




2023

SUPPORTING THE COVID FRESHMEN: AN EXPLORATORY STUDY OF THE TEACHING ASPECTS THAT SUPPORTED THE EXECUTIVE FUNCTIONING OF UNDERGRADUATE FRESHMEN DURING COVID-19

Jennifer Lynn Pusateri

University of Kentucky, jlpusa2@uky.edu

Author ORCID Identifier:

 <https://orcid.org/0009-0002-3380-2328>

Digital Object Identifier: <https://doi.org/10.13023/etd.2023.053>

[Right click to open a feedback form in a new tab to let us know how this document benefits you.](#)

Recommended Citation

Pusateri, Jennifer Lynn, "SUPPORTING THE COVID FRESHMEN: AN EXPLORATORY STUDY OF THE TEACHING ASPECTS THAT SUPPORTED THE EXECUTIVE FUNCTIONING OF UNDERGRADUATE FRESHMEN DURING COVID-19" (2023). *Theses and Dissertations--Education Sciences*. 120. https://uknowledge.uky.edu/edsc_etds/120

This Doctoral Dissertation is brought to you for free and open access by the College of Education at UKnowledge. It has been accepted for inclusion in Theses and Dissertations--Education Sciences by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@sv.uky.edu.

STUDENT AGREEMENT:

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty-free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's thesis including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Jennifer Lynn Pusateri, Student

Dr. Janice Almasi, Major Professor

Dr. Kun Huang, Director of Graduate Studies

SUPPORTING THE COVID FRESHMEN: AN EXPLORATORY STUDY OF THE
TEACHING ASPECTS THAT SUPPORTED THE EXECUTIVE FUNCTIONING OF
UNDERGRADUATE FRESHMEN DURING COVID-19

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Education
at the University of Kentucky

By
Jennifer Lynn Pusateri
Lexington, Kentucky
Director: Dr. Janice Almasi, Endowed Professor of Literacy Education
Lexington, Kentucky
2023

Copyright © Jennifer Lynn Pusateri 2023
<https://orcid.org/0009-0002-3380-2328>

ABSTRACT OF DISSERTATION

SUPPORTING THE COVID FRESHMEN: AN EXPLORATORY STUDY OF THE TEACHING ASPECTS THAT SUPPORTED THE EXECUTIVE FUNCTIONING OF UNDERGRADUATE FRESHMEN DURING COVID-19

Transitioning from high school to higher education is one of the most stressful times in a person's life. But, for the undergraduate students who were freshmen during the fall of 2020 (in the middle of the COVID-19 pandemic), this predictable stress was compounded by additional stressors related to the pandemic. While there were undoubtedly many teaching factors that made learning more difficult during the pandemic, there were also many aspects of teaching that these freshmen found helpful. This exploratory study of secondary data sought to discover which aspects of teaching were most helpful to the COVID Freshmen (the students who transitioned from high school to college in the fall of 2020), a group of students experiencing extreme levels of stress. An examination of student surveys collected during the fall of 2020 indicated that these helpful aspects of teaching could be grouped into six themes: (a) presentation and content delivery, (b) help-seeking and emotional security, (c) comprehension and practice, (d) engagement and social interaction, (e) time-management, organization, and planning, and (f) study habits and memory retention. Furthermore, each of these six themes included two or more teaching aspects that are related to executive functioning, the cognitive processes that guide the behaviors and skills needed for higher order thinking. Undergraduate instructors can use the information about helpful teaching aspects, collected from these highly stressed COVID Freshmen, to inform instructional decisions in their current and future courses.

KEYWORDS: COVID-19, Executive Function, Undergraduate Freshmen, Stress, Transition to College, Universal Design for Learning, UDL

Jennifer Lynn Pusateri

(Name of Student)

04/11/2023

Date

SUPPORTING THE COVID FRESHMEN: AN EXPLORATORY STUDY OF THE
TEACHING ASPECTS THAT SUPPORTED THE EXECUTIVE FUNCTIONING OF
UNDERGRADUATE FRESHMEN DURING COVID-19

By
Jennifer Lynn Pusateri

Dr. Janice Almasi

Director of Dissertation

Dr. Kun Huang

Director of Graduate Studies

04/11/2023

Date

DEDICATION

To Joey, Kira, and Sadie.

Acknowledgements

The following dissertation benefited from the experience and guidance of several people. First, my Dissertation Chair, Dr. Janice Almasi, met regularly with me and provided rich feedback and thought-provoking questions, in addition to providing support and kindness throughout my entire dissertation process. Next, I would like to thank the complete Dissertation Committee, and outside reader, respectively: Dr. Kun Huang, Dr. Mary Shake, Dr. Ellen Usher, and Dr. Joseph Hammer. Each individual brought their expertise and distinctive research lens to this work which helped me to examine the aspects of my study in unique and beneficial ways.

In addition to the invaluable assistance above, I also benefitted from the emotional assistance of my friends, colleagues, and family. I would like to thank Dr. Jaeyun Han and Dr. Mike Wallace for helping me plan and execute the analysis and coding portions of the study. I also want to thank my husband, Joey Pusateri, who provided constant support through the process, and my daughters, Kira and Sadie, who kept me grounded in a way that only teenagers can. My dogs (Buster and Fiona) and cat (Tasha), reminded me that sometimes scratches and pets take precedence over typing and reading. Finally, I wish to thank the students, specifically the COVID Freshmen, who responded to the original study for providing us with their perspective during one of the most difficult periods in the history of higher education.

Table of Contents

Acknowledgements.....	iii
Table of Contents.....	iv
List of Tables	viii
List of Figures.....	ix
CHAPTER 1 Introduction	1
Background.....	1
Rationale.....	4
Statement of the Problem	4
Significance of the Study	7
Purpose of the Study.....	8
Definition of Terms	8
Summary.....	9
CHAPTER 2 Literature Review	11
Transitioning from High School to College	12
Developmental Transition: Theory of Emerging Adulthood	13
Ecological Transition: New Academic, Social, and Living Contexts.....	16
Stress	17
Distress and Eustress.....	18
Stress Overload due to COVID-19.....	18
Executive Functioning (EF).....	21
What is Executive Functioning (EF)?	21
Executive Functions vs. Self-Regulation	22
EF and Instructional Supports.....	24
Multiple Models of EF	26
Brown’s (2005) Model of EF.....	31
Connections Between EF and Stress.....	36
Summary.....	38
CHAPTER 3 Methods	40

Research Design	40
Background on the Primary Study.....	43
Participants	43
Sample Selection.....	44
Participant Demographics	48
Course-Level and College Information.....	49
Course Modality.....	51
Context	52
Data Sources.....	53
Data Gathering Procedures.....	55
Data Analysis Procedures.....	58
Coding Structure	59
First Cycle Coding: Provisional Coding	60
Second Cycle Coding: Code-Mapping.....	62
Third Cycle Coding: Intercoder Reliability (ICR)	64
How Relation to EF Was Determined.....	70
Positionality Statement.....	71
Former Teacher at School for Students with Specific Learning Disabilities	72
My Work as a Universal Design Consultant at a University Teaching Center	73
Member of the Research Team for the Primary Study.....	74
Role of the Researcher.....	75
Summary.....	76
CHAPTER 4 Findings and Discussion	77
Course Design Elements the COVID Freshmen Found Helpful	77
Presentation and Content Delivery.....	78
Help-Seeking and Emotional Security	85
Comprehension and Practice	92
Engagement and Social Interaction.....	97
Time-Management, Organization, and Planning	103
Study Habits and Memory Retention	108
Not Applicable, Negative, and Unclear	113

Distribution of the Student Responses by Code Theme.....	114
Helpful Course Design Elements Related to Executive Functions	116
Presentation and Content Delivery.....	117
Help-Seeking and Emotional Security	118
Comprehension and Practice.....	118
Engagement and Social Interaction.....	118
Time-Management, Organization and Planning	119
Study Habits and Memory Retention.....	119
Summary and Discussion.....	120
Alignment to Current Research	120
Presentation and Content Delivery.....	120
Help-Seeking and Emotional Security	121
Comprehension and Practice.....	122
Engagement and Social Interaction.....	123
Time-Management, Organization, and Planning	124
Study Habits and Memory Retention	124
Course Design Elements the COVID Freshmen Found Helpful that Relate to EFs... 125	
Time-Management, Organization, and Planning	126
Presentation and Content Delivery.....	127
Engagement and Social Interaction.....	127
Help-Seeking and Emotional Security	128
Study Habits and Memory Retention	129
Comprehension and Practice.....	129
Brown’s Action Cluster.....	130
Summary.....	130
CHAPTER 5 Conclusions, Implications, and Suggestions for Future Research.....	132
Conclusions	132
Limitations.....	134
Limitations: Primary Study	134
Limitations: Secondary Study	135
Implications for Practice.....	136
Implications Related to RQ1	136

Implications Related to RQ2.....	140
Universal Design for Learning (UDL).....	143
Suggestions for Future Research.....	144
Appendix A.....	146
Appendix B.....	147
Appendix C.....	148
References.....	149
Jennifer Lynn Pusateri	159
Vita	159
Educational Institutions Attended and Degrees Already Awarded	159
Professional Positions Held.....	159
Professional Publications.....	159

List of Tables

Table 1: Ethnic/Racial Makeup of the Sample vs. All Undergraduates	49
Table 2: Student Survey Question Categories and Types.....	53
Table 3: Number of Phrases Per Student Response.....	65

List of Figures

Figure 1: Factors “Weighing Down” on the EFs of the COVID Freshmen	6
Figure 2: Detangling the Terms Self-Regulation and Executive Functions	23
Figure 3: Model of Developmental Stages of EF (Denckla, 2019)	28
Figure 4: Thomas E. Brown’s (2005) Model of EF	31
Figure 5: Crosswalk: Hot and Cool EFs and Brown’s (2005) EF Model	36
Figure 6: Research Question Plan	41
Figure 7: Research Design for the Exploratory Study of Secondary Data	42
Figure 8: Funnel Diagram Depicting Sampling for Secondary Study	47
Figure 9: Course Levels Taken by Freshmen in the Sample	50
Figure 10: Survey Responses by Academic College	51
Figure 11: Course Modality for COVID Freshmen (T1)	52
Figure 12: Excerpt From the Student Survey of the TLC Study (T1)	55
Figure 13: Steps in the Data Gathering Process	56
Figure 14: Diagram of Data Analysis Procedures	59
Figure 15: Example of Code Mapping Process	63
Figure 16: How One Example Response Was Divided Into Phrases	65
Figure 17: Intercoder Reliability (ICR) Procedure for the Current Study	68
Figure 18: Side-by-side: Brown (2005) Model and Diagram from RQ 1	71
Figure 19: Course Design Elements the COVID Freshmen Found Helpful	78
Figure 20: Code Theme and Sub-Codes for Presentation and Content Delivery	80
Figure 21: Code Theme and Sub-Codes for Help-Seeking and Emotional Security	86

Figure 22: Code Theme and Sub-Codes for Comprehension and Practice	93
Figure 23: Code Theme and Sub-Codes for Engagement and Social Interaction	99
Figure 24: Code Theme and Sub-Codes for Time Management, Organization, and Planning	104
Figure 25: Code Theme and Sub-Codes for Study Habits and Memory Retention.....	110
Figure 26: Distribution of Student Phrases by Course Design Elements the COVID Freshmen Found Helpful	115
Figure 27: Course Design Elements the COVID Freshmen Found Helpful that Relate to EFs	117
Figure 28: Crosswalk: EF-Related Sub-Codes and Brown’s (2005) EF Model.....	126
Figure 29: Checklist of Suggested Supports for Stressed Students	139
Figure 30: Checklist for Supporting EFs	143

CHAPTER 1

Introduction

Research has shown that the transition from high school to college can be one of the most stressful times in a person's life (Conley et al., 2014; Kroshus et al., 2021; Leary & DeRosier, 2012; Ruberman, 2014) as it includes both developmental stressors (Arnett, 2000; Arnett, 2004; Arnett, 2007; Nelson, 2021) and environmental, or ecological, stressors (Arnett, 2000; Conley et al., 2014; Kroshus, et al., 2021; Leary & DeRosier, 2012) related to the period of life called emerging adulthood. In addition to this somewhat predictable level of stress, the stressors related to COVID-19, including those related to academics (Cao et al., 2020; Das et al., 2020; Mesghina et al., 2021; Son et al., 2020) along with stressors related to health and lifestyle (Cao et al., 2020; Das et al., 2020; Lee et al., 2021; Son et al., 2020; Xiong et al., 2020), added additional factors which may have exacerbated the overall stress of the COVID Freshmen (the students who graduated high school and started college in 2020, during the COVID-19 pandemic), potentially pushing them into a state of stress overload. In fact, during the COVID-19 pandemic, 88% of the undergraduate students surveyed by Lee et al. (2021) during COVID indicated that they experienced moderate to severe stress.

Background

In March of 2020, the COVID-19 pandemic reached the U.S., and seemingly overnight, the country shut down. Domestic and international flights were canceled (Bureau of Transportation Statistics, 2021), schools were closed (Education Week, 2020), and nearly all businesses (except for the essentials like grocery stores, hospitals, and gas stations) shut their doors for an undetermined period (Bartik et al., 2020). To keep

progress moving forward, most educational organizations decided to quickly shift from a face-to-face model to an online model (Fuchsia State University [this is a pseudonym], 2020). By the fall of 2020, many universities planned to hold classes either online or in a hybrid model (meeting partially online and partially in person) for that semester (Aspegren & Zwickel, 2020). Classes either met in person with social distancing and reduced numbers, online via video meeting platforms (i.e., Zoom, Google Meet, etc.), or in a hybrid format (Aspegren & Zwickel, 2020). In most cases, assignments were submitted electronically to instructors by email or through online learning management systems (LMS) like Canvas, Moodle, or Google Classroom and many instructors were expected to record and post all lectures in the LMS to accommodate students who were quarantined (Fuchsia State University, 2020). In higher education, most instructors had little to no experience or training in teaching online, however, they were still expected to begin teaching in an online modality with very little notice (Johnson et al., 2020).

Students who were high school seniors in the spring of 2020 had a very different end to their secondary school career, especially as compared to years before (TIME, 2020). Many of the rites of passage that U.S. high school students and families look forward to each spring like prom, end-of-the-year performances like musicals and concerts, state sports tournaments, and other competitions like speech and debate and academic team competitions were all canceled in the blink of an eye (TIME, 2020). For the students graduating high school in the spring of 2020, this also meant that many of them did not get to walk across the stage at their high school graduation, with most schools opting for a virtual version of graduation where students and their families sat alone in their homes and watched a live online video of the names of graduating seniors

read aloud (TIME, 2020). The predictability of these annual events (prom, competitions, graduations, etc.) was disrupted, and these high school seniors may have approached their futures with a vague sense of insecurity, realizing that their plans could potentially be canceled by something like COVID with little to no notice (Camacho-Zuniga et al., 2021).

Of the students who graduated high school in the spring of 2020, those who attended college in the fall of 2020 likely experienced a very different version of college, as freshmen, than anything they may have imagined. This group of students, who will be referred to in this current study as the *COVID Freshmen*, entered college during this difficult time in the history of higher education in the U.S. and they may have endured a higher level of stress than any other class of college freshmen in recent history (Lee et al., 2021).

In addition, Lee et al. (2021), found that 44% of their participants reported moderate to severe anxiety and 36% reported moderate to severe depression. Before the pandemic, only about one-third (33%) of undergraduates in the U.S. “were diagnosed by mental health professionals for having at least one mental health symptom” (Lee et al., 2021, p. 522). The presence of COVID-19-related stressors, in addition to the stressors that typically accompany the transition from high school to college, had the potential to put the COVID Freshmen into a state of stress-overload, which has been shown to cause academic problems related to executive functioning (EF) (Applehans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Denckla, 2019; Kira et al., 2021; Shields et al., 2016).

Rationale

Executive functions (EFs) are the group of cognitive skills associated with planning, time-management, organization, emotional regulation, and goal setting (Brown, 2005). Humans are not born with EFs, but rather, they develop over time (Denckla, 2019). Recent research has shown that one's EFs are not fully developed until around age 25, and even up to age 35 for some individuals (Denckla, 2019). For undergraduate freshmen, most of whom are around age 18, their executive functions are still developing. This means that even in a typical school year, one could expect undergraduate freshmen to struggle with EFs because they are still in the process of developing.

A large body of research has shown that stress can negatively impact executive functions (Applehans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Kira et al., 2021; Shields et al., 2016). The EF struggles typically experienced by younger undergraduates (due to their age and cognitive development) may have been exacerbated for the COVID freshmen because they faced the added stressors of transitioning from high school to college during the COVID-19 pandemic. This could have made it more difficult to manage their own activation, focus, action, emotions, memory, and effort (Brown, 2005).

Statement of the Problem

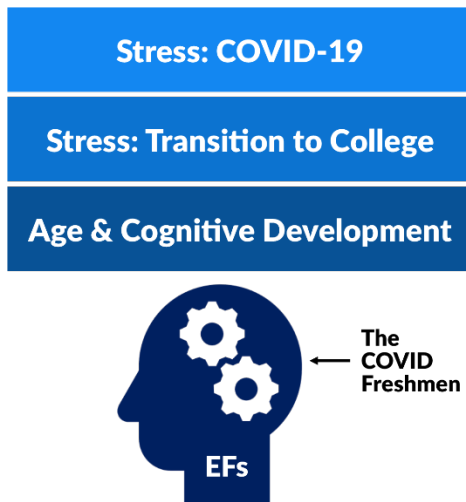
The COVID Freshmen may have experienced an exceptional level of stress due to stressors associated with the transition from high school to college amid a global pandemic. Elevated levels of stress can impact one's executive functions (Applehans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Kira et al., 2021; Shields et al., 2016), and because undergraduate freshmen, who are often around age 18, are still in the

process of developing their executive functions, it could be suggested that the COVID Freshmen were likely to have had difficulties with executive functions because of the potential for elevated stressors during the COVID-19 pandemic.

Additionally, during COVID-19, many undergraduates were learning in an online or hybrid (part of the class meets online, and part of the class meets in person) modality, rather than learning in the more traditional model of in-person college classes (Camacho-Zuniga et al., 2021). While research has shown that online learning and face-to-face learning are equally effective, online classes can be difficult for individuals who have difficulty with EFs (Harel-Gadassi, 2022). “[Online] courses require a relatively high level of autonomy and self-regulation on the part of the learners” (Harel-Gadassi, 2022, p. 130). So, the COVID Freshmen may have had trouble with EFs for several reasons: (a) because of their age in relation to their cognitive development (Denckla, 2019), (b) stress from transitioning from high school to college (Conley et al., 2014; Kroshus et al., 2021; Leary & DeRosier, 2012; Ruberman, 2014), and (c) stress related to the COVID-19 pandemic (Lee et al., 2021). As a result, the COVID Freshmen, who were also taking many courses in an online or hybrid setting (which require strong EF skills), likely needed all the help they could get during the fall semester of 2020. Figure 1 depicts the factors that may have weighed down the EFs of the COVID Freshmen.

Figure 1

Factors “Weighing Down” on the EFs of the COVID Freshmen



The side profile of the head with gears inside represents the EFs of the COVID Freshmen. First, this group was already at a disadvantage in relation to executive functioning because, at their age, roughly 18, their pre-frontal cortex (PFC) is still not fully developed. The PFC is widely understood to be the region of the brain where executive functions are housed (Denckla, 2019). This concept is represented in the image by the dark blue block labeled “Age & Cognitive Development.” On top of the “Age & Cognitive Development” block is a block labeled “Stress: Transition to College.” This block represents the stress that is often experienced by undergraduate freshmen, during a normal, non-COVID year, as they transition from high school to college (Conley et al., 2014; Kroshus et al., 2021; Leary & DeRosier, 2012; Ruberman, 2014). Finally, the third block, labeled “Stress: COVID-19” indicates the potential for additional stressors which were related to COVID-19 (Cao et al., 2020; Das et al., 2020; Mesghina et al., 2021; Son et al., 2020). Each of these three factors (age and cognitive development, stress from the

transition to college, and stress from COVID-19) had the potential to weigh down on the executive functioning of the COVID Freshmen.

Significance of the Study

In the years immediately following the COVID-19 pandemic, some research has begun to emerge outlining undergraduate students' experiences navigating college during this exceptional time. While there are several studies about students' perceptions of online learning during COVID-19 (Almendingen et al., 2021; Ives, 2021; Mohammadi et al., 2021; Roy & Covelli, 2021), undergraduates' mental health during COVID-19 (Cao et al., 2020; Das et al., 2021; Lee et al., 2021; Masha'al et al., 2020; Mesghina et al., 2021; Son et al., 2020; Tortella et al., 2021; Xiong et al., 2020), and even one study examining the effects of COVID-19 cumulative stressors on EF (Kira et al., 2021), none of these studies examined the effects of COVID-related stressors, in addition to the potential stressors related to transitioning from high school to college, and the possible impact of these stressors on the EFs of the COVID Freshmen. Additionally, no studies have been found that examine which aspects of teaching these over-stressed COVID Freshmen found helpful during this tumultuous period in higher education history, nor have any studies examined whether these helpful instructional choices supported students' EFs or whether they supported other aspects related to students' success.

This study examined survey data collected from the COVID Freshmen during the fall of 2020 which asked, "Which aspects of your instructor's teaching were most helpful to you? Why?" The helpful teaching aspects which were identified by the COVID Freshmen can help explain how their professor's instructional choices supported their

academic performance, specifically in relation to those instructional aspects which helped to support students' EFs, during this difficult semester.

Purpose of the Study

The purpose of this study was to ascertain which course design elements (specifically, course design elements that relate to students' executive functions) the COVID Freshmen reported to be most helpful during a time when they were potentially experiencing elevated levels of stress, the fall semester of 2020. Research questions for this study were as follows:

1. Which course design elements did the COVID Freshmen report to be most helpful during the fall semester of 2020?
2. Which course design elements, reported by the COVID Freshmen during the fall semester of 2020, relate to executive functions?

Definition of Terms

Some of the terms used in this study can have different meanings in different contexts, so I have added the section below to clarify how terms were used in the context of this study.

The COVID-19 pandemic refers to the period when major restrictions (i.e., mask mandates, social distancing, and business/school closings) impacted every aspect of life in the U.S., beginning around March 2020 and lasting until around June 2021, as a result of the global spread of the coronavirus disease caused by the SARS-CoV-2 virus (World Health Organization, n.d.).

The COVID Freshmen are the group of students who graduated high school in the spring of 2020, during the COVID-19 pandemic, and entered college in the fall of 2020.

This term was created by the author as a way of shortening the phrase *students who entered college during the fall of 2020, during the COVID-19 pandemic* to the much simpler, *COVID Freshmen*.

Stress or stress overload refers to an emotional state of distress, the negative reaction to an overabundance of stressors that can negatively impact one's performance (Gibbons, 2015; Rudland et al., 2018).

Executive functions (EFs) are the cognitive processes that help individuals plan, organize, regulate emotional responses, and set goals (Brown, 2005; Denckla, 2019; Miyake et al., 2000). For the purposes of this study, I will use Brown's (2005) organizational structure for dividing the many behaviors and skills related to or governed by EF into six broad clusters (activation, focus, action, emotions, memory, and effort).

Summary

The transition from high school to college is reported to be one of the most stressful times in a person's life (Conley et al., 2014; Kroshus et al., 2021; Leary & DeRosier, 2012; Ruberman, 2014). But, students who experienced this transition during the COVID-19 pandemic (the COVID Freshmen) may have encountered additional layers of stressors related to academics (Cao et al., 2020; Das et al., 2020; Mesghina et al., 2021; Son et al., 2020) along with stressors related to health and lifestyle (Cao et al., 2020; Das et al., 2020; Lee et al., 2021; Son et al., 2020; Xiong et al., 2020). These multiple layers of stress may have caused undergraduate students to report a higher level of stress as compared to previous, non-pandemic, years (Lee et al., 2021). A vast body of research links excessive levels of stress with a significant reduction in executive functioning (EF) skills (Applehans et al., 2021; Bangasser & Shors, 2011; Bettis et al.,

2017; Kira et al., 2021; Shields et al., 2016). These EF skills: activation, focus, action, emotions, memory, and effort (Brown, 2005), are always needed in teaching and learning situations but are especially important in an online learning environment (Harel-Gadassi, 2022). During the fall of 2020, most undergraduate students were taking classes in online or hybrid modalities (Camacho-Zuniga et al., 2021), so the EF problems that the COVID Freshmen may have experienced during the transition from high school to college (in the midst of a global pandemic) likely had a significant impact on their academic performance in these online and hybrid contexts. Therefore, it is imperative that we understand the instructional choices which may have helped support students' EF during this difficult time.

CHAPTER 2

Literature Review

In a normal academic year, the transition from high school to college can be very difficult for first-year undergraduate students (Conley et al., 2014; Kroshus et al., 2021; Leary & DeRosier, 2012; Ruberman, 2014). Some of the difficulties encountered during this transition can be attributed to the developmental period called emerging adulthood which is typically associated with the time between ages 18-25 (Arnett, 2000; Arnett, 2004; Arnett, 2007; Nelson, 2021). Another source of difficulty may be related to the ecological or environmental transitions that occur when these emerging adults begin college; those associated with the changes in social, academic, and living contexts (Arnett, 2000; Conley et al., 2014; Kroshus, et al., 2021; Leary & DeRosier, 2012). But, the COVID Freshmen faced an additional set of potential stressors, due to the onslaught of the pandemic, including those related to academics (Cao et al., 2020; Das et al., 2020; Mesghina et al., 2021; Son et al., 2019), health (Das et al. 2020; Son et al., 2020), and lifestyle (Cao et al., 2020; Das et al., 2020; Kira et al., 2020; Lee et al., 2021; Son et al., 2020).

While this study did not specifically examine how (or if) this elevated stress and anxiety may have affected students' academic experiences during the pandemic, one can look to the existing literature related to the connections between stress and executive function (EF) skills (Applehans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Denckla, 2019; Kira et al., 2021; Shields et al., 2016) as a potential factor for understanding the teaching aspects that were most helpful to the COVID Freshmen.

The following chapter will begin with a discussion of the literature related to transitioning from high school to college and the period of life called emerging adulthood (Arnett, 2000). Next, the literature surrounding stress, including additional stressors related to COVID-19, will be examined. Finally, a section on EF will begin with an introduction to the concept of EF (Brown, 2005; Denckla, 2019; Denckla & Mahone, 2018; Metzler, 2018; Miyake et al., 2000), followed by a clarification of the difference between EF and self-regulation (CAST, 2018; Hofmann et al., 2012; Neubeck et al., 2022; Salehinejhad et al., 2021) and another section on common EF instructional supports (Daley & Rose, 2018; Metzler, 2010; Rosen et al., 2014). Finally, this chapter will conclude with a brief discussion of three different models of EF skills (Brown, 2005; Denckla, 2019; Miyake et al., 2000), followed by a review of the literature connecting stress with EF (Appelhans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Denckla, 2019; Kira et al., 2021; Shields et al., 2016).

Transitioning from High School to College

A vast body of research purports that all transitions in one's academic life are disruptive to some degree (Conley et al., 2014), but the transition from high school to college can be especially stressful due to the intersection of psychological developmental changes, new social interactions, and increased autonomy which occur simultaneously. This period of development, occurring from about age 18-25, has been called the *Emerging Adulthood* stage of development (Arnett, 2000; Arnett, 2004; Arnett, 2007; Nelson, 2021). In addition to these developmental changes, emerging adults who attend college can also face barriers related to social and academic factors which often take place in a new environment. (Conley et al., 2014; Kroshus et al., 2021; Leary &

DeRosier, 2012). “As the transition to college includes both a developmental transition- into emerging adulthood- and an ecological transition- to new academic, social, and often living contexts- it can be viewed as a crucial turning point in development, which presents a heightened risