the UDL guidelines (CAST, 2018), Hardiman (2012) underscored the importance of pictorial representations to improve memory retention. This advice aligns with the integration of arts into teaching. Hardiman also believed that mnemonics, chunking, and interleaving could help memory. I use chunking quite often in my class. I break down a complex process like DNA replication into four major steps before I delve into the topic so that students can remember the process better. As for interleaving, Roediger and Pyc (2012) documented that it improved retention. Interleaving is a teaching practice where an instructor interleaves different materials within a given lecture. For example, suppose an instructor teaches a student to recognize a triangle. Instead of showing three triangles in a row, they can interleave a circle between the two triangles. Within my context, I often review materials as I teach new concepts to students, which is an example of interleaving (Hardiman, 2012). Doing so helps students see how new content

relates to previous information. Even though teaching for mastery can improve student achievement, teaching for application is even more essential for students in higher education.

Teaching for Application

In college, students acquire specialized knowledge that prepares them to enter the workforce. Students not only need to know subject-specific information, but they also need to apply it in a real-world setting. They need to be creative in solving problems. Teaching for application can help them make that transition. Research in neuroscience shows that taxi drivers in London have larger hippocampal volumes than those in the control group (Maguire et al., 2000). Maguire et al. (2000) found that the hippocampal volume increased with the years a driver drove a taxi. The hippocampus is responsible for memory formation (Carrion & Wong, 2012; Hardiman, 2012). A large hippocampus implies that a taxi driver can store large navigation information, allowing the driver to navigate the city's streets more effectively. This evidence shows that the brain is moldable, and instructors can train students to become more creative.

Hardiman (2012) had many recommendations for fostering creativity in a classroom. One is the use of investigation. For example, when I cover scientific investigation, I ask students: What are their hypotheses if they walk into a dark classroom? How do they test to identify the most likely explanation? In a science lab, students have many opportunities to investigate different topics. The lab usually centers around problem- and project-based learning, two other suggestions of Hardiman. Likewise, Gregory et al. (2013) indicated that a way to foster creativity in a classroom was by allowing students to have hands-on experiences. These experiences help students think critically and use different equipment that typical biotechnology companies usually have.

Hardiman (2012) and Gregory et al. (2013) proposed that instructors should ask students questions with multiple and open-ended answers. These questions encourage students to generate as many solutions to a problem as possible. In the real world, a problem has multiple solutions. By generating as many answers as possible to a question, students can have the chance to examine different solutions. Hao et al. (2016) found that when the participants in the study had the opportunity to reflect on the participants' ideas, these individuals produced more original ideas. In other words, these individuals become more creative. Gregory et al. (2013) also highlighted the need for students to consider the implications and implementations of the responses. In real life, one usually looks for the most efficient solution to a problem. After carefully examining the responses, students should know if their answers are practical.

Students should be able to use knowledge flexibly and think flexibly (Gregory et al., 2013). Students can use flexible thinking to develop new ideas when no solutions exist. Achieving this objective requires instructors to encourage students to see relationships between concepts (Gregory et al., 2013). Instructors can reach this goal by using multiple ways to state the same problem (Hardiman, 2012). Using analogies and metaphors in teaching can promote creativity by letting students see relationships between concepts in new ways (Hardiman, 2012). Similarly, integrating art into instruction can enhance creative thinking (Hardiman, 2012). Once again, one sees an overlap between the BTTM and the UDL framework regarding representation.

Likewise, working in a group on a complex problem can stimulate creativity (Dow & Kozlowski, 2020; Gregory et al., 2013; Hardiman, 2012). Gregory et al. (2013) stated that students generated more ideas when collaborating than alone. In a group project, students can discuss their ideas, reflect on their assumptions, and evaluate each other's answers. Researchers have shown reflection can improve idea generation (Hao et al., 2016). Similarly, exposure to the

ideas of others can promote creative thinking by providing students with more opportunities to reflect (Gregory et al., 2013).

Critical reflection on an assumption is a crucial aspect of adult learning (Mezirow, 1998). Adults can modify their beliefs when encountering new ideas inconsistent with their views. In group work, students are more likely to utilize explanatory questioning. This practice can enhance students' content mastery (Roediger & Pyc, 2012). Working in a group can also improve intergroup relations, which is a goal of ME (Banks et al., 2001). Although not stated in the BTTM, teaching for application should be more than training students to become creative thinkers. It should also be helping students to become civil citizens within an increasingly diverse society. However, instructors must evaluate their students at some point. The following section covers the different assessments instructors can use to evaluate student learning.

Evaluation of Learning

The evaluation of learning involves different types of assessment and feedback. Hardiman (2012) supported using multiple assessments to measure student achievement. This aspect of the BTTM shares many commonalities with the ME and the UDL frameworks. Hardiman and Whitman (2013) found that when teachers used alternative assessments, students were more motivated to learn. These students could do a podcast, trifold poster, diorama, presentation, iMovie, painting, drawing, or hypertext essay. These examples are performance assessments. Hardiman and Whitman (2013) argued that when students worked on projects, these students had to retrieve information actively. Retrieval practice enhances retention (Roediger & Pyc, 2012), which is an objective of education. Before students can be creative, they need to master the content well. Mastering the content well can make students more competitive in the job market.

Additionally, students can learn and think differently based on their backgrounds (Banks et al., 2001; CAST, 2018; Fugate et al., 2019; Hardiman, 2012). Providing students with alternative assessments allows all learners to demonstrate their knowledge effectively (Banks et al., 2001; CAST, 2018; Hardiman, 2012). Moreover, alternative assessments can reduce stress, which positively impacts learning, as stated in the section on emotional climate. Different types of assessment can foster creativity, as students usually are more creative when they work on a project rather than a high-stakes exam. Reducing the amount of stress that students may experience can also promote creativity (Dow & Kozlowski, 2020). When students are free of stress, they think better. Hardiman (2012) also suggested using portfolio assessments and student journals to evaluate learning. These assessments can allow instructors to know their students' progress.

In addition to assessments, instructors should give students feedback. Feedback can inform students and instructors about their progress (Hardiman, 2012). Instructors need to know students' performances on key content to modify teaching. Students need to know where they stand to improve their study strategies. In a meta-analysis study, Wisniewski et al. (2020) reported that feedback could enhance cognition. Feedback helps students to correct their misunderstandings. Informative feedback is more helpful than noninformative feedback (Hardiman, 2012; Wisniewski et al., 2020). Informative feedback includes providing students with explanations as to why the answers are right or wrong (Hardiman, 2012; Wisniewski et al., 2020). By providing explanations, students may encode the information better due to elaboration. Elaboration can improve memory (Hardiman, 2012; Roediger & Pyc, 2012). Noninformative feedback (i.e., noting if an answer is right or wrong) may not improve students' comprehension

of the materials. Students may not understand why their responses are right or wrong and have little opportunity for additional elaboration.

As for the timing of feedback, studies show inconsistent findings (Kettle & Haubl, 2010; Zhao & Redifer, 2016). Kettle and Haubl (2010) reported that immediate feedback improved achievement. Zhao and Redifer (2016) found otherwise. These differences may be due to how these authors conducted their studies. Kettle and Haubl (2010) held their work in natural settings, inside classrooms, while other students graded the participants' oral representations. Zhao and Redifer (2016) conducted their work in the lab, using a computer program to do the grading. Although feedback timing may or may not contribute to learning, feedback alone can improve student achievement.

Summary

In summary, the BTTM has six targets: (a) the emotional climate, (b) the physical learning environment, (c) learning design, (d) teaching for mastery, (e) teaching for application, and (f) evaluating learning. Hardiman (2012) based these recommendations on neuroscience and cognitive science research. These targets share many similar aspects to ME and the UDL frameworks. Integrating these guidelines into teaching adult learners increases the promise of improving the academic achievement of all students, and for this project, particularly foster youth. Although the FLC predominantly emphasizes the BTTM to support teaching by STEM faculty, this study incorporates the ME and UDL frameworks into the BTTM when appropriate. The following sections include the procedure for the FLC.

Procedure for the Faculty Professional Development

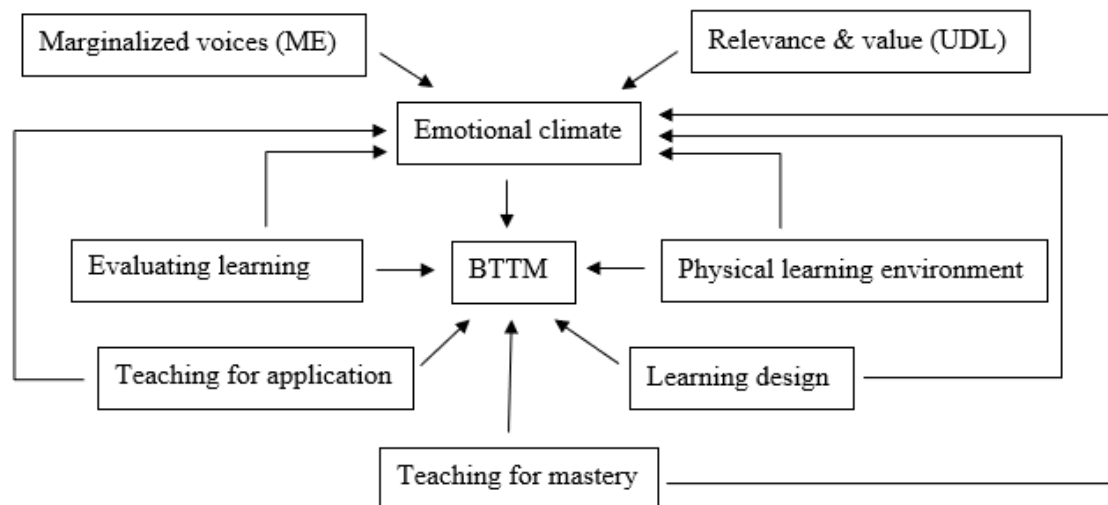
The FLC enters around the BTTM to increase buy-in from STEM instructors. As stated, the BTTM shares many commonalities with the ME and the UDL frameworks. Nevertheless,

including the voice of the marginalized from ME and relevance and value from the UDL are three major aspects that the BTTM may not state. In the FLC, the researcher incorporates these aspects into the module on the emotional climate of the BTTM as they can create a more welcoming learning environment for all students. As indicated, the physical learning environment, learning design, teaching for mastery, teaching for application, and evaluative learning can impact learning and contribute to the emotional climate of a classroom.

Figure 3.3 captures the framework of the FLC. Creating a warm learning environment for foster students can enhance their sense of belonging. The data from the needs assessment showed that 80% of foster youth received little social support. When foster students feel they belong to an academic institution, they may stay and finish their educational goals. Studies show that when students’ sense of belonging increases, students’ learning outcomes usually improve (LaCosse et al., 2020; Murphy et al., 2020; Walton & Cohen, 2011).

Figure 3.3

The Creating Supportive Learning Environments for Adult Learners Framework



Note. Adapted from *The Brain-Targeted Teaching Model for 21st-Century Schools* (p. xvii), by M.M. Hardiman, 2012, Corwin Press. Copyright 2012 by Corwin.

The FLC encourages instructors to use teaching practices known to improve learning based on neuroscience and cognitive research. Appendix D lists the content and activities for each module of the FLC. Appendix E illustrates all the modules. Appendix F provides samples of the actual presentations for modules one, three, and seven. Faculty members can join this year-long FLC to help them acquire these skills. Bickerstaff and Cormier (2015) observed that faculty professional development was more effective if it was more than a one-time event. The FLC event consists of seven sessions, two hours per session, for 14 hours spanning two semesters. The first semester has four sessions. It begins on Week 4 of the semester and ends on Week 13. The second semester has three sessions. It also starts on Week 4 of the second semester but ends on Week 10. In this context, instructors are busy during the first 3 weeks of classes and the last 3 weeks of the semester. The researcher anticipates that more instructors can participate in this FLC if it is in the middle of the semester.

Additionally, all meetings are virtual to provide more flexibility for the faculty. The FLC requires the participants to meet every 3 weeks. In each session, faculty build on the content by proposing strategies they can incorporate into subsequent lessons. Faculty members are encouraged to implement and gather data/information on their recommended teaching strategies in between meetings. They use the forms in Appendix G to record their implementations. When they return, they can discuss the pros and cons of their implementations in three groups of four. Then, one group member reports the key findings of each group so that everyone can have a lively discussion about best teaching practices.

The literature on faculty professional development indicates that collaboration is vital to a successful FLC (Bickerstaff & Cormier, 2015; Darling-Hammond et al., 2017). For the FLC, the current researcher plans to recruit 12 participants from the mathematics, sciences, and

engineering division, on average, one member per discipline. The researcher loosely modeled this FLC to the work of Hromalik et al. (2020). The FLC of Hromalik et al. had three hosts and 20 participants. The current researcher is the only host of this event, so keeping the FLC to 12 individuals ensures that all participants can fully participate and receive appropriate attention from me.

The current researcher designed this FLC for STEM faculty as STEM instructors might need to become more familiar with these teaching strategies, and students might find STEM courses challenging. Students at the community college usually have a lower retention rate and success rate for STEM credit courses than non-STEM credit courses, 84.53% versus 88.51% and 65.84% versus 72.98%, respectively (CCCCO, 2022a). These trends are common throughout the community college system in California (CCCCO, 2022a). The STEM courses selected to obtain these percentages were agriculture and natural resources, biological sciences, engineering and industrial technologies, information technology, mathematics, and physical sciences. Non-STEM courses were the remaining courses in the Data Mart of the CCCCCO (2022a).

Moreover, the National Science Foundation [NSF] (2020) indicated that community colleges awarded the most STEM certificates and degrees in higher education. At least 47% of U.S. students who earned a bachelor's degree in STEM also took some courses at a community college (NSF, 2020). This finding shows the important roles of community colleges in preparing students for STEM careers. In addition to foster youth, the current researcher wants to retain more Hispanic and African American students in STEM. The NSF (2020) and Fry et al. (2021) reported that African Americans, Hispanics, and American Indians remain underrepresented in STEM careers. The following sections consist of specific details about this FLC.

Content

A week before the first meeting, the participants will receive a survey via email about their familiarity with the ME, UDL, and BTTM frameworks (see Appendix H). The survey is anonymous. The researcher plans to tailor the FLC to participants' understandings and needs using the survey results. Appendix D lists each module's content and activities. For Module 1, an adapted version of the Ice Breakers and Warm-up of the Critical Friends Protocols will be used (see National School Reform Faculty, n.d.). Particularly, each participant must tell the truth and a lie about themselves when introducing themselves. All participants will try to guess the lie. The first module of Appendix E and the corresponding slide in Appendix F have the introduction instructions.

Then, the three teaching models of Wink (2011) begin the lesson. Next, the transformative model will be connected to the ME framework (Banks et al., 2001). The five aspects of ME include (a) teacher learning; (b) student learning; (c) intergroup relations; (d) school governance, organization, and equity; and (e) assessment, as given to the students. Gay's (2015) recommendations will be incorporated into ME when applicable. After that, the UDL framework will be described (e.g., CAST, 2018). The three major components include (a) engagement, (b) representation, and (c) action and expression. The first module will conclude with an overview of the BTTM and its six targets: (a) the emotional climate, (b) the physical learning environment, (c) learning design, (d) teaching for mastery, (e) teaching for application, and (f) evaluating learning (Hardiman, 2012). The instructors will learn that the FLC focuses on the BTTM.

The second module covers the emotional climate and its benefits. Faculty members will receive examples of how they can create a welcoming learning environment for their students.

The physical learning environment and its benefits will be explained. From here on, the instructors will be encouraged to identify and use at least one of the recommended teaching practices in their classrooms after they finish each module. The Cycle of Inquiry of Critical Friends Protocols (National School Reform Faculty, n.d.) will be used to guide the implementations of Modules 2 to 7. The frame question for each module is the following: How does a particular brain target contribute to student learning?

The participants receive information about each brain target during the meeting and read the corresponding literature (see Appendix D) before implementing the recommended teaching practices in their classrooms. The participants implement the recommended teaching strategies and collect data using the forms in Appendix G. Then, they analyze the data independently and report their findings in the next meeting.

During the next meeting, the participants discuss each other's findings to identify the best teaching methods before they receive information on the next brain target. The seventh module is a review where new materials are not covered. Appendix F has the actual presentation for the seventh module. The meeting starts with participants providing feedback to one another on the implementation of evaluating learning, the last brain target. Then, they reflect on their implementations of the entire BTM. They will also provide feedback on improving future FLC and whether the research should be scaled to include other disciplines. After the last meeting, the participants retake the survey (see Appendix H) that they took before the first module. The results from the pre- and post-surveys can help evaluate the effectiveness of the FLC. All presented materials will be posted on Canvas so that the participants can access the materials anytime.

Process

The FLC centers on the transformative learning theory of Mezirow (1998) and the sociocultural learning theory of Vygotsky (1978). Mezirow (1998) developed this theory to explain adult learning. Mezirow proposed that an adult usually had a frame of reference or a lens through which the person viewed the world. The person builds this frame of reference based on their experiences. From my experience, I know that STEM faculty may be experts in their disciplines, but they may not receive appropriate training to become effective instructors, particularly with diverse learners. Changing the teaching practices of STEM faculty can require faculty members to shift their frames of reference. They need to know that their students' backgrounds can influence learning and that effective teaching involves creating a nurturing environment for learners.

Mezirow (1998) indicated that people could change their frames of reference if exposed to new ideas and reflected on their assumptions. One way to do that is through discussion so the person can reevaluate their assumption (Mezirow, 1998). Similarly, Vygotsky (1978) pointed out that a person has the potential to learn and grow if the individual can work with a more knowledgeable peer. Vygotsky named this process zone of proximal development, an area of development within which a person can grow. The participants can learn about the BTTM from the intervention in this situation. Working in groups, they can learn from each other to identify best teaching practices. By the end of the FLC, the participants can become more effective instructors.

The FLC builds active learning (Bonwell & Eison, 1991) and improvement science (Lewis, 2015). Bonwell and Eison (1991) defined active learning as any activity that requires the learners to carry it out and think about it. Darling-Hammond et al. (2017) emphasized that active

learning was key to a successful faculty professional development event. To promote active learning, participants work collaboratively on identifying the pros and cons of each brain target and implementing it in their classrooms for each module. The presented materials provide the foundation for the participants to discuss.

However, improvement science is a method to improve a practice or product using the plan-do-study-act (PDSA) cycle (Lewis, 2015). The participants will plan how to implement each brain target in their classes. They will implement and collect data between meetings (the doing part). When they return, they will share the data within their groups and discuss the teaching practices they recommend for future use (the study part). Through discussions with other participants, they can discover new teaching strategies to change and enhance student outcomes (the acting part). Teaching is a complex subject, and allowing instructors to collaborate on identifying the best teaching strategies can help them become creative instructors. Gregory et al. (2013) documented that people could generate more ideas when they work in a group on a complex problem. When people work in a group, they can examine each idea's effectiveness and practicality. Then, they can reflect on their ideas. Active learning and improvement science can contribute to the success of the FLC.

Examples from Hardiman's (2012) work on implementing each brain target will be provided to guide the instructors. These examples serve as guideposts for the instructors rather than rigid guidelines the participants must follow. In addition to examples, the faculty will read journal articles from cognitive and neuroscience, which form the groundwork for the recommended teaching practices. Donna Strickland, a physicist and Nobel laureate, said that scientists usually like to understand why something works (Nobel Prize, 2018), and these articles can provide explanations. Although the explanations may not be inclusive, they can form the

seeds for the participants to reevaluate their teaching methods. Through reflections, the participants can shift their frames of reference about effective teaching, which is the objective of this FLC.

Summary

Although the FLC focuses on the BTTM, it also consists of aspects of ME and UDL when the BTTM does not explicitly include them. The planned FLC is a year-long event with a total of 14 hours of professional development, which allows the participants to receive training and implement the recommended teaching strategies as they go along. This way, the instructors can get formative feedback from other participants and me. Using the transformative learning theory (Mezirow, 1998), sociocultural learning theory (Vygotsky, 1978), active learning (Bonwell & Eison, 1991), and improvement science (Lewis, 2015) as the foundations, the FLC provides multiple opportunities for collaboration, implementations, discussions, and reflections for the participants. Thus, faculty are likelier to change their frames of reference about teaching and learning.

Conclusion

The FLC holds great promise to improve the achievement of foster youth. At the community college, foster youth often experience multiple challenges. However, the lack of social support is the most significant barrier that foster students face when they pursue their educational goals. Addressing this barrier requires me to review the literature to identify the most appropriate intervention to reduce the feelings of isolation of foster youth. The reviewing process leads to the ME, UDL, and BTTM frameworks. Even though all three frameworks may have different approaches to teaching, they can create a welcoming learning environment for learners, which is a key target of the BTTM. The FLC structures around the BTTM and includes ME and

the UDL in the module on emotional climate. By fostering a warm learning environment, foster youth may feel more belonging to the community college, which can improve their retention and success rates. This intervention can enhance the achievement of other marginalized students, improving the retention rates of all learners and preventing a drop in enrollment rates.

Reflection on Doctoral Journey and Future Plan

This doctoral journey has been a learning curve for me. I looked up every topic in this dissertation and was unfamiliar with most materials in this program. Through this doctoral journey, I have transitioned from an inexperienced instructor who knew little about learning and teaching to an informative instructor with much information to share with my colleagues, especially STEM faculty. I also understand marginalized students better, particularly foster youth. Based on this dissertation process, I sympathize with the many barriers that my students can face. I now know how to support my students due to my awareness of the community college's many services. In the future, I plan to disseminate the information I have learned throughout this program to my colleagues to improve the achievement of all students. An example of that is the proposed FLC.

The Doctoral Journey

As a biochemist, I came into this program thinking I could understand the molecular mechanism of the human mind and, by doing so, transform my teaching practices. The specialization that I chose was mind, brain, and teaching. At the time, I believed that the mind or cognition was from biochemical processes in the brain, and the brain functioned according to biological, chemical, and physical laws independently from its environment (I know that this view seems contradicted when the brain constantly receives input from the environment). I used to view teaching as transferring my knowledge to my students. I unknowingly believed in “the

empty vessel theory of teaching” (Rodriguez, 2012, p. 177), which meant students’ brains were empty containers, and teaching was to fill those containers with information.

Now, I know that learning and teaching are complex processes. Aside from biochemical processes in learners’ brains and the teacher, learning reflects learners’ experiences, and teaching entails adapting teaching practices to meet the learners’ needs (Rodriguez, 2012). Teaching can also reflect the teacher’s background (Rodriguez, 2012). For example, I view mentoring my students as an integral part of teaching, which may differ from a colleague’s perspective. My viewpoint reflects my experience as an immigrant and as a first-generation college student. Additionally, I had little knowledge of embodied cognition, where the mind, body, and environment can contribute to thinking (Fugate et al., 2019).

Similarly, when I started my journey, my POP was about the underrepresentation of female and minority students in STEM in higher education. However, I finish this program with a POP on the achievement gap of foster youth. This shift in focus reflects my growth as a researcher who, through my advisor’s and executive sponsor’s guidance, realized that the achievement gap of foster youth was a more pressing issue within my context. Nonetheless, I have come full circle by proposing an FLC to create a more inclusive learning environment for all students. This process required me to learn about ME, UDL (except for providing accommodations for students with special needs), the BTTM, FLCs, and the Critical Friends protocols. Learning was frustrating when I knew almost nothing about these topics, but the outcomes were rewarding. Now, I can change the trajectories of students’ lives as many of my great instructors have changed mine.

Future Plans

I plan to propose this FLC to my administrators in the Fall of 2023 so that I can implement it in the Fall of 2024. I also want to submit a funding request for this FLC to recruit participants for this year-long event. Hromalik et al. (2020) pointed out that one way to recruit participants was to incentivize them. These authors mentioned that their participants received a stipend of \$1,000 for participating in the training and another \$1000 for implementing their FLC. From my experience, faculty members are more likely to participate in a faculty professional development event if they receive incentives. I also plan to scale this FLC to other disciplines if the outcomes are favorable.

I want to transform higher education. Leaders, funders, and educators often emphasize the need to improve teaching practices in the K-12 system, as evidenced by the literature reviewed in this program, for example, the BTTM. However, introducing these teaching practices into higher education is equally important, especially when the achievement gap of marginalized students seems so wide. For example, the Children's Bureau (2019) reported that 69% of foster youth finished high school or the equivalent, but only 7% earned a vocational certificate or a college degree. Besides, higher education is one of the last formal educational contexts in which educators can train productive and socially just citizens for society.

References

Adoption Assistance and Child Welfare Act of 1980, Pub. L. No. 96–272 (1980).

<https://www.congress.gov/bill/96th-congress/house-bill/3434>

Adoption and Safe Families Act of 1997, Pub. L. No. 105–89 (1997).

<https://www.congress.gov/105/plaws/publ89/PLAW-105publ89.pdf>

Ainsworth, M. S. (1979). Infant – mother attachment. *American Psychologist*, 34(10), 932–937.

<https://doi.org/10.1037/0003-066X.34.10.932>

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders*

(5th ed.). <https://dsm.psychiatryonline.org/doi/book/10.1176/appi.books.9780890425787>

American Red Cross. (n.d.). *Facts about blood and blood types*.

<https://www.redcrossblood.org/donate-blood/blood-types.html>

Anderson, R. C., Reynolds, R. E., Schallert, D. L., & Goetz, E. T. (1977). Frameworks for comprehending discourse. *American Educational Research Journal*, 14(4), 367–381.

<https://doi.org/10.3102/00028312014004367>

Antelope Valley College. (2018). *Student services*. <https://www.avc.edu/student-services>

Antelope Valley College. (2020a). *ASO Hearts & Hands Pantry*. [https://www.avc.edu/](https://www.avc.edu/student-services/student-life/aso/hearts-and-hands)

[student-services/student-life/aso/hearts-and-hands](https://www.avc.edu/student-services/student-life/aso/hearts-and-hands)

Antelope Valley College. (2020b). *AVC at a glance*. [https://www.avc.edu/sites/default/files/](https://www.avc.edu/sites/default/files/administration/At%20a%20Glance%202020.pdf)

[administration/At%20a%20Glance%202020.pdf](https://www.avc.edu/sites/default/files/administration/At%20a%20Glance%202020.pdf)

Antelope Valley College. (2020c). *Guardian scholars foster youth*.

<https://www.avc.edu/student-services/foster>

Antelope Valley College. (2020d). *Students Raising Children Program*.

<https://www.avc.edu/administrations/organizations/equity/SRC>

Antelope Valley College. (2020e). *Student Transition Academic Retention (STAR)*.

<https://www.avc.edu/studentservices/star>

Antelope Valley College. (2021a). *Spring 2021 student profile*.

<https://public.tableau.com/profile/svetlana6591#!/vizhome/Spring2021/Spring2021>

Antelope Valley College. (2021b). *Spring 2021 student profile, foster youth*.

<https://public.tableau.com/profile/svetlana6591#!/vizhome/Spring2021/Spring2021>

Atwater, M. M. (2010). Dr. Geneva Gay: Multicultural education for all disciplines. *Science Activities*, 47(4), 160–162. <https://doi.org/10.1080/00368121003753902>

Banks, J. A., Cookson, P., Gay, G., Hawley, W. D., Irvine, J. J., Nieto, S., Schofield, J. W., & Stephan, W. G. (2001). Diversity within unity: Essential principles for teaching and learning in a multicultural society. *Kappan*, 83(3), 196–203.

<https://doi.org/10.1177/003172170108300309>

Banz, B. C., Worhunsky, P. D., Pittman, B. P., Astur, R. S., Tennen, H. A., Raskin, S. A., Austad, C. S., Wood, R. M., Fallahi, C. R., Potenza, M. N., & Pearlson, G. D. (2019). Relationships between drinking quantity and frequency and behavioral and hippocampal BOLD responses during working memory performance involving allocentric spatial navigation in college students. *Drug and Alcohol Dependence*, 201, 236–243.

<https://doi.org/10.1016/j.drugalcdep.2019.03.030>

Barber, C. (2021, June 27). How the pandemic roiled the foster care system. *Scientific American*.

<https://www.scientificamerican.com/article/how-the-pandemic-roiled-the-foster-care-system/>

Barroso, A., & Brown, A. (2021). *Gender pay gap in U.S. held steady in 2020*. Pew Research Center. <https://www.pewresearch.org/fact-tank/2021/05/25/gender-pay-gap-facts/>

- Bartlett, F. C. (1932). *Remembering*. The University Press.
- Benbenishty, R., Siegel, A., & Astor, R. A. (2018). School-related experiences of adolescents in foster care: A comparison with their high-school peers. *American Journal of Orthopsychiatry*, 88(3), 261–268. <https://doi.org/10.1037/ort0000242>
- Best, J. I., & Blakeslee, J. E. (2020). Perspectives of youth aging out of foster care on relationship strength and closeness in their support networks. *Children and Youth Services Review*, 108, 1–8. <https://doi.org/10.1016/j.childyouth.2019.104626>
- Bickerstaff, S., & Cormier, M. S. (2015). Examining faculty questions to facilitate instructional improvement in higher education. *Studies in Educational Evaluation*, 46, 74–80. <https://doi.org/10.1016/j.stueduc.2014.11.004>
- Blunt, J. R., & Karpicke, J. D. (2014). Learning with retrieval-based concept mapping. *Journal of Educational Psychology*, 106(3), 849–858. <https://doi.org/10.1037/a0035934>
- Boddy, J., Bakketeig, E., & Østergaard, J. (2020). Navigating precarious times? The experience of young adults who have been in care in Norway, Denmark and England. *Journal of Youth Studies*, 23(3), 291–306. <https://doi.org/10.1080/13676261.2019.1599102>
- Bolin, R. M., Pate, M., & McClintock, J. (2017). The impact of alcohol and marijuana use on academic achievement among college students. *The Social Science Journal*, 54(4), 430–437. <https://doi.org/10.1016/j.soscij.2017.08.003>
- Bonwell, C. C., & Eison, J. A. (1991). *Active learning: Creating excitement in the classroom*. 1991 ASHE-ERIC higher education reports. ERIC Clearinghouse on Higher Education, The George Washington University. <https://files.eric.ed.gov/fulltext/ED336049.pdf>
- Bowlby, J. (1969). *Attachment and Loss: Vol. 1. Attachment*. Basic Books.
- Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation*. Basic Books.

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. https://doi.org/10.1207/s15430421tip3903_2
- Broda, M., Yun, J., Schneider, B., Yeager, D. S., Walton, G. M., & Diemer, M. (2018). Reducing inequality in academic success for incoming college students: A randomized trial of growth mindset and belonging interventions. *Journal of Research on Educational Effectiveness*, 11(3), 317–338. <https://doi.org/10.1080/19345747.2018.1429037>
- Bronfenbrenner, U. (1994). Ecology models of human development. In T. N. Postlewaite & T. Husen (Eds.), *International encyclopedia of education* (2nd ed., Vol. 3, pp. 1643–1647). Elsevier.
- Cage, J. (2018). Educational attainment for youth who were maltreated in adolescence: Investigating the influence of maltreatment type and foster care placement. *Child Abuse & Neglect*, 79, 234–244. <https://doi.org/10.1016/j.chiabu.2018.02.008>
- California Community Colleges Chancellor’s Office. (n.d.). *Datamart glossary of terms*. <https://datamart.cccco.edu/Resources.aspx>
- California Community Colleges Chancellor’s Office. (2019a). *Annual/term student count report* [Data set]. https://datamart.cccco.edu/Students/Student_Term_Annual_Count.aspx
- California Community Colleges Chancellor’s Office. (2019b). *Credit course retention/success rate summary report* [Data set]. https://datamart.cccco.edu/Outcomes/Course_Ret_Success.aspx
- California Community Colleges Chancellor’s Office. (2019c). *Special population/group count summary* [Data set]. https://datamart.cccco.edu/Services/Special_Pop_Count.aspx

- California Community Colleges Chancellor's Office. (2019d). *Special population group credit course retention/success rate summary report* [Data set]. https://datamart.cccco.edu/Outcomes/Course_Ret_Success_SP.aspx
- California Community Colleges Chancellor's Office. (2021a). *All hands on deck for student retention and enrollment*. <https://www.cccco.edu/About-Us/News-and-Media/California-Community-Colleges-Outlook-Newsletter/acting-chancellor-column-nov>
- California Community Colleges Chancellor's Office. (2021b). *FTES summary*. https://datamart.cccco.edu/Students/FTES_Summary.aspx
- California Community Colleges Chancellor's Office. (2021c). *Retention/success rate* [Data set]. https://datamart.cccco.edu/Outcomes/Course_Ret_Success.aspx
- California Community Colleges Chancellor's Office. (2022a). *Credit course retention/success rate summary report* [Data set]. https://datamart.cccco.edu/Outcomes/Course_Ret_Success.aspx
- California Community Colleges Chancellor's Office. (2022b). *Joint analysis enacted 2022–23 budget*. <https://www.cccco.edu/-/media/CCCCO-Website/College-Finance-and-Facilities/Budget-News/Budget-2022-23/final-22-23-enacted-budget-joint-analysis2022-23.pdf>
- California Department of Education. (2020). *California Department of Education releases 2019–20 high school graduation and dropout rates*. <https://www.cde.ca.gov/nr/ne/yr20/yr20rel101.asp>
- California Department of Social Services. (n.d.). *Foster care*. <https://www.cdss.ca.gov/inforesources/foster-care>

California Department of Social Services. (2016). *Child Welfare Services Program intake*.

<https://www.cdss.ca.gov/ord/entres/getinfo/pdf/cws2.pdf>

California Fostering Connections to Success Act, A.B. 12, 2010-2012 Reg. Sess. (Cal. 2010)

(enacted). <https://www.cdss.ca.gov/inforesources/foster-care/extended-foster-care-ab-12>

California Senate Bill, S.B. 967, 2021-2022 Reg. Sess. (Cal. 2018).

<https://openstates.org/ca/bills/20212022/SB967/>

Carrion, V. G., & Wong, S. S. (2012). Can traumatic stress alter the brain? Understanding the implications of early trauma on brain development and learning. *Journal of Adolescent Health*, 51, 23–28.

<https://doi.org/10.1016/j.jadohealth.2012.04.010>

CAST. (2018). *Universal design for learning guidelines Version 2.2*. <http://udlguidelines.cast.org>

CAST. (2022). *Timeline of innovation*. <https://www.cast.org/impact/timeline-innovation>

Chambers, R. M., Crutchfield, R. M., Willis, T. Y., Cuza, H. A., Otero, A., Harper, S. G. G., & Carmichael, H. (2018). “It's just not right to move a kid that many times:” A qualitative study of how foster care alumni perceive placement moves. *Children and Youth Services Review*, 86, 76–83.

<https://doi.org/10.1016/j.childyouth.2018.01.028>

Cheatham, L. P., Luo, Y., Hubbard, S., Jackson, M. S., Hassenbein, W., & Bertram, J. (2021).

Cultivating safe and stable spaces: Reflections on a campus-based support program for foster care alumni and youth experiencing homelessness. *Children and Youth Services Review*, 130, Article 106247.

<https://doi.org/10.1016/j.childyouth.2021.106247>

Cheung, J. R., Lietz, C. A., Carpenter, B. M., Sitz, E., & Lietz, B. C. (2019). Cultivating

resilience in college students with a foster care background. *Journal of Public Child*

Welfare, 15(2), 182–202. <https://doi.org/10.1080/15548732.2019.1679694>

- Children's Bureau. (2019). *National youth in transition: Database Data Brief #7* [Dataset]. U.S. Department of Health & Human Services. <https://www.acf.hhs.gov/cb/resource/nytd-data-brief-7>
- Children's Bureau. (2020a). *AFCARS report #27* [Data set]. U.S. Department of Health & Human Services. <https://www.acf.hhs.gov/cb/resource/afcars-report-27>
- Children's Bureau. (2020b). *NYTD report to congress*. U.S. Department of Health & Human Services. https://www.acf.hhs.gov/sites/default/files/documents/cb/nytd_report_to_congress.pdf
- Child Welfare Information Gateway. (2014). *Parenting a child who has experienced trauma*. U.S. Department of Health and Human Services, Children's Bureau. <https://www.childwelfare.gov/pubs/factsheets/child-trauma/>
- Child Welfare Information Gateway. (2019). *What is child abuse and neglect? Recognizing the signs and symptoms*. U.S. Department of Health and Human Services, Administration for Children and Families, Children's Bureau. <https://www.childwelfare.gov/pubs/factsheets/whatiscan/>
- Child Welfare Information Gateway. (2020). *Foster care statistics 2018*. U.S. Department of Health and Human Services, Administration for Children and Families, Children's Bureau. <https://www.childwelfare.gov/pubs/factsheets/foster/>
- Chiou, C. (2008). The effect of concept mapping on students' learning achievements and interests. *Innovations in Education and Teaching International*, 45(4), 375–387. <https://doi.org/10.1080/14703290802377240>

- Clemens, E. V., Helm, H. M., Myers, K., Thomas, C., & Tis, M. (2017a). The voices of youth formerly in foster care: Perspectives on educational attainment gaps. *Children and Youth Services Review*, 79, 65–77. <https://doi.org/10.1016/j.childyouth.2017.06.003>
- Clemens, E. V., Klopfenstein, K., Lalonde, T. L., & Tis, M. (2018). The effects of placement and school stability on academic growth trajectories of students in foster care. *Children and Youth Services Review*, 87, 86–94. <https://doi.org/10.1016/j.childyouth.2018.02.015>
- Clemens, E. V., Klopfenstein, K., Tis, M., & Lalonde, T. L. (2017b). Educational stability policy and the interplay between child welfare placements and school moves. *Children and Youth Services Review*, 83, 209–217. <https://doi.org/10.1016/j.childyouth.2017.11.003>
- Clemens, E. V., Lalonde, T. L., & Sheesley, A. P. (2016). The relationship between school mobility and students in foster care earning a high school credential. *Children and Youth Services Review*, 68, 193–201. <https://doi.org/10.1016/j.childyouth.2016.07.016>
- Cleveland Clinic. (2022). *Dopamine deficiency*. <https://my.clevelandclinic.org/health/articles/22588-dopamine-deficiency>
- Combs, K. M., Begun, S., Rinehart, D. J., & Taussig, H. (2018). Pregnancy and childbearing among young adults who experienced foster care. *Child Maltreatment*, 23(2), 166–174. <https://doi.org/10.1177/1077559517733816>
- Cooper, D., Mery, P., & Rassen, E. (2008). *Serving former foster youth in California community colleges: Successes, challenges, and recommendations*. Center for Student Success Research & Planning Group for California Community Colleges Research & Report Writing. <http://www.careerladdersproject.org/docs/FosterYouthReport.pdf>

- Courtney, M. E., Dworsky, A. L., Cusick, G. R., Havlicek, J., Perez, A., & Keller, T. E. (2007). *Midwest evaluation of the adult functioning of former foster youth: Outcomes at age 21*. Chapin Hall at the University of Chicago. <https://www.chapinhall.org/wp-content/uploads/Midwest-Eval-Outcomes-at-Age-21.pdf>
- Courtney, M. E., Okpych, N. J., Park, K., Harty, J., Feng, H., Torres-Garcia, A., & Sayed, S. (2018). *Findings from the California Youth Transitions to Adulthood Study (CalYOUTH): Conditions of youth at age 21*. Chapin Hall at the University of Chicago. <https://www.chapinhall.org/research/cal youth-wave3/>
- Crenshaw, K. W. (2017). *On intersectionality: Essential writings*. The New Press.
- Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development* (Research brief, ED606741). ERIC. <https://eric.ed.gov/?id=ED606741>
- Davis, D. (2014). *10 years of advanced placement exam data show significant gains in access and success; areas for improvement*. The College Board Communications Office. <https://newsroom.collegeboard.org/10-years-advanced-placement-exam-data-show-significant-gains-access-and-success-areas-improvement>
- Day, A., Riebschleger, J., & Wen, J. (2018). The fostering academics mentoring excellence program. *New Directions for Community Colleges*, 2018(181), 39–47. <https://doi.org/10.1002/cc.20290>
- Denton, J. A. (1990). *Society and the official world: A reintroduction to sociology*. Rowman & Littlefield.
- Dow, G. T., & Kozlowski, K. (2020). The creative brain. *Educational Leadership*, 77(8), 44–49. <http://www.ascd.org/>

- Downey, D. B., & Condrón, D. J. (2016). Fifty years since the Coleman Report: Rethinking the relationship between schools and inequality. *Sociology of Education*, 89, 207–220.
<https://doi.org/10.1177/0038040716651676>
- Doyle, A. (2019). *How to dress for a job interview*. The Balance Careers.
<https://www.thebalancecareers.com/how-to-dress-for-an-interview-2061163#:~:text=%20Here%20are%20the%20fundamental%20building%20blocks%20of,8%20Professional%20hairstyle%209%20Neutral-colored%20pantyhose%20More%20>
- Dweck, C. (2000). *Self-theories: Their role in motivation, personality and development*. Taylor & Francis.
- Dworsky, A. (2018). Improving the postsecondary educational attainment of youth in foster care. *New Directions for Community Colleges*, 2018(181), 11–19.
<https://doi.org/10.1002/cc.20287>
- Dworsky, A., Napolitano, L., & Courtney, M. (2013). Homelessness during the transition from foster care to adulthood. *American Journal of Public Health*, 103(S2), S318–S323.
<https://doi.org/10.2105/AJPH.2013.3014>
- Elzinga, B. M., Schmahl, C. G., Vermetten, E., van Dyck, R., & Bremner, J. D. (2003). Higher cortisol levels following exposure to traumatic reminders in abuse-related PTSD. *Neuropsychopharmacology*, 28(9), 1656–1665.
<https://www.nature.com/articles/1300226/>
- Erzen, E., & Çikrikci, Ö. (2018). The effect of loneliness on depression: A meta-analysis. *International Journal of Social Psychiatry*, 64(5), 427–435.
<https://doi.org/10.1177/0020764018776349>

- Fawley-King, K., Trask, E. V., Zhang, J., & Aarons, G. A. (2017). The impact of changing neighborhoods, switching schools, and experiencing relationship disruption on children's adjustment to a new placement in foster care. *Child Abuse & Neglect*, *63*, 141–150. <https://doi.org/10.1016/j.chiabu.2016.11.016>
- Ferrara, A. M., & Panlilio, C. C. (2020). The role of metacognition in explaining the relationship between early adversity and reading comprehension. *Children and Youth Services Review*, *112*, 1–10. <https://doi.org/10.1016/j.chilyouth.2020.104884>
- Fields, R. D. (2020). The Brain Learns in Unexpected Ways: Neuroscientists have discovered a set of unfamiliar cellular mechanisms for making fresh memories. *Scientific American*, *322*(3), 74. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8284127/>
- Fostering Connections to Success and Increasing Adoptions Act of 2008, Pub. L. No. 110–351 (2008). <https://www.congress.gov/bill/110th-congress/house-bill/6893>
- Fry, R., Kennedy, B., & Funk, C. (2021). *STEM jobs see uneven progress in increasing gender, racial and ethnic diversity*. Pew Research Center. <https://www.pewresearch.org/science/2021/04/01/stem-jobs-see-uneven-progress-in-increasing-gender-racial-and-ethnic-diversity/>
- Fugate, J. M., Macrine, S. L., & Cipriano, C. (2019). The role of embodied cognition for transforming learning. *International Journal of School & Educational Psychology*, *7*(4), 274–288. <https://doi.org/10.1080/21683603.2018.1443856>
- Gardner, H. (2020). “Neuromyths”: A critical consideration. *Mind, Brain, and Education*, *14*(1), 2–4. <https://doi.org/10.1111/mbe.12229>

- Gay, G. (2015). The what, why, and how of culturally responsive teaching: International mandates, challenges, and opportunities. *Multicultural Education Review*, 7(3), 123–139. <https://doi.org/10.1080/2005615X.2015.1072079>
- Geiger, J. M., & Beltran, S. J. (2017). Readiness, access, preparation, and support for foster care alumni in higher education: A review of the literature. *Journal of Public Child Welfare*, 11(4–5), 487–515. <https://doi.org/10.1080/15548732.2017.1354795>
- Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology and Metabolism*, 10(2), 486–489. <https://doi.org/10.5812/ijem.3505>
- Gingerich, S. B., Seaverson, E. L., & Anderson, D. R. (2018). Association between sleep and productivity loss among 598 676 employees from multiple industries. *American Journal of Health Promotion*, 32(4), 1091–1094. <https://doi.org/10.1177/0890117117722517>
- Graves, B. S., Hall, M. E., Dias-Karch, C., Haischer, M. H., & Apter, C. (2021). Gender differences in perceived stress and coping among college students. *PLoS One*, 16(8), Article e0255634. <https://doi.org/10.1371/journal.pone.0255634>
- Greenfield, E. A., Akincigil, A., & Moorman, S. M. (2020). Is college completion associated with better cognition in later life for people who are the least, or most, likely to obtain a bachelor's degree? *The Journals of Gerontology: Series B*, 75(6), 1286–1291. <https://doi.org/10.1093/geronb/gbz132>
- Greeno, E. J., Lee, B. R., Tuten, M., & Harburger, D. (2019). Prevalence of substance use, housing instability, and self-perceived preparation for independence among current and former foster youth. *Child and Adolescent Social Work Journal*, 36(4), 409–418. <https://doi.org/10.1007/s10560-018-0568-y>

- Gregory, E., Hardiman, M., Yarmolinskaya, J., Rinne, L., & Limb, C. (2013). Building creative thinking in the classroom: From research to practice. *International Journal of Educational Research*, 62, 43–50. <https://doi.org/10.1016/j.ijer.2013.06.003>
- Hansson, Å., & Gustafsson, J. E. (2020). School mobility and achievement for children placed and not placed in out-of-home care. *Scandinavian Journal of Educational Research*, 64(2), 167–180. <https://doi.org/10.1080/00313831.2018.1527395>
- Hao, N., Ku, Y., Liu, M., Hu, Y., Bodner, M., Grabner, R. H., & Fink, A. (2016). Reflection enhances creativity: Beneficial effects of idea evaluation on idea generation. *Brain and Cognition*, 103, 30–37. <https://doi.org/10.1016/j.bandc.2016.01.005>
- Hardiman, M. M. (2012). *Brain-targeted teaching for 21st-century schools*. Corwin Press.
- Hardiman, M. M., JohnBull, R. M., Carran, D. T., & Shelton, A. (2019). The effects of arts-integrated instruction on memory for science content. *Trends in Neuroscience and Education*, 14, 25–32. <https://doi.org/10.1016/j.tine.2019.02.002>
- Hardiman, M. M., Rinne, L., Gregory, E., & Yarmolinskaya, J. (2012). Neuroethics, neuroeducation, and classroom teaching: Where brain sciences meet pedagogy. *Neuroethics*, 5, 135–143. <https://doi.org/10.1007/s12152-011-9116-6>
- Hardiman, M. M., & Whitman, G. (2013). Assessment and the learning brain. *Independent School-Journal of the National Association of Independent Schools*, 73(2), 36–41. <https://eric.ed.gov/?id=EJ1047971>
- Harlan, J., & Marken, S. (2020). *Black college grads report less support in college*. GALLUP. <https://news.gallup.com/poll/312548/black-college-grads-report-less-support-college.aspx>

- Heyman, J. C., White-Ryan, L., Kelly, P., Farmer, G. L., Leaman, T. L., & Davis, H. J. (2020). Voices about foster care: The value of trust. *Children and Youth Services Review*, *113*, 1–9. <https://doi.org/10.1016/j.chidyouth.2020.104991>
- Hill, K., & Peyton, L. (2017). Reaching successful futures: Experiences of participants in the education and training vouchers program. *Children & Schools*, *39*(2), 89–97. <https://doi.org/10.1002/cc.20290>
- Hogan, S. R. (2018). Foster youth in higher education: Mental health and academic achievement during the first college year. *Journal of the First-Year Experience & Students in Transition*, *30*(2), 65–78. <https://www.ingentaconnect.com/contentone/fyesit/fyesit/2018/00000030/00000002/art00004>
- Hromalik, C. D., Myhill, W. N., & Carr, N. R. (2020). “All faculty should take this”: A universal design for learning training for community college faculty. *TechTrends*, *64*(1), 91–104. <https://doi.org/10.1007/s11528-019-00439-6>
- Hua, J. P., Piasecki, T. M., McDowell, Y. E., Boness, C. L., Trela, C. J., Merrill, A. M., Sher, K. J., & Kerns, J. G. (2020). Alcohol use in young adults associated with cortical gyrification. *Drug and Alcohol Dependence*, *209*, 1–7. <https://doi.org/10.1016/j.drugalcdep.2020.107925>
- Huang, H., Fernandez, S. B., Rhoden, M. A., & Joseph, R. (2019). Elements of a college support program that matter: A case study. *Research on Social Work Practice*, *29*(8), 949–960. <https://doi.org/10.1177/1049731519832105>
- Immordino - Yang, M. H., & Damasio, A. (2007). We feel, therefore we learn: The relevance of affective and social neuroscience to education. *Mind, Brain, and Education*, *1*, 3–10. <https://doi.org/10.1111/j.1751-228X.2007.00004.x>

Institutional Effectiveness, Research & Planning. (2022a). *Outcomes*.

<https://public.tableau.com/app/profile/svetlana6591/viz/Factbook2022/FACTBOOK>

Institutional Effectiveness, Research & Planning. (2022b). *Fall 2022 student profile*.

<https://public.tableau.com/app/profile/svetlana6591/viz/Fall2022StudentProfile/Fall2022>

Institutional Effectiveness, Research & Planning. (2022c). *2022 FTES summer & fall*.

<https://public.tableau.com/app/profile/svetlana6591/viz/2022FTESSummerFall/Fall2022>

Johns Hopkins University Dissertation Clinic. (2017). *Testing assumptions for statistical analysis* [Video]. Vimeo.

<https://vimeopro.com/user40279264/dissertationclinic/video/222377389>

Johnson, G. (2021). *The living world*. McGraw Hill.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, 33(7), 14–26.

<https://doi.org/10.3102/0013189X033007014>

Johnson, R. M., Strayhorn, T. L., & Parler, B. (2020). “I just want to be a regular kid:” A qualitative study of sense of belonging among high school youth in foster care. *Children and Youth Services Review*, 111, 1–8. <https://doi.org/10.1016/j.childyouth.2020.104832>

Kelly, P. (2020). Risk and protective factors contributing to homelessness among foster care youth: An analysis of the National Youth in Transition Database. *Children and Youth Services Review*, 108, 1–8. <https://doi.org/10.1016/j.childyouth.2019.104589>

Kensinger, C., & Minnick, D. J. (2018). The invisible village: An exploration of undergraduate student mothers’ experiences. *Journal of Family and Economic Issues*, 39(1), 132–144.

<https://doi.org/10.1007/s10834-017-9535-6>

- Kesby, J. P., Eyles, D. W., McGrath, J. J., & Scott, J. G. (2018). Dopamine, psychosis and schizophrenia: The widening gap between basic and clinical neuroscience. *Translational Psychiatry*, 8(1), 1–12. <https://doi.org/10.1038/s41398-017-0071-9>
- Kettle, K. L., & Haubl, G. (2010). Motivation by anticipation: Expecting rapid feedback enhances performance. *Psychological Science*, 21(4), 545–547. <https://doi.org/0.1177/0956797610363541>
- Kim, C., & Tamborini, C. R. (2019). Are they still worth it? The long-run earnings benefits of an associate degree, vocational diploma or certificate, and some college. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 5(3), 64–85. <https://doi.org/10.7758/RSF.2019.5.3.04>
- Kinarsky, A. R. (2017). Fostering success: Understanding the experience of foster youth undergraduates. *Children and Youth Services Review*, 81, 220–228. <https://doi.org/10.1016/j.chilyouth.2017.08.016>
- Knapp, H. (2017). *Mann-Whitney u-test* [Video]. SAGE Research Methods. <https://doi.org/10.4135/9781544301563>
- Knapp, H. (2018). *Intermediate statistics using SPSS®*. SAGE.
- Kohnke, S., Patterson, M. S., & Moehlmann, R. (2022). *UDL solutions for common science barriers*. National Science Teaching Association. <https://www.nsta.org/science-teacher/science-teacher-julyaugust-2022/udl-solutions-common-science-barriers>
- Krogstad, J. M., & López, G. (2016). *Roughly half of Hispanics have experienced discrimination*. Pew Research. <https://www.pewresearch.org/fact-tank/2016/06/29/roughly-half-of-hispanics-have-experienced-discrimination/>

- LaCosse, J., Canning, E. A., Bowman, N. A., Murphy, M. C., & Logel, C. (2020). A social-belonging intervention improves STEM outcomes for students who speak English as a second language. *Science Advances*, *6*(40), Article eabb6543.
<https://doi.org/10.1126/sciadv.abb6543>
- Lane, T. Y. (2017). Tribulations and achievements: The lived experiences of African American college students formerly in foster care. *Journal of Human Behavior in the Social Environment*, *27*(3), 141–150. <https://doi.org/10.1080/10911359.2016.1262805>
- Lenz-Rashid, S. (2018). An urban university campus support program for students from foster care: Services and outcomes. *Children and Youth Services Review*, *94*, 180–185.
<https://doi.org/10.1016/j.chilyouth.2018.09.033>
- Leslie, M. (2016, June 22). “Undead” genes come alive days after life ends. *Science*.
<https://www.science.org/content/article/undead-genes-come-alive-days-after-life-ends>
- Lewis, C. (2015). What is improvement science? Do we need it in education? *Educational Researcher*, *44*(1), 54–61. <https://doi.org/10.3102/0013189X15570388>
- Lochmiller, C. R., & Lester, J. N. (2017). *An introduction to educational research: Connecting methods to practice*. Sage.
- Ma, J., Pender, M., & Welch, M. (2019). *Education pays 2019: The benefits of higher education for individuals and society*. The College Board.
<https://research.collegeboard.org/pdf/education-pays-2019-full-report.pdf>
- Maddox, B. (2003). The double helix and the “wronged heroine.” *Nature*, *421*(6921), 407–408.
<https://www.nature.com/articles/nature01399>

- Maguire, E. A., Gadian, D. G., Johnsrude, I. S., Good, C. D., Ashburner, J., Frackowiak, R. S., & Frith, C. D. (2000). Navigation-related structural change in the hippocampi of taxi drivers. *Proceedings of the National Academy of Sciences*, *97*(8), 4398–4403.
<https://doi.org/10.1073/pnas.07003959>
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, *50*(4), 370–396.
<https://doi.org/10.1037/h0054346>
- Masters, A., Pandi-Perumal, S. R., Seixas, A., Girardin, J. L., & McFarlane, S. I. (2014). Melatonin, the hormone of darkness: From sleep promotion to Ebola treatment. *Brain Disorders & Therapy*, *4*(1), Article 1000151.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4334454/>
- McKinney-Vento Homeless Assistance Act, Pub. L. No. 106-400 (2000).
<https://www.congress.gov/bill/106th-congress/house-bill/5417>
- Meda, S. A., Gueorguieva, R. V., Pittman, B., Rosen, R. R., Aslanzadeh, F., Tennen, H., Leen, S., Hawkins, K., Raskin, S., Wood, R. M., Austad, C. S., Gager, A., Fallahi, C., & Pearlson, G. D. (2017). Longitudinal influence of alcohol and marijuana use on academic performance in college students. *PLoS One*, *12*(3), Article e017221.
<https://doi.org/10.1371/journal.pone.0172213>
- Meda, S. A., Hawkins, K. A., Dager, A. D., Tennen, H., Khadka, S., Austad, C. S., Wood, R. M., Raskin, S., Fallahi, C. R., & Pearlson, G. D. (2018). Longitudinal effects of alcohol consumption on the hippocampus and parahippocampus in college students. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, *3*(7), 610–617.
<https://doi.org/10.1016/j.bpsc.2018.02.006>

- Menna-Barreto, L., & Wey, D. (2008). Time constraints in the school environment: What does a sleepy student tell us? *Mind, Brain, & Education*, 2(1), 24–28.
<https://doi.org/10.1111/j.1751-228X.2008.00025.x>
- Meyer, A., Rose, D. H., & Gordon, D. (2014). *Universal design for learning: Theory and practice*. CAST Professional Publishing.
- Mezirow, J. (1998). On critical reflection. *Adult Education Quarterly*, 48(3), 185–198.
<https://doi.org/10.1177/074171369804800305>
- Mihalec-Adkins, B. P., Christ, S. L., & Day, E. (2020). An exploration of placement-related psychosocial influences on school engagement among adolescents in foster care. *Children and Youth Services Review*, 108, Article 104616.
<https://doi.org/10.1016/j.childyouth.2019.104616>
- Mikulincer, M., & Shaver, P. R. (2003). The attachment behavioral system in adulthood: Activation, psychodynamics, and interpersonal processes. *Advances in Experimental Social Psychology*, 35, 53 – 152. [https://doi.org/10.1016/S0065-2601\(03\)01002-5](https://doi.org/10.1016/S0065-2601(03)01002-5)
- Miles, M. B., Huberman, A. M., & Saldana, J. (2013). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE.
- Miller, R., Blakeslee, J., & Ison, C. (2020). Exploring college student identity among young people with foster care histories and mental health challenges. *Children and Youth Services Review*, 114, Article 104992. <https://doi.org/10.1016/j.childyouth.2020.104992>
- Mitchell, M. (2018). “No one acknowledged my loss and hurt”: Non-death loss, grief, and trauma in foster care. *Child Adolescent Social Work*, 35, 1–9.
<https://doi.org/10.1007/s10560-017-0502-8>

- Morton, B. M. (2016). The power of community: How foster parents, teachers, and community members support academic achievement for foster youth. *Journal of Research in Childhood Education*, 30(1), 99–112. <https://doi.org/10.1080/02568543.2015.1105334>
- Morton, B. M. (2018). The grip of trauma: How trauma disrupts the academic aspirations of foster youth. *Child Abuse & Neglect*, 75, 73–81. <https://doi.org/10.1016/j.chiabu.2017.04.021>
- Murphy, M. C., Gopalan, M., Carter, E. R., Emerson, K. T., Bottoms, B. L., & Walton, G. M. (2020). A customized belonging intervention improves retention of socially disadvantaged students at a broad-access university. *Science Advances*, 6(29), 1–7. <https://doi.org/10.1126/sciadv.aba4677>
- National Cancer Institute. (2020). *Cancer statistics*. <https://www.cancer.gov/about-cancer/understanding/statistics>
- National Center for Education Statistics. (2019). *Antelope Valley College*. U.S. Department of Education. <https://nces.ed.gov/collegenavigator/?q=antelope+valley+college&s=all&id=109350#outcome>
- National Center for Education Statistics. (2020a). *Educational attainment of young adults*. U.S. Department of Education. https://nces.ed.gov/programs/coe/indicator_caa.asp
- National Center for Education Statistics. (2020b). *Public high school graduation rates*. U.S. Department of Education. https://nces.ed.gov/programs/coe/indicator_coi.asp
- National Data Archive on Child Abuse and Neglect. (2019). *NYTD outcomes file codebook*. Children’s Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U. S. Department of Health and Human Services. https://www.ndacan.acf.hhs.gov/datasets/pdfs_user_guides/Dataset228Codebook.pdf

- National School Reform Faculty. (n.d.). *NSRF protocols and activities... from A to Z*.
<https://nsrfharmony.org/protocols/>
- National Science Foundation. (2020). *The state of U.S. science and engineering 2020*.
<https://nces.nsf.gov/pubs/nsb20201/u-s-s-e-workforce>
- The National Voice of Foster Parents. (n.d.). *History of foster care in the United States*.
<https://www.nfpaonline.org/page-1105741>
- Neal, J. W., & Neal, Z. P. (2013). Nested or networked? Future directions for ecological systems theory. *Social Development*, 22, 722–737. <https://doi.org/10.1111/sode.12018>
- Nikolaev, B. (2018). Does higher education increase hedonic and eudaimonic happiness? *Journal of Happiness Studies*, 19(2), 483–504. <https://doi.org/10.1007/s10902-016-9833-y>
- Nobel Prize. (2018, October 2). “*We scientists like to puzzle as to why something is working.*” – *Interview with Donna Strickland* [Video]. YouTube.
<https://www.youtube.com/watch?v=tbbIJqKcM2E>
- North, C. E. (2006). More than words? Delving into the substantive meaning(s) of “social justice” in education. *Review of Educational Research*, 76(4), 507–535.
<https://doi.org/10.3102/00346543076004507>
- Nucleus Medical Media. (2015). *Biology: Cell structure I* [Video]. YouTube.
<https://www.youtube.com/watch?v=URUJD5NEXC8>
- Organization for Economic Co-operation and Development. (2019). *Trends shaping education 2019*. https://doi.org/10.1787/trends_edu-2019-en

- Okpych, N. J., & Courtney, M. E. (2014). Does education pay for youth formerly in foster care? Comparison of employment outcomes with a national sample. *Children and Youth Services Review, 43*, 18–28. <https://doi.org/10.1016/j.childyouth.2014.04.013>
- Okpych, N. J., & Courtney, M. E. (2018a). Barriers to degree completion for college students with foster care histories: Results from a 10-year longitudinal study. *Journal of College Student Retention: Research, Theory & Practice, 23*(1).
<https://doi.org/10.1177/1521025118791776>
- Okpych, N. J., & Courtney, M. E. (2018b). The role of avoidant attachment on college persistence and completion among youth in foster care. *Children and Youth Services Review, 90*, 106–117. <https://doi.org/10.1016/j.childyouth.2018.05.014>
- Okpych, N. J., & Courtney, M. E. (2019). Longitudinal analyses of educational outcomes for youth transitioning out of care in the US: Trends and influential factors. *Oxford Review of Education, 45*(4), 461–480. <https://doi.org/10.1080/03054985.2019.1592747>
- Okpych, N. J., Park, S. E., Sayed, A. S., & Courtney, M. E. (2020). The roles of Campus-Support Programs (CSPs) and Education and Training Vouchers (ETVs) on college persistence for youth with foster care histories. *Children and Youth Services Review, 111*, Article 104891. <https://doi.org/10.1016/j.childyouth.2020.104891>
- Olsen, R. F., & de Montgomery, C. J. (2018). Revisiting out-of-home placed children’s poor educational outcomes—Is school change part of the explanation? *Children and Youth Services Review, 88*, 103–113. <https://doi.org/10.1016/j.childyouth.2018.03.005>

- Opel, N., Redlich, R., Dohm, K., Zaremba, D., Goltermann, J., Repple, J., Kaehler, C., Grotegerd, D., Leehr, E. J., Böhnlein, J., & Dannlowski, U. (2019). Mediation of the influence of childhood maltreatment on depression relapse by cortical structure: A 2-year longitudinal observational study. *The Lancet Psychiatry*, *6*(4), 318–326. [https://doi.org/10.1016/S2215-0366\(19\)30044-6](https://doi.org/10.1016/S2215-0366(19)30044-6)
- Pedersen, P. (2000). *A handbook for developing multicultural awareness* (3rd ed.). American Counseling Association.
- Piel, M. H., Geiger, J. M., Schelbe, L., Day, A., & Kearney, K. S. (2020). Lessons learned from college support programs for students with a history of foster care. *Journal of Student Affairs Research and Practice*, *57*(1), 77–89. <https://doi.org/10.1080/19496591.2019.1644117>
- Plumb, J. L., Bush, K. A., & Kersevich, S. E. (2016). Trauma-sensitive schools: An evidence-based approach. *School Social Work Journal*, *40*(2), 37–60. <https://www.ingentaconnect.com/content/iassw/sswj/2016/00000040/00000002/art00005#Refs>
- Reardon, S. (2022). Human brain cells implanted in rats prompt excitement-and concern. *Nature*, *610*(7932), 427–428. <https://doi.org/10.1038/d41586-022-03238-x>
- Rodriguez, V. (2012). The teaching brain and the end of the empty vessel. *Mind, Brain, and Education*, *6*(4), 177–185. <https://doi.org/10.1111/j.1751-228X.2012.01155.x>
- Roediger, H. L., III, & Pyc, M. A. (2012). Inexpensive techniques to improve education: Applying cognitive psychology to enhance educational practice. *Journal of Applied Research in Memory and Cognition*, *1*(4), 242–248. <https://doi.org/10.1016/j.jarmac.2012.09.002>

- Rogowsky, B. A., Calhoun, B. M., & Tallal, P. (2020). Providing instruction based on students' learning style preferences does not improve learning. *Frontiers in Psychology, 11*, 1–7.
<https://doi.org/10.3389/fpsyg.2020.00164>
- Rosenberg, R., & Kim, Y. (2018). Aging out of foster care: Homelessness, post-secondary education, and employment. *Journal of Public Child Welfare, 12*(1), 99–115.
<https://doi.org/10.1080/15548732.2017.1347551>
- Roy, R. N., Bradecich, A., Dayne, N., & Luna, A. (2018). The transition to motherhood: The experiences of college student-parents. *Journal of Family & Consumer Sciences, 110*(3), 48–57. <https://doi.org/10.14307/JFCS110.3.48>
- Rymph, C. E. (2017). *Raising government children: A history of foster care and the American welfare state*. UNC Press Books.
- Sallee, M. W., & Cox, R. D. (2019). Thinking beyond childcare: Supporting community college student-parents. *American Journal of Education, 125*(4), 621–645.
<https://www.journals.uchicago.edu/doi/abs/10.1086/704094>
- Sandh, S., Donaldson, V. M., & Katz, C. C. (2020). Students connected to foster care: An overview of high school experiences. *Children and Youth Services Review, 113*, 1–7.
<https://doi.org/10.1016/j.childyouth.2020.104905>
- Schneider, B., Martinez, S., & Ownes, A. (2006). Barriers to educational opportunities for Hispanics in the United States. In M. Tienda & F. Mitchell (Eds.), *Hispanics and the future of America* (pp. 197–227). National Academies Press.
<https://www.ncbi.nlm.nih.gov/books/NBK19909/>

- Sethi, A. (2019). *A brief history of foster care in the United States*. Court Appointed Special Advocates of Travis County.
https://www.casatravis.org/a_brief_history_of_foster_care_in_the_united_states
- Shpiegel, S., & Cascardi, M. (2018). The impact of early childbirth on socioeconomic outcomes and risk indicators of females transitioning out of foster care. *Children and Youth Services Review*, *84*, 1–8. <https://doi.org/10.1016/j.chilyouth.2017.11.001>
- Skilbred, D. T., Iversen, A. C., & Moldestad, B. (2017). Successful academic achievement among foster children: What did the foster parents do? *Child Care in Practice*, *23*(4), 356–371. <https://doi.org/10.1080/13575279.2016.1188764>
- Skobba, K., Meyers, D., & Tiller, L. (2018). Getting by and getting ahead: Social capital and transition to college among homeless and foster youth. *Children and Youth Services Review*, *94*, 198–206. <https://doi.org/10.1016/j.chilyouth.2018.10.003>
- Souers, K., & Hall, P. (2016). *Fostering resilient learners: Strategies for creating a trauma-sensitive classroom*. Association for Supervision and Curriculum Development.
- State Government of Victoria, Australia. (2019). *Laws of motion*.
<https://www.education.vic.gov.au/school/teachers/teachingresources/discipline/science/continuum/Pages/conceptmaps.aspx#link54>
- Steenbakkens, A., van der Steen, S., & Grietens, H. (2019). How do youth in foster care view the impact of traumatic experiences? *Children and Youth Services Review*, *103*, 42–50.
<https://doi.org/10.1016/j.chilyouth.2019.05.026>
- Stein, W. D., Cuffe, M., Bernfield, R. M., Chow, C., Staehelin, L. A., Laskey, R. A., Slack, J. M. W., Cooper, J. A., Alberts, B. M., & Lodish, H. F. (2022). *Cell*. Encyclopedia Britannica.
<https://www.britannica.com/science/cell-biology>

Stewart B. McKinney Homeless Assistance Act, Pub. L. No. 100–77 (1987).

<https://www.congress.gov/bill/100th-congress/house-bill/558>

Substance Abuse and Mental Health Services Administration. (2014). *TIP 57: Trauma-informed care in behavioral health services*. U.S. Department of Health & Human Services.

https://store.samhsa.gov/product/TIP-57-Trauma-Informed-Care-in-Behavioral-Health-Services/SMA14-4816?referer=from_search_result

Tanner, C. K. (2008). Explaining relationships among student outcomes and the school's physical environment. *Journal of Advanced Academics*, 19(3), 444–471.

<https://doi.org/10.4219/jaa-2008-812>

Tobolowsky, B. F., Scannapieco, M., Aguiniga, D. M., & Madden, E. E. (2019). Former foster youth experiences with higher education: Opportunities and challenges. *Children and Youth Services Review*, 104, Article 104362.

<https://doi.org/10.1016/j.childyouth.2019.05.039>

Tyng, C. M., Amin, H. U., Saad, M. N., & Malik, A. S. (2017). The influences of emotion on learning and memory. *Frontiers in Psychology*, 8, Article 1454.

<https://doi.org/10.3389/fpsyg.2017.01454>

Unrau, Y. A., Dawson, A., Hamilton, R. D., & Bennett, J. L. (2017). Perceived value of a campus-based college support program by students who aged out of foster care. *Children and Youth Services Review*, 78, 64–73. <https://doi.org/10.1016/j.childyouth.2017.05.011>

U.S. Bureau of Labor Statistics. (2020). *Learn more, earn more: Education leads to higher wages, lower unemployment*. U.S. Department of Labor.

<https://www.bls.gov/careeroutlook/2020/data-on-display/education-pays.htm>

U.S. Census Bureau. (2021). *QuickFacts*.

<https://www.census.gov/quickfacts/fact/table/US/PST045221>

U.S. Centers for Medicare & Medicaid Services. (2014). *Medicaid & CHIP coverage*. The

Department of Health and Human Services. <https://www.healthcare.gov/medicaid-chip/>

Vespa, J., Medina, L., & Armstrong, D. M. (2020). *Demographic turning points for the United States: Population projections for 2020 to 2060*. U.S. Census Bureau.

<https://www.census.gov/content/dam/Census/library/publications/2020/demo/p25-1144.pdf>

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*.

Harvard University Press.

Walby, S., Armstrong, J., & Strid, S. (2012). Intersectionality: Multiple inequalities in social

theory. *Sociology*, 46(2), 224–240. <https://doi.org/10.1177/0038038511416164>

Walton, G. M., & Cohen, G. L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. *Science*, 331(6023), 1447–1451.

<https://doi.org/10.1126/science.1198364>

Ward, H. C., & Selvester, P. M. (2012). Faculty learning communities: Improving teaching in higher education. *Educational Studies*, 38(1), 111–121.

<https://doi.org/10.1080/03055698.2011.567029>

Watt, T., Faulkner, M., Bustillos, S., & Madden, E. (2019). Foster care alumni and higher education: A descriptive study of post-secondary achievements of foster youth in Texas.

Child and Adolescent Social Work Journal, 36(4), 399–408.

<https://doi.org/10.1007/s10560-018-0569-x>

- Whitman, K. L. (2018). Personal perspectives on providing services to foster youth. *New Directions for Community Colleges*, 2018(181), 81–90. <https://doi.org/10.1002/cc.20294>
- Wink, J. (2011). *Critical pedagogy: Notes from the real world*. Pearson.
- Wisniewski, B., Zierer, K., & Hattie, J. (2020). The power of feedback revisited: A meta-analysis of educational feedback research. *Frontiers in Psychology*, 10, Article 3087. <https://doi.org/10.3389/fpsyg.2019.03087>
- Wladis, C., Hachey, A. C., & Conway, K. (2018). No time for college? An investigation of time poverty and parenthood. *The Journal of Higher Education*, 89(6), 807–831. <https://doi.org/10.1080/00221546.2018.1442983>
- Yeager, D. S., Hanselman, P., Walton, G. M., Murray, J. S., Crosnoe, R., Muller, C., Tipton, E., Schneider, B., Hulleman, C. S., Hinojosa, C. P., & Dweck, C. S. (2019). A national experiment reveals where a growth mindset improves achievement. *Nature*, 573(7774), 364–369. <https://doi.org/10.1038/s41586-019-1466-y>
- Zhao, Q., & Redifer, J. (2016). Expecting immediate grades: Impacts on motivation, effort, and performance. *SAGE Open*, 6(2), 1–9. <https://doi.org/10.1177/2158244016646413>

Appendix A

Descriptions of School Services

Associated Student Organization (ASO) Hearts and Hands: A program that provides free fresh food and used clothes to students who have food insecurity

At Risk Community for Homeless Educational Services (ARCHES): A comprehensive program that provides homeless students with basic needs such as food and referral to housing services

Books Help Enhance Learning Possibilities (The Books H.E.L.P.): A program that provides free textbook rentals for students

California Work Opportunity and Responsibility to Kids (CalWORKs): A program that provides educational and technical training for low income, parent students so that they can be employed

Campus Connect (Bus Pass Program): A program that provides a free bus pass for qualified AVC students

Career Center: A program that provides the students with information on different career fields

Counseling Center: A program that provides academic counseling to all students

Extended Opportunity Programs and Services (EOPS): A state program that funds the college to support disadvantaged students with financial needs and academic guidance

Financial Aid and Scholarships: A program that provides students with financial assistance, so socioeconomically disadvantaged students can achieve their educational goals

Guardian Scholars Foster Youth: A comprehensive program that connects foster students to other services on campus and in the community to support their basic needs, well-being, networking, and academic performance

Health Services: A program that provides basic mental, medical, dental, and vision cares for students

Job Placement Center (JPC): A program that provides current and former students with information and resources about employment opportunities

Learning Center: A program that provides free academic tutoring for students

Office for Students with Disabilities: A program that serves students with special needs so that they can achieve their educational goals by providing them with academic guidance and appropriate accommodations

Students Raising Children Program: A program that provides childcare for parent students

Student Transition Academic Retention (STAR): A federal program that aims to enhance the retention rate and graduation rate of the students through academic counseling, career guidance, and financial assistance in addition to other services

Appendix B

Survey Questions

Background Information

1) Are you 18 years of age or older? Yes/No

If no, please stop here, and thank you for your time.

2) Are you currently a foster youth? Yes/No

If no, have you ever been a foster youth? Yes/No

3) What is your marital status?

a) Married

b) Single

4) What is your gender?

a) Female

b) Male

c) Non-binary

d) Decline to state

5) What is your race/ethnicity?

a) African American

b) American Indian or Alaska Native

c) Asian

d) Hispanic or Latino

e) White (non-Hispanic)

f) Other

6) How many courses have you taken in college?

- 7) What is your major?
- 8) For each of the following areas, please check whether you had or if you could have used additional resources in the past year:

	I had sufficient resources.	I could have used additional resources.
Buying clothes		
Paying rent		
Paying for food		
Paying utility bills		
Paying for transportation		

- 9) How often do you feel there is someone you can rely on for help?
- a) None of the time
 - b) A little of the time
 - c) Some of the time
 - d) Most of the time
 - e) All of the time

Experiences and Perceptions of Campus Services

- 10) Have you accessed the Guardian Scholars Foster Youth?
- a) Yes
 - b) No
- 11) Which of the following services have you used at AVC? Please check all that apply.
- _____ Associated Student Organization (ASO) Hearts & Hands Pantry
 - _____ ARCHES (At Risk Community for Homeless Educational Services)
 - _____ CalWORKs (California Work Opportunity and Responsibility to Kids)
 - _____ Campus Connect (Bus Pass Program)
 - _____ Career Center
 - _____ EOPS (Extended Opportunity Programs and Services)

_____ Financial Aid & Scholarships

_____ Health Services

_____ Office for Students with Disabilities

_____ STAR (Student Transition Academic Retention)

_____ Students Raising Children Program

_____ The Books H.E.L.P. (The Books Help Enhance Learning Possibilities
Program)

_____ The Counseling Center

_____ (JPC) The Job Placement Center

_____ The Learning Center

12) What are the top three services that are most useful to you?

13) What are the top three services that are least useful to you?

14) Please indicate what other service(s) you want the college to offer.

Appendix C

The Codebook for the Most Useful, Least Useful, and Desired Services Perceived by Foster Youth

Code	Definition	Magnitude	Example	Subcode	Frequency	Theme
Admissions and Records Office ^a	Response that makes notion to the Admissions	-	<i>“Admissions”</i>		1	Admission
ARCHES	Responses that make notion to the ARCHES program	-	<i>“ARCHES, OSD”</i>		5	Financial Support
		*	<i>“Housing offers and food offers”</i> <i>“Roommate linking”</i>		8	
ASO Hearts and Hands	Responses that make notion to the ASO Hearts and Hands program	+	<i>“Hearts and hands pantry, campus connect, eops”</i> <i>“Food support, funds for continuing education”</i>		9	
		-	<i>“star, arches, aso”</i> <i>“Food, books, and healthcare”</i>		3	
		*	<i>“Housing [,] Free meal [,] Clothing assistance”</i> <i>“Cal Fresh benefits for students experiencing academic probation”</i>		4	
Books H.E.L.P.	Responses that make notion to the	+	<i>“Transportation, book help, food services”</i>		26	

Code	Definition	Magnitude	Example	Subcode	Frequency	Theme
	Books H.E.L.P. program	-	"Books Help, Cal Works, STAR"		4	
		*	Help with <i>providing books</i> and other resources like more money for books" "Free Copies or Prints (even if not in a program) <i>Free Book Codes</i> for Classes"		2	
CalWORKs	Responses that make notion to the CalWORKs program	+	"Calworks" "counseling, calworks, financial aid"		13	
		-	"Student Rising Children Child Care Program, Calworks, Arches"		8	
Campus Connect (Bus Pass)	Responses that make notion to the Campus Connect (Bus Pass) program	+	"Financial aid, <i>the buss pass program</i> and the counseling center." "Transportation, job placement and childcare"	Transportation	8	
		-	"Health, counseling and <i>transportation</i> " "Not applicable? <i>Bus pass</i> I guess, students raising children, I live with my dad and don't		8	

Code	Definition	Magnitude	Example	Subcode	Frequency	Theme
			have kids, idk what to say.”			
		*	“Gas cards for foster youth, food stamps of food assistance, rent assistance”		2	
			“Parking waiver”	Parking waiver	1	
Computer Loan ^a	Response that makes notion to the Computer Loan program	+	“Library, financial aid, & computer loan program”		1	
Financial Aid and Scholarships	Responses that make notion to the Financial Aid and Scholarships program	+	“Star, Counselling Center, <i>Financial aid & Scholarship</i> ” “Food support, <i>funds for continuing education</i> ”		55	
		*	“... <i>More scholarships</i> and knowledge about scholarships if possible” “ <i>Cash Grants</i> for foster you[th]”		4	
Job Placement Center	Responses that make notion to the Job Placement Center	+	“ <i>Job Placement Center</i> , Counseling Services, Financial Aid”		7	
		-	“ <i>Job center</i> ” “1. <i>Job Placement</i> 2. <i>EOPS</i> 3. <i>Health</i> ”		7	

Code	Definition	Magnitude	Example	Subcode	Frequency	Theme
			Services 4. The Counseling Center 5. Financial Aid”			
		*	“ <i>Work placement</i> ”		1	
Students Raising Children	Responses that make notion to the Students Raising Children program	+	“Financial aid, cal work’s, <i>student raising children care program</i> ” “Transportation, job placement and <i>childcare</i> ”		2	
		-	“ <i>Student Rising Children Child Care Program, Calworks, Arches</i> ” “Not applicable? Bus pass I guess, <i>students raising children</i> , I live with my dad and don’t have kids, idk what to say.”		9	
		*	“Help for <i>young parents</i> ” “More Access to <i>Childcare Programs</i> ”		2	
Career Center	Responses that make notion to the Career Center program	+	“Financial Aid, Books HELP and <i>Career Center</i> ”		5	Guidance
		-	“ <i>Career center, calworks</i> ”		2	

Code	Definition	Magnitude	Example	Subcode	Frequency	Theme
Counseling Center	Responses that make notion to the Counseling Center	+	“ <i>Counseling</i> ” “ <i>The counselor center</i> ”	Academic counseling	29	
		-	“ <i>Counseling, OSD, Campus Connect</i> ”		2	
		*	“ <i>The college should cater to fi[r]st year students. Students sometimes take classes not needed and end up over extending there units.</i> ” “ <i>Additional help/communication with foster youth about help/benefits they can receive/apply for.</i> ”		3	
			“ <i>Life help</i> ” “ <i>Someone to talk to about taxes?</i> ” “ <i>Credit Help</i> ” “ <i>Native Tribal Resources</i> ”	Life counseling	4	
EOPS	Responses that make notion to the EOPS	+	“ <i>EOPS and foster youth assistance</i> ”		23	
		-	“ <i>EOPS, Books Help, JPC</i> ”		6	
Guardian Scholars Foster Youth	Responses that make notion to the Guardian Scholars	+	“ <i>EOPS and foster youth assistance</i> ”		1	

Code	Definition	Magnitude	Example	Subcode	Frequency	Theme
	Foster Youth program					
Learning Center	Responses that make notion to the Learning Center	+	“Financial Aid, <i>Learning Center</i> ” “ <i>Tutors</i> [,] Book help [,] Financial aid”		23	
		-	“ <i>The learning center</i> , childcare, arches”		1	
		*	“Meet with students through online to access <i>tutors</i> ” “Math <i>tutoring</i> one on one”		3	
Library ^a	Responses that make notion to the library	+	“ <i>Library</i> , financial aid, & computer loan program”		2	
OSD	Responses that make notion to the OSD	+	“Books Help, EOPS, <i>OSD</i> ”		9	
		-	“ <i>OSD</i> , EOPS and Campus Connect since everything mostly done online now.”		6	
STAR	Responses that make notion to the STAR program	+	“EOPS, <i>STAR</i> and CalWorks”		3	
		-	“ <i>star</i> , arches, aso”		7	

Code	Definition	Magnitude	Example	Subcode	Frequency	Theme
Umoja ^a	Responses that make notion to the Umoja program	+	<i>“Umoja, financial and book helps”</i>		3	
Health Services	Responses that make notion to the Health Services	+	<i>“Financial Aid, Counseling Center, Health Services”</i>		1	Health Care
		-	<i>“Health, counseling and transportation”</i> <i>“Health services and osd”</i>		9	
		+	<i>“Therapy”</i> <i>“Suicide Prevention.”</i> <i>“Better mental health counseling.”</i>		4	
New Courses ^a	Responses that make notion to new courses	*	<i>“culinary arts program”</i> <i>“driving lessons”</i> <i>“Completely online”</i>		4	New curriculum
Clubs ^a	Response that makes notion to the clubs	-	<i>“ARCHES [,] job placement [,] clubs”</i>		1	Peer support
Services for part-time students ^a	Response that makes notion to the services for part-time students	*	<i>“More services that part time students can qualify for”</i>		1	Support for part-time students

Note. Most useful service = +, least useful service = -, desired service = *. Italicized words or phrases were used to code.

^aServices that were not listed in the survey. Umoja is a program aimed to support African American students.

Appendix D

Content and Activities of the Faculty Learning Community on Creating Supportive Learning Environments for Adults

Module	Goal	Time	Content	Activities	Activities between meetings	
1. Introduction to multicultural education (ME), the Universal Design for Learning (UDL), and the brain-targeted teaching model (BTTM)	Able to locate the FLC's materials on Canvas	20 minutes	Introduction	Participants discuss what they think of these frameworks.	Participants read the work of Banks et al. (2001).	
	Able to identify the three teaching models of Wink	10 minutes	Indicate to the participants that they can access materials for this FLC on Canvas		Participants read the access portions of UDL framework (CAST, 2018).	
	Able to describe the five components of ME		Explain the three teaching models of Wink		Participants obtain <i>The Brain-Targeted Teaching Model for 21st-Century Schools</i> by Hardiman (2012), if possible.	
	Able to define culturally responsive teaching (CRT)	15 minutes	Link Wink's transformative model to (ME) Connect ME to CRT	Discussion about ME		
	Able to identify the three aspects of the UDL	10 minutes	Introduce the UDL framework			
		15 minutes	Discussion about UDL			
	Able to give an example of neuromyth	25 minutes	Define neuroeducation and neuromyths			
	Able to name the six targets of the BTTM			Introduce the BTTM		
		20 minutes	Discuss the BTTM			
		5 minutes	Discuss homework: activities before the next meeting			

Module	Goal	Time	Content	Activities	Activities between meetings
2. Emotional climate and physical learning environment	Able to describe the emotional climate	15 minutes	Describe the emotional climate of the BTM	Participants work in groups to discuss how they can implement these targets in their classrooms.	Participants read the works of Carrion and Wong (2012) and Tyng and colleagues (2017) on the impact of emotion on learning.
		25 minutes	Discuss ways to implement the emotional climate in a classroom		
	Able to give at least three examples of the emotional climate	10 minutes	Incorporate marginalized voices into teaching materials (ME/CRT)	One group member reports key suggestions and receives feedback from other participants and me.	Participants read the work of Tanner (2008) on the influence of the physical environment on learning.
	Able to define the physical learning environment	20 minutes	Discuss how one can incorporate marginalized voices into the lectures		Participants read examples from Hardiman's book about how instructors can foster the emotional climate in their classes. (I also post all examples on Canvas if instructors do not have the book).
	Able to provide an example of the physical learning environment	10 minutes	Describe the relevance and value of learned materials to the real world (UDL)		
		20 minutes	Discuss examples of relevance and value		The participants implement these teaching practices in their classes.
		5 minutes	Define the physical learning environment		Participants use forms A and B in Appendix G to document their implementations.
		10 minutes	Discuss how one can change the physical learning environment		They will report their findings during the next meeting.
		5 minutes	Discuss homework: activities before the next meeting		
3. Learning design	Able to describe learning design	32 minutes	Discuss in small groups on the implementations of fostering the emotional climate and physical learning environment	The participants work in groups to discuss the pros and cons of implementing the recommended teaching practices for the emotional	Participants read the works of Chiou (2008) and Blunt and Karpicke (2014).
	Able to give at least two				Participants also read examples of instructors using this brain

Module	Goal	Time	Content	Activities	Activities between meetings
	examples of learning design	28 minutes	Share key ideas with all participants	climate and physical learning environment.	target in their teaching from Hardiman’s book.
		20 minutes	Describe learning design	One group member shares key findings with everyone else.	Participants implement learning designs in their classrooms.
		35 minutes	Discuss how one can implement learning design in a classroom	Participants discuss how they can incorporate learning design into their teaching practices.	Participants use form C in Appendix G to document the implementations. They will report their findings during the next meeting.
		5 minutes	Discuss homework: activities before the next meeting		
4. Teaching for mastery	Able to describe teaching for mastery	32 minutes	Discuss in small groups on the implementation of learning design	The participants work in small groups to discuss the pros and cons of implementing the recommended teaching practices on learning design.	Participants read the works of Hardiman et al. (2019) and Roediger and Pyc (2012).
	Able to give at least four examples of teaching for mastery	28 minutes	Share key ideas with all participants		Participants also read examples of instructors using this brain target in their teaching from Hardiman’s book.
		20 minutes	Explain teaching for mastery	One group member shares key findings with everyone else.	Participants implement teaching for mastery in their classes.
	Able to identify the benefits of retrieval practice, interleaving, spacing, elaborative interrogation, and self-explanatory	35 minutes	Discuss how one can implement teaching for mastery in a classroom	Participants discuss how they can implement teaching for mastery in their classes.	Participants use form D in Appendix G to document their findings. They will report their results during the next meeting.
		5 minutes	Discuss homework: activities before the next meeting		
5. Teaching for application	Able to describe teaching for application	32 minutes	Discuss in small groups on the implementation of teaching for mastery	The participants work in small groups to discuss the pros and cons of implementing the recommended teaching practices on teaching for mastery.	Participants read the works of Gregory et al. (2013) and Hao et al. (2016).
	Able to give at least four examples of	28 minutes	Share key ideas with all participants		Participants also read examples of instructors using this brain target in

Module	Goal	Time	Content	Activities	Activities between meetings
	teaching for application	20 minutes	Describe teaching for application	One group member shares key findings with everyone else.	their teaching from Hardiman's book.
	Able to recognize the benefits of teaching for application	35 minutes	Discuss how one can implement teaching for application in a classroom	Participants discuss how they can implement teaching for application in their classes.	Participants implement teaching for application in their classes.
		5 minutes	Discuss homework: activities before the next meeting		Participants use form E in Appendix G to document their findings. They will report their results during the next meeting.
6. Evaluating learning	Able to describe evaluating learning	32 minutes	Discuss in small groups on the implementation of teaching for application	The participants work in small groups to discuss the pros and cons of implementing the recommended teaching practices on teaching for application.	Participants read the works of Hardiman and Whitman (2013) and Wisniewski et al. (2020).
	Able to give at least four examples of evaluating learning	28 minutes	Share key ideas with all participants		Participants also read examples of instructors using this brain target in their teaching from Hardiman's book.
		20 minutes	Explain evaluating learning	One group member shares key findings with everyone else.	Participants implement evaluating learning in their classes.
	Able to recognize the benefits of evaluating learning on diverse learners	35 minutes	Discuss how one can implement evaluating in a classroom	Participants discuss how they can implement evaluating learning in their classes.	Participants use form F in Appendix G to document their findings. They will report their results during the next meeting.
		5 minutes	Discuss homework: activities before the next meeting		
7. Review	Able to explain ME, UDL, and the BTTM to someone else	32 minutes	Discuss in small groups on the implementation of evaluating learning	The participants work in small groups to discuss the pros and cons of implementing the recommended teaching practices on evaluating learning.	After the meeting, the participants retake the survey (see Appendix H) they took when they first joined the FLC.
		28 minutes	Share key ideas with all participants		

Module	Goal	Time	Content	Activities	Activities between meetings
		20 minutes	Recaps the six targets of the BTTM	One group member shares key findings with everyone else.	
		35 minutes	Discuss best teaching practices for all six targets of the BTTM	Participants discuss how they can improve their teaching practices from now on.	
		5 minutes	Discuss homework: post-survey	Participants discuss how they can improve future FLC on the BTTM and if the FLC should be scaled up to other disciplines.	

*Note: Adapted from “ALL Faculty Should Take This: A Universal Design for Learning Training for Community College Faculty,” by C. D. Hromalik, W. N. Myhill, and N. R. Carr, 2020, *Journal of TechTrend*, 64(1), pp. 94–95 (<https://doi.org/10.1007/s11528-019-00439-6>). Copyright 2022 by Springer Nature Switzerland AG.

Appendix E

Agendas and Contents of the Modules

Module 1

I. Agenda

- 10:00 a.m. Introduction
- 10:20 Three teaching models of Wink
Multicultural education (ME)
Culturally responsive teaching (CRT)
- 10:30 Discussion about ME
- 10:45 The universal design for learning (UDL)
- 10:55 Discussion about UDL
- 11:10 Neuroeducation, neuromyths, and the brain-targeted teaching model (BTTM)
- 11:35 Discussion about the BTTM
- 11:55 Homework
- 12:00 p.m. Adjourn

II. Content

- A. Introduction: Use Ice Breakers and Warm-up of Critical Friends Protocols (National School Reform Faculty, n.d.)
1. Your name
 2. Your discipline
 3. A truth about you
 4. A lie about you
 5. Guess the lie

6. Indicate that participants can access all materials on Canvas
 7. The relevance of the FLC to STEM faculty
- B. The three teaching models of Wink (2011)
1. Transmissive model: passive listening
 - a. Only lecturing
 2. Generative model: more interactions between students and teacher
 - a. Questions to and from students
 - b. Answers to and from the teacher
 3. Transformative model: use and apply knowledge in the real world
 - a. Project based
 - b. Hands-on experiences
- C. Multicultural education (Banks et al., 2001)
1. Introduction to ME
 2. Relevance of ME
 3. Teacher learning
 - a. The influence of students' backgrounds on their learning
 - b. Intersectionality: multiple identities and inequalities
 - c. Culturally responsive teaching of Gay (2015)
 - d. Growth mindset
 4. Student learning
 - a. Knowledge and power
 - b. Incorporation of marginalized voices
 - (1) Example: Rosaline Franklin and the discovery of the structure of DNA

5. Intergroup relations

a. Group work

b. Dispel stereotypes

(1) Examples: evolution and blood transfusion

(2) Animation of blood transfusion (American Red Cross, n.d.):

<https://www.redcrossblood.org/donate-blood/blood-types.html>

6. School governance, organization, and equity

a. Voices of all stakeholders (leadership level)

7. Assessment

a. Multiple types of assessment

D. Discussion about ME

1. Questions

a. What do you think about these teaching practices?

b. Describe at least one strategy that you will implement in your classrooms

E. Universal design for learning (UDL)

1. Show a video about UDL (CAST, 2010):

<https://www.youtube.com/watch?v=bDvKnY0g6e4>

2. Multiple means of engagement (the ‘why’ of learning)

a. Recruiting interests

3. Multiple means of representation (the ‘what’ of learning)

a. Perception

4. Multiple means of action and expression (the ‘how’ of learning)”

a. Multiple types of assessment

- b. Assistive technologies
- F. Discussion about UDL
 - 1. Questions
 - a. What do you think about these teaching practices?
 - b. Describe at least one strategy that you will implement in your classrooms
- G. Neuroeducation, neuromyths, and the brain-targeted teaching model (BTTM)
 - 1. Neuroeducation:
 - a. Neuroscience/cognitive science and education
 - 2. Neuromyths
 - a. False claims
 - b. Left-brained and right-brained people
 - c. Teaching students according to their learning styles
 - 3. BTTM
 - a. Emotional climate
 - b. Physical learning environment
 - c. Learning design
 - d. Teaching for mastery
 - e. Teaching for application
 - f. Evaluating learning
 - g. YouTube video about the BTTM (Johns Hopkins University, 2010):
<https://www.youtube.com/watch?v=lsf5TwsAhHU>
- H. Discussion about the BTTM
 - 1. Questions

- a. What do you think about these teaching practices?
- b. Describe at least one strategy that you will implement in your classrooms

G. Homework

1. Read the work of Banks et al. (2001)
2. Read the access portions of UDL framework (CAST, 2018):
<http://udlguidelines.cast.org>
3. Obtain the *Brain-Targeted Teaching Model for 21st-Century Schools* by Hardiman (2012), if possible

Module 2

I. Agenda

- | | |
|------------|--|
| 10:00 a.m. | The emotional climate |
| 10:15 | Discussion about implementing this brain target |
| 10:40 | Including marginalized voices (ME/CRT) in teaching materials |
| 10:50 | Discussion about including marginalized voices in teaching materials |
| 11:10 | Relevance and value (UDL) |
| 11:20 | Discussion about implementing relevance and value |
| 11:40 | The physical learning environment |
| 11:45 | Discussion about implementing the physical learning environment |
| 11:55 | Homework |
| 12:00 p.m. | Adjourn |

II. Content

- A. Use Cycle of Inquiry of Critical Friends Protocols (National School Reform Faculty, n.d.)
for all modules from now on

B. The emotional climate:

1. Define the emotional climate: a warming learning environment
2. Show evidence from neuroscience: Carrion and Wong (2012)
3. Ways to foster a friendly learning environment:
 - a. Use humor
 - b. Use positive language
 - c. Set classroom routines
 - d. Give students choices in selecting assignments and assessments
 - e. Utilize group work

C. Discussion about the emotional climate

1. Questions
 - a. Describe at least one strategy that you will implement in your classrooms
 - b. What are the pros and cons of this strategy?
 - c. Why did you choose it?

D. Including marginalized voices (ME/CRT) in teaching materials (ME/CRT)

1. Making marginalized students feel included
2. Providing a holistic view of the topic being taught
3. Examples of incorporating marginalized voices into teaching materials
 - a. Stories of individuals that have been overlooked in the history of STEM
 - (1) The story of Rosaline Franklin
 - (2) The history of HeLa cell
 - b. Show educational videos with diverse speakers
 - c. Use gender inclusive language

E. Discussion about including marginalized voices

1. Questions

- a. Describe at least one strategy that you will implement in your classrooms
- b. What are the pros and cons of this strategy?
- c. Why do you choose it?

F. Relevance and value (UDL)

1. Keeping students engage

2. Relevance: Why is a particular topic applicable to the students?

- a. Example: mitosis and cancer

3. Value: What are the benefits of learning about this topic?

- a. Example: mitosis, potential cause of cancer, and potential cure for cancer

G. Discussion about relevance and value

1. Questions

- a. Describe at least one strategy that you will implement in your classrooms
- b. What are the pros and cons of this strategy?
- c. Why do you choose it?

H. The physical learning environment

1. Define the physical learning environment: characteristics of a classroom or a building

2. A way to positively influence the physical learning environment:

- a. Leave a few lights on when using a projector
- b. Minimize the release of melatonin by the brain

I. Discussion about the physical learning environment

1. Questions

- a. Describe at least one strategy that you will implement in your classrooms
- b. What are the pros and cons of this strategy?
- c. Why did you choose it?

J. Homework

1. Read the works of Carrion and Wong (2012) and Tyng et al. (2017) on the impact of emotion on learning
2. Read the work of Tanner (2008) on the influence of the physical environment on learning
3. Read examples from Hardiman's (2012) book about how instructors can foster the emotional climate in their classes (post all examples on Canvas if instructors do not have the book)
4. Implement these teaching practices in the classes
5. Use forms A and B in Appendix G to document the implementations
6. Report the findings during the next meeting

Module 3

I. Agenda

- | | |
|------------|---|
| 10:00 a.m. | Discussion in small groups about the implementations of the emotional climate and the physical learning environment |
| 10:32 | Share key ideas with all participants about the implementations |
| 11:00 | Learning design |
| 11:20 | Discussion about the implementation of learning design |
| 11:55 | Homework |
| 12:00 p.m. | Adjourn |

II. Content

A. Discussion in small groups

1. Questions for discussion

- a. What aspects of the emotional climate and physical learning environment did you implement in your class(es)?
- b. Did they work?
- c. Did they not work?
- d. If a recommended technique did not work, why do you think it didn't work out?
- e. What would you do differently in the future?

B. Share key ideas

1. Collecting ideas

- a. What are some best practices that you recommend everyone to use?
- b. What are some pitfalls that you recommend everyone to avoid?

2. Refining teaching practices

- a. How would you modify your teaching practices in the future?
- b. If you do not want to change your teaching practices, why?

C. Learning design

1. Provide students with a big picture of major concepts

- a. Use analogy of solving a jigsaw puzzle from Hardiman (2012)

2. Use concept mapping

- a. Describe the effect of concept mapping on memory (Chiou, 2008; Blunt & Karpicke, 2014)
- b. Example of concept mapping from Hardiman (2012)

3. Utilize other graphic presentations (overlapping with UDL)
 - a. Examples of other graphic presentations:
 - (1) Video of cell structure (Nucleus Medical Media, 2015):
<https://www.youtube.com/watch?v=URUJD5NEXC8>
 - (2) Picture of the cell (Stein et al., 2022):
<https://www.britannica.com/science/cell-biology>
 - (3) Concept map of laws of motion (State Government of Victoria, Australia, 2019):
<https://www.education.vic.gov.au/Documents/school/teachers/teachingresources/discipline/science/continuum/lawsotion2.pdf>
4. Describe schema theory of Anderson (1977) and Bartlett (1932)
 - a. Define schemata: the organization of information in the mind
 - b. Relate new information to known information (overlapping with CRT)

D. Discussion about learning design

1. Questions
 - a. Describe at least one strategy that you will implement in your classrooms
 - b. What are the pros and cons of this strategy?
 - c. Why did you choose it?

E. Homework

1. Read the works of Chiou (2008) and Blunt and Karpicke (2014)
2. Read examples of instructors using this brain target in their teaching from Hardiman's (2012) book
3. Implement learning designs in the classrooms

4. Use form C in Appendix G to document the implementations
5. Report the findings during the next meeting

Module 4

I. Agenda

- 10:00 a.m. Discussion in small groups about the implementation of learning design
- 10:32 Share key ideas with all participants about the implementation
- 11:00 Teaching for mastery
- 11:20 Discussion about the implementation of teaching for mastery
- 11:55 Homework
- 12:00 p.m. Adjourn

II. Content

A. Discussion in small groups

1. Questions for discussion

- a. What aspects of learning design did you implement in your class(es)?
- b. Did they work?
- c. Did they not work?
- d. If a recommended technique did not work, why do you think it didn't work out?
- e. What would you do differently in the future?

B. Share key ideas

1. Collect ideas:

- a. What are some best practices that you recommend everyone to use?
- b. What are some pitfalls that you recommend everyone to avoid?

2. Refine teaching practices

- a. How would you modify your teaching practices in the future?
 - b. If you do not want to change your teaching practices, why?
- C. Teaching for Mastery
- 1. Teaching for mastery: Retaining information
 - a. The benefits of integrating arts into STEM courses
 - (1) Describe the work of Hardiman's team (2019)
 - (2) Explain embodied cognition as discussed in the work of Fugate (2019)
 - (a) Describe the body and the mind in thinking
 - (b) Describe the influence of culture on thinking: link to CRT
 - b. Describe techniques for improving memory (Roediger & Pyc, 2012)
 - (1) Retrieval practice
 - (2) Spacing: varying the amount of time of learning/teaching
 - (3) Interleaving: interleave teaching topics (review an old concept when cover new concepts)
 - (4) Elaborative interrogation
 - (5) Self-explanatory
 - 2. Ways to implement teaching for mastery:
 - a. Use of dance
 - b. Use of singing
 - c. Use of drawing
 - d. Use of tableau
 - e. Use of picture/image
 - f. Use of creative writing

- g. Use retrieval practice
- h. Use of spacing
- i. Use of interleaving
- j. Use of elaborative interrogation
- k. Use of self-explanatory
- l. Use of chunking
- m. Use of mnemonics
- n. Use of enactment
- o. Use of production

D. Discussion about teaching for mastery

1. Questions
 - a. Describe at least one strategy that you will implement in your classrooms
 - b. What are the pros and cons of this strategy?
 - c. Why did you choose it?

E. Homework

1. Read the works of Hardiman et al. (2019) and Roediger and Pyc (2012)
2. Read examples of instructors using this brain target in their teaching from Hardiman's (2012) book
3. Implement teaching for mastery in the classes
4. Use form D in Appendix G to document the findings
5. Report the results during the next meeting

Module 5

I. Agenda

- 10:00 a.m. Discussion in small groups about the implementation of teaching for mastery
- 10:32 Share key ideas with all participants about the implementation
- 11:00 Teaching for application
- 11:20 Discussion about the implementation of teaching for application
- 11:55 Homework
- 12:00 p.m. Adjourn

II. Content

A. Discussion in small groups

1. Questions for discussion

- a. What aspects of teaching for mastery did you implement in your class(es)?
- b. Did they work?
- c. Did they not work?
- d. If a recommended technique did not work, why do you think it didn't work out?
- e. What would you do differently in the future?

B. Share key ideas

1. Collect ideas

- a. What are some best practices that you recommend everyone to use?
- b. What are some pitfalls that you recommend everyone to avoid?

2. Refine teaching practices:

- a. How would you modify your teaching practices in the future?
- b. If you do not want to change your teaching practices, why?

C. Teaching for application

1. Define teaching for application: The ability to use and generate new knowledge in the real world
 - a. Describe evidence from neuroscience: taxi drivers in London and their hippocampal volumes (Maguire et al., 2000)
 - b. Help students to become creative
 - (1) The power of investigation (Hardiman, 2012)
 - (2) Reflection (Hao et al., 2016)
 - (3) Guidelines (Gregory et al., 2013)
 - (a) Equip students with sufficient knowledge and help them to master the content, link to teaching for mastery
 - (b) Ask students open-ended questions, allow students to generate multiple ideas
 - (c) Ask students questions that have multiple correct answers
 - (d) Ask students about the implications and implementation of their answers
 - (e) Include group work when the problem has multiple parts
 - (f) Ask students about the relationships between concepts, use knowledge flexibly
 - (g) Ask students to describe a relationship between two novel ideas, think flexibility
 - (h) Provide students with a checklist or a rubric
2. Ways to implement teaching for application:
 - a. Use hands-on experience
 - b. Use projects

- c. Use open-ended questions
 - d. Use questions with multiple answers
 - e. Ask for implication of a topic
 - f. Ask for the implementation of a topic
 - g. State the same problem in multiple ways
 - h. Use analogies and metaphors
 - i. Integrate arts into teaching
 - j. Use group work on a complex problem
- D. Discussion about teaching for application
- 1. Questions
 - 1. Describe at least one strategy that you will implement in your classrooms
 - 2. What are the pros and cons of this strategy?
 - 3. Why did you choose it?

E. Homework

- 1. Read the works of Gregory et al. (2013) and Hao et al. (2016)
- 2. Read examples of instructors using this brain target in their teaching from Hardiman's (2012) book
- 3. Implement teaching for application in the classes
- 4. Use form E in Appendix G to document the findings
- 5. Report their results during the next meeting

Module 6

I. Agenda

- 10:00 a.m. Discussion in small groups about the implementation of teaching for application

- 10:32 Share key ideas with all participants about the implementation
- 11:00 Evaluating learning
- 11:20 Discussion about the implementation of evaluating learning
- 11:55 Homework
- 12:00 p.m. Adjourn

II. Content

A. Discussion in small groups

1. Questions for discussion

- a. What aspects of teaching for application did you implement in your class(es)?
- b. Did they work?
- c. Did they not work?
- d. If a recommended technique did not work, why do you think it didn't work out?
- e. What would you do differently in the future?

B. Share key ideas

1. Collect ideas

- a. What are some best practices that you recommend everyone to use?
- b. What are some pitfalls that you recommend everyone to avoid?

2. Refine teaching practices

- a. How would you modify your teaching practices in the future?
- b. If you do not want to change your teaching practices, why?

C. Evaluating learning

1. Use different types of assessment

- a. Enhance motivation

- b. Overlap with ME and UDL
- 2. Provide informative feedback to enhance learning (Wisniewski et al., 2020)
- 3. Ways to implement evaluating learning:
 - a. Students' podcasts
 - b. Students' trifold posters
 - c. Students' presentations
 - d. Students' iMovie or other types of videos
 - e. Students' paintings
 - f. Students' drawings
 - g. Students' hypertext essays
 - h. Students' portfolios
 - i. Students' journals
 - j. Students' quizzes or exams
 - k. Provide feedback with right or wrong answers only
 - l. Provide feedback with explanations

D. Discussion about evaluating learning

- 1. Questions
 - a. Describe at least one strategy that you will implement in your classrooms
 - b. What are the pros and cons of this strategy?
 - c. Why did you choose it?

E. Homework

- 1. Read the works of Hardiman and Whitman (2013) and Wisniewski et al. (2020)

2. Read examples of instructors using this brain target in their teaching from Hardiman's (2012) book
3. Implement evaluating learning in the classes
4. Use form F in Appendix G to document the findings
5. Report the results during the next meeting

Module 7

I. Agenda

- 10:00 a.m. Discussion in small groups about the implementation of evaluating learning
- 10:32 Share key ideas with all participants about the implementation
- 11:00 Review the six targets of the BTTM
- 11:20 Discussion about best teaching practices using the BTTM
- 11:55 Homework
- 12:00 p.m. Adjourn

II. Content

A. Discussion in small groups

1. Questions for discussion
 - a. What aspects of evaluating learning did you implement in your class(es)?
 - b. Did they work?
 - c. Did they not work?
 - d. If a recommended technique did not work, why do you think it didn't work out?
 - e. What would you do differently in the future?

B. Share key ideas

1. Collect ideas:

- a. What are some best practices that you recommend everyone to use?
 - b. What are some pitfalls that you recommend everyone to avoid?
 2. Refine teaching practices:
 - a. How would you modify your teaching practices in the future?
 - b. If you do not want to change your teaching practices, why?
- C. Review the BTTM and the FLC
1. Emotional climate
 - a. Marginalized voices of ME
 - b. Relevance and value of UDL
 2. Physical learning environment
 3. Learning design
 4. Teaching for mastery
 5. Teaching for application
 6. Evaluating learning
- D. Discussion about the implementation of the BTTM
1. Questions
 - a. What would you have done differently if you were to implement the BTTM again?
 - b. What teaching practices work best for you and why?
 - c. How would you improve future FLC?
 - d. Should the FLC be scaled up to include other disciplines?
- E. Homework
1. Take the post-survey (see Appendix H) on Canvas

Appendix F

Samples of Presentations for Modules 1, 3, and 7

Slides for Module 1



Agenda 1

- 10:00 a.m. Introduction
- 10:20 Three teaching models of Wink (2012)
Multicultural education (ME) (Banks et al., 2001)
Culturally responsive teaching (CRT) (Gay, 2015)
- 10:30 Discussion about ME
- 10:45 The universal design for learning (UDL) (CAST, 2018)
- 10:55 Discussion about UDL

Agenda 2

- 11:10 Neuroeducation (Hardiman, 2012)
Neuromyths (Gardner, 2020; Hardiman, 2012)
The brain-targeted teaching model (BTTM) (Hardiman, 2012)
- 11:35 Discussion about the BTTM
- 11:55 Homework
- 12:00 p.m. Adjourn

Introduction*

- Your name
- Your discipline
- A truth about you
- A lie about you
 - We will guess your lie 😊.
- Canvas: all information related to this faculty learning community

*Ice Breakers and Warm-up in Critical Friends Protocols (National School Reform Faculty, n.d.)

Relevance of this faculty learning community

- Student achievement

	Retention rate (%)	Success rate (%)
STEM credit courses	84.53	65.84
Non-STEM credit courses	88.51	72.98

(California Community Colleges Chancellor's Office [CCCCO], 2022)

The three teaching models of Wink (2012)

- Transmissive model
 - Passive listening
- Generative model
 - More active learning
- Transformative model
 - Applying and generating knowledge

Multicultural education (ME) framework (Banks et al., 2001)

- Multicultural education
 - Teacher learning: training for teachers
 - Student learning: culturally responsive teaching (Gay, 2015)
 - Intergroup relations: fostering inclusion
 - School governance, organization, and equity: organizational levels
 - Assessments

Relevance of ME

- Demographics of the students*

Race/Ethnicity	%
Hispanic	61.4
White, Non-Hispanic	15.3
African American	13.3
Asian	4.0
Other/Unknown	2.4

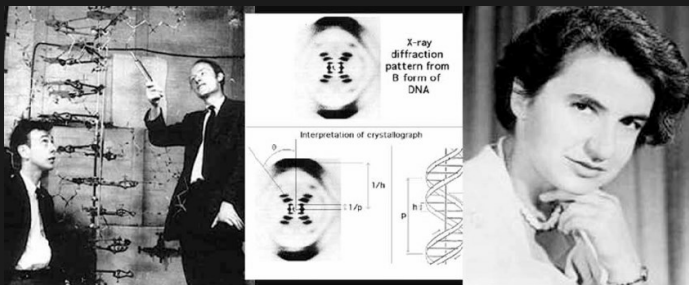
*Institutional Effectiveness, Research & Planning (2022)

Teacher learning

- The influence of students' backgrounds on their learning (Banks et al., 2001)
- Intersectionality: multiple identities and inequalities (Walby et al., 2012)
- Culturally responsive teaching of Gay (2015)
- Growth mindset (Dweck, 2000)

Student learning

- Knowledge and power (Gay, 2015)
- Incorporation of marginalized voices (Gay, 2015)
 - Example: Rosaline Franklin and the discovery of the structure of DNA (Maddox, 2003)



Note. From "How to Prepare a Scientific Surgical Paper a Practical Approach," by L. A. Michel, 2012. *Acta Chirurgica Belgica*, 112(5), p. 328 (<https://doi.org/10.1080/00015458.2012.11680848>). Copyright 2012 by Taylor & Francis Group.

Intergroup relations (Bank et al., 2001)

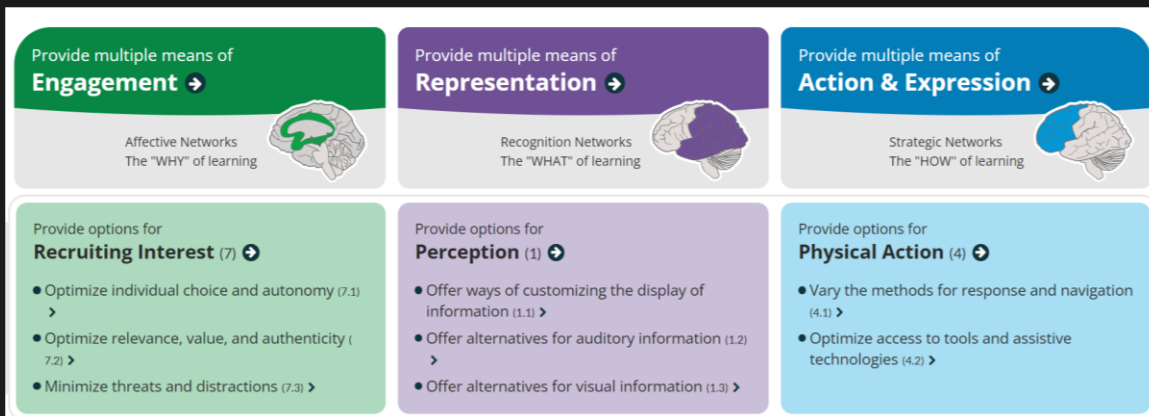
- Group work
- Dispel stereotypes
 - Examples
 - Evolution
 - Blood transfusion: Animation (American Red Cross, n.d.)
 - <https://www.redcrossblood.org/donate-blood/blood-types.html>

Discussion about ME

- Questions:
 - What do you think about the recommended teaching practices of ME?
 - Describe at least one strategy that you will implement in your classrooms

Universal design for learning (UDL)

YouTube video (CAST, 2010): <https://www.youtube.com/watch?v=bDvKnY0g6e4>



Note. Excerpted from Universal Design for Learning Guidelines version 2.2, CAST, 2018 (<http://udlguidelines.cast.org>). Copyright 2022 by CAST, Inc.

Discussion about UDL

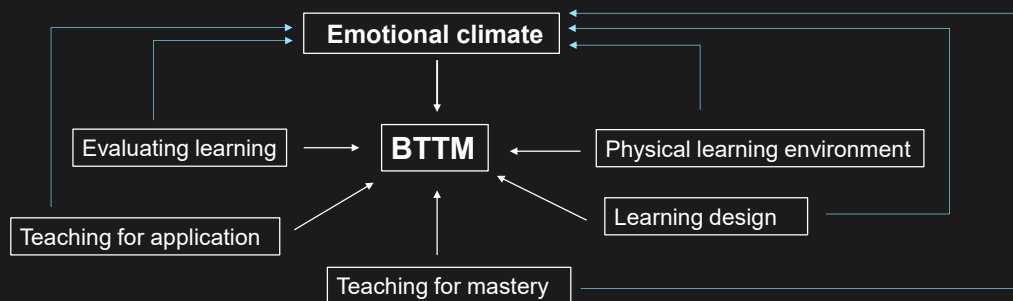
- Questions
 - What do you think about the suggested teaching practices of UDL?
 - Describe at least one strategy that you will implement in your classrooms

Neuroeducation and neuromyths

- Neuroeducation: Neuroscience/cognitive science + Education (Hardiman, 2012)
- Neuromyths (Gardner, 2020):
 - False claims
 - Left-brained and right-brained people
 - Teaching students according to their learning styles (Rogowsky, 2020)

The brain-targeted teaching model (BTTM) (Hardiman, 2012)

YouTube video about BTTM: <https://www.youtube.com/watch?v=lsf5TwsAhHU>



Note. Adapted from *The Brain-Targeted Teaching Model for 21st-Century Schools* (p. xvii), by M.M., Hardiman, 2012, Corwin Press. Copyright 2012 by Corwin Press.

Discussion about the BTTM

- Questions
 - What do you think about these teaching practices?
 - Describe at least one strategy that you will implement in your classrooms

Homework

- Yes, you do have homework.
 - Read the work of Banks et al. (2001)
 - Read the access portions of UDL framework (CAST, 2018)
 - Link <http://udlguidelines.cast.org>
 - Obtain *The Brain-Targeted Teaching Model for 21st-Century Schools* by Hardiman (2012), if possible

References 1

American Red Cross. (n.d.). Facts about blood and blood types.

<https://www.redcrossblood.org/donate-blood/blood-types.html>

Banks, J. A., Cookson, P., Gay, G., Hawley, W. D., Irvine, J. J., Nieto, S., Schofield, J. W., & Stephan, W. G.

(2001). Diversity within unity: Essential principles for teaching and learning in a multicultural society.

Kappan, 83(3), 196-203. <https://doi.org/10.1177/003172170108300309>

CAST. (2010). *UDL at a glance* [Video]. YouTube. <https://www.youtube.com/watch?v=bDvKnY0q6e4>

CAST. (2018). *Universal Design for Learning Guidelines version 2.2*. <http://udlguidelines.cast.org>

California Community Colleges Chancellor's Office. (2022). *Credit course retention/success rate summary*

report [Data set]. https://datamart.cccco.edu/Outcomes/Course_Ret_Success.aspx

Reference 2

Dweck, C. (2000). *Self-theories: Their role in motivation, personality and development*.

Taylor & Francis.

Gay, G. (2015). The what, why, and how of culturally responsive teaching: International

mandates, challenges, and opportunities. *Multicultural Education Review*, 7(3), 123

-139. <https://doi.org/10.1080/2005615X.2015.1072079>

Gardner, H. (2020). "Neuromyths": A Critical Consideration. *Mind, Brain, and Education*, 14(1), 2-4.

<https://doi.org/10.1111/mbe.12229>

Hardiman, M. (2012). *Brain-targeted teaching for 21st-century schools*. Corwin Press.

References 3

Institutional Effectiveness, Research & Planning. (2022). Fall 2022 student profile.

<https://public.tableau.com/app/profile/svetlana6591/viz/Fall2022StudentProfile/Fall2022>

Johns Hopkins University. (2010). *Brain-targeted teaching model overview* [Video]. Youtube.

<https://www.youtube.com/watch?v=lsf5TwsAhHU>

Maddox, B. (2003). The double helix and the “wronged heroine”. *Nature*, 421(6921), 407-408.

<https://www.nature.com/articles/nature01399>

Michel, L. A. (2012). How to Prepare a Scientific Surgical Paper A practical approach. *Acta Chirurgica*

Belgica, 112(5), 323-339. <https://doi.org/10.1080/00015458.2012.11680848>

References 4

National School Reform Faculty. (n.d.). NSRF protocols and activities... from A to Z.

<https://nsrfharmony.org/protocols/>

Rogowsky, B. A., Calhoun, B. M., & Tallal, P. (2020). Providing instruction based on students' learning style preferences does not improve learning. *Frontiers in Psychology*, 11, 1-7.


<https://doi.org/10.3389/fpsyg.2020.00164>

Walby, S., Armstrong, J., & Strid, S. (2012). Intersectionality: Multiple inequalities in social theory. *Sociology*, 46(2), 224–240.

<https://doi.org/10.1177/0038038511416164>

Wink, J. (2011). *Critical pedagogy: Notes from the real world*. Pearson.

Slides for Module 3



Creating Supportive Learning Environments for Adults

MODULE 3: LEARNING DESIGN
DANG HUYNH

Agenda 1

- 10:00 a.m. Discussion in small groups about the implementations of the emotional climate and the physical learning environment
- 10:32 Share key ideas with all participants about the implementations
- 11:00 Learning design
- 11:20 Discussion about the implementation of learning design
- 11:55 Homework
- 12:00 p.m. Adjourn

Discussion in a small group

- Questions
 - What aspects of the emotional climate and physical learning environment did you implement in your class(es)?
 - Did they work?
 - Did they not work?
 - If a recommended technique did not work, why do you think it didn't?
 - What would you do differently in the future?

Share ideas with everyone

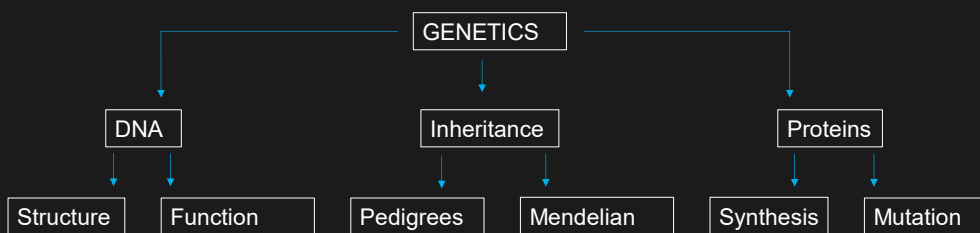
- Collecting ideas
 - What are some best practices that you recommend everyone to use?
 - What are some pitfalls that you recommend everyone to avoid?
- Refining teaching practices
 - How would you modify your teaching practices in the future?
 - If you do not want to change your teaching practices, why?

An overview of learning design

- Provide students with a big picture of major concepts
 - A jigsaw puzzle (Hardiman, 2012)
- Use concept mapping (Chiou, 2008; Blunt & Karpicke, 2014)
- Utilize other graphic presentations (overlapping with UDL)
- Describe the schema theory of Anderson (1977) and Bartlett (1932)

Concept mapping

- Improve retention (Chiou, 2008; Blunt & Karpicke, 2014)
- Improve students' motivations (Chiou, 2008)
- Example:



Note. Adapted from *The Brain-Targeted Teaching Model for 21st-Century Schools* (p. 93), by M.M., Hardiman, 2012, Corwin Press. Copyright 2012 by Corwin Press.

Other graphic presentations

Examples:

- YouTube video of cell structure (Nucleus Medical Media, 2015): <https://www.youtube.com/watch?v=URUJD5NEXC8>
- Picture of cell structure (Stein et al., 2022): <https://www.britannica.com/science/cell-biology>
- Concept map of laws of motion (State Government of Victoria, Australia, 2019): <https://www.education.vic.gov.au/Documents/school/teachers/teachingresources/discipline/science/continuum/lawsotion2.pdf>

Schema theory of Anderson (1977) and Bartlett (1932)

- Schemata: the organization of information in the mind
- Relate new information to known information, overlapping with CRT (Gay, 2015)

Discussion about learning design

- Questions
 - Describe at least one strategy that you will implement in your classroom
 - What are the pros and cons of this strategy?
 - Why did you choose it?

Homework

- Read the works of Chiou (2008) and Blunt and Karpicke (2014)
- Read examples of instructors using this brain target in their teaching from Hardiman's (2012) book
- Implement learning designs in the classrooms
- Use form C in Appendix G to document the implementation
- Report the findings during the next meeting

References 1

- Anderson, R. C., Reynolds, R. E., Schallert, D. L., & Goetz, E. T. (1977). Frameworks for Comprehending Discourse. *American Educational Research Journal*, 14(4), 367–381.
<https://doi.org/10.3102/00028312014004367>
- Bartlett, F.C. (1932). *Remembering*. The University Press.
- Blunt, J. R., & Karpicke, J. D. (2014). Learning with retrieval-based concept mapping. *Journal of Educational Psychology*, 106(3), 849–858. <https://doi.org/10.1037/a0035934>
- Chiou, C. (2008). The effect of concept mapping on students' learning achievements and interests. *Innovations in Education and Teaching International*, 45(4), 375–387. <https://doi.org/10.1080/14703290802377240>

References 2

- Gay, G. (2015). The what, why, and how of culturally responsive teaching: International mandates, challenges, and opportunities. *Multicultural Education Review*, 7(3), 123–139. <https://doi.org/10.1080/2005615X.2015.1072079>
- Hardiman, M. (2012). *Brain-targeted teaching for 21st-century schools*. Corwin Press.
- Nucleus Medical Media. (2015). *Biology: Cell structure I* [Video]. YouTube.
<https://www.youtube.com/watch?v=URUJD5NEXC8>
- State Government of Victoria, Australia. (2019). *Laws of motion*.
<https://www.education.vic.gov.au/school/teachers/teachingresources/discipline/science/continuum/Pages/conceptmaps.aspx#link54>

References 3

Stein, W. D. , Cuffe, M., Bernfield, R. M., Chow, C., Staehelin, L. A. , Laskey, R. A., Slack, J. M. W., Cooper, J. A., Alberts, B. M. & Lodish, H. F. (2022). *Cell*. Encyclopedia Britannica.
<https://www.britannica.com/science/cell-biology>

Slides for Module 7



Agenda 1

- 10:00 a.m. Discussion in small groups about the implementation of evaluating learning
- 10:32 Share key ideas with all participants about the implementation
- 11:00 Review the six targets of the BTTM
- 11:20 Discussion about best teaching practices using the BTTM
- 11:55 Homework
- 12:00 p.m. Adjourn

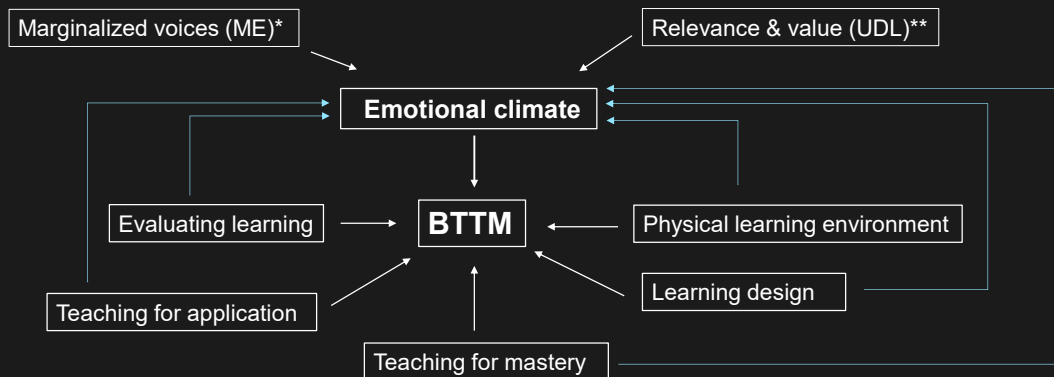
Discussion in a small group

- Questions
 - What aspects of evaluating learning did you implement in your class(es)?
 - Did they work?
 - Did they not work?
 - If a recommended technique did not work, why do you think it didn't?
 - What would you do differently in the future?

Share ideas with everyone

- Collecting ideas
 - What are some best practices that you recommend everyone to use?
 - What are some pitfalls that you recommend everyone to avoid?
- Refining teaching practices
 - How would you modify your teaching practices in the future?
 - If you do not want to change your teaching practices, why?

Review the BTTM and the FLC



Note. Adapted from *The Brain-Targeted Teaching Model for 21st-Century Schools* (p. xvii), by M.M., Hardiman, 2012, Corwin Press. Copyright 2012 by Corwin Press.

*Gay, 2015.

**CAST, 2018.

Discussion about using the BTTM

- What would you have done differently if you were to implement the BTTM again?
- What teaching practices work best for you and why?
- How would you improve future FLC?
- Should the FLC be scaled up to include other disciplines?

Homework

- Take the post-survey on Canvas

References

CAST. (2018). *Universal Design for Learning Guidelines version 2.2*. <http://udlguidelines.cast.org>

Gay, G. (2015). The what, why, and how of culturally responsive teaching: International mandates, challenges, and opportunities. *Multicultural Education Review*, 7(3), 123-139. <https://doi.org/10.1080/2005615X.2015.1072079>

Hardiman, M. (2012). *Brain-targeted teaching for 21st-century schools*. Corwin Press.

Appendix G

Evaluating the Implementation of the Brain-Targeted Teaching Model (BTTM) Forms

A) Form for evaluating the implementation of emotional climate

1. Which of the following practices did you use to foster the emotional climate in your classroom(s)?
 - a) Include marginalized voices in teaching materials
 - b) Indicate relevance and value of taught topics
 - c) Use humor
 - d) Use positive language
 - e) Set classroom routines
 - f) Give students choices in selecting assignments and assessments
 - g) Utilize group work
 - h) Other(s) (please indicate what you did)
2. In what way, did these practices contribute to student learning?
3. In what way, did these practices not contribute to student learning?
4. Would you use them again in the future?
 - a) Yes
 - b) No
 - c) Not sure
5. How do you feel about the support you received for this brain-target?
 - a) I need no additional support.
 - b) I need additional support.
6. Do you have other comments about the emotional climate of this module?

B) Form for evaluating the implementation of physical learning environment

1. Which of the following practices did you use to foster the physical learning environment in your classroom(s)?
 - a) Keep a few lights on when using a projector
 - b) Other(s) (please indicate what you did)
2. In what way, did these practices contribute to student learning?
3. In what way, did these practices not contribute to student learning?
4. Would you use them again in the future?
 - a) Yes
 - b) No
 - c) Not sure
5. How do you feel about the support you received for this brain-target?
 - a) I need no additional support.
 - b) I need additional support.
6. Do you have other comments about the physical learning environment this module?

C) Form for evaluating the implementation of learning design

1. Which of the following practices did you use to foster learning design in your classroom(s)?
 - a) Give students a big picture of the topics to be covered
 - b) Use concept mapping
 - c) Use other graphic presentation(s) (please indicate what you did)
2. In what way, did these practices contribute to student learning?
3. In what way, did these practices not contribute to student learning?

4. Would you use them again in the future?
 - a) Yes
 - b) No
 - c) Not sure
5. How do you feel about the support you received for this brain-target?
 - a) I need no additional support.
 - b) I need additional support.
6. Do you have other comments about learning design?

D) Form for evaluating the implementation of teaching for mastery

1. Which of the following practices did you use to foster teaching for mastery in your classroom(s)?
 - a) Use of dance
 - b) Use of singing
 - c) Use of drawing
 - d) Use of tableau
 - e) Use of picture/image
 - f) Use of creative writing
 - g) Use retrieval practice
 - h) Use of spacing
 - i) Use of interleaving
 - j) Use of elaborative interrogation
 - k) Use of self-explanatory
 - l) Use of chunking

- m) Use of mnemonics
 - n) Use of enactment
 - o) Use of production
 - p) Other(s) (please indicate what you did)
2. In what way, did these practices contribute to student learning?
 3. In what way, did these practices not contribute to student learning?
 4. Would you use them again in the future?
 - a) Yes
 - b) No
 - c) Not sure
 5. How do you feel about the support you received for this brain-target?
 - a) I need no additional support.
 - b) I need additional support.
 6. Do you have other comments about teaching for mastery?

E) Form for evaluating the implementation of teaching for application

1. Which of the following practices did you use to foster teaching for application in your classroom(s)?
 - a) Use hands-on experience
 - b) Use projects
 - c) Use open-ended questions
 - d) Use questions with multiple answers
 - e) Ask for implication of a topic
 - f) Ask for the implementation of a topic

- g) State the same problem in multiple ways
 - h) Use analogies and metaphors
 - i) Integrate arts into teaching
 - j) Use group work on a complex problem
 - k) Other(s) (please indicate what you did)
2. In what way, did these practices contribute to student learning?
 3. In what way, did these practices not contribute to student learning?
 4. Would you use them again in the future?
 - a) Yes
 - b) No
 - c) Not sure
 5. How do you feel about the support you received for this brain-target?
 - a) I need no additional support.
 - b) I need additional support.
 6. Do you have other comments about teaching for application?

F) Form for evaluating the implementation of evaluating learning

1. Which of the following practices did you use to evaluate students in your classroom(s)?
 - a) Students' podcasts
 - b) Students' trifold posters
 - c) Students' presentations
 - d) Students' iMovie or other types of videos
 - e) Students' paintings

- f) Students' drawings
 - g) Students' hypertext essays
 - h) Students' portfolios
 - i) Students' journals
 - j) Students' quizzes or exams
 - k) Provide feedback with right or wrong answers only
 - l) Provide feedback with explanations
 - m) Other(s) (please indicate what you used)
2. In what way, did these practices contribute to student learning?
 3. In what way, did these practices not contribute to student learning?
 4. Would you use them again in the future?
 - a) Yes
 - b) No
 - c) Not sure
 5. How do you feel about the support you received for this brain-target?
 - a) I need no additional support.
 - b) I need additional support.
 6. Do you have other comments about evaluating learning?

Appendix H

Faculty's Experiences with the ME, UDL, and BTTM Frameworks

- 1) How long have you been teaching at the college?
 - a) 0-2 years
 - b) 2-4 years
 - c) 4-6 years
 - d) 6-8 years
 - e) More than 8 years
- 2) What course levels have you taught? (Check all courses that apply)
 - a) Introductory courses
 - b) Advanced courses
- 3) What subject have you taught? (If you teach more than one subject, please check all subjects that you are teaching).
 - a) Agriculture/Park and Landscape Management
 - b) Astronomy
 - c) Biological Sciences
 - d) Chemistry
 - e) Computer Information Science - Brochure
 - f) Earth Science
 - g) Engineering
 - h) Geosciences
 - i) Mathematics
 - j) Physical Science & Physics

- k) Water Treatment
- 4) What is your experience with ME?
 - a) None
 - b) I have heard about it, but I do not know what it is.
 - c) I know what it is but have not used it in my teaching practices.
 - d) I have used some of it in my teaching practices.
 - e) I have used it extensively in my teaching practices.
 - 5) What is your experience with the UDL?
 - a) None
 - b) I have heard about it, but I do not know what it is.
 - c) I know what it is but have not used it in my teaching practices.
 - d) I have used some of it in my teaching practices.
 - e) I have used it extensively in my teaching practices.
 - 6) What is your experience with the BTM?
 - a) None
 - b) I have heard about it, but I do not know what it is.
 - c) I know what it is but have not used it in my teaching practices.
 - d) I have used some of it in my teaching practices.
 - e) I have used it extensively in my teaching practices.
 - 7) What do you hope to gain from this FLC? (For the post-survey, this question will be replaced with the question: What did you gain from this FLC?)
 - 8) Which course or course session would you like to focus on during this FLC? (For the pre-survey only)

9) What is your biggest challenge in delivering your lessons?

10) Is there something that you do in your teaching that others would benefit from learning?

11) Other comments: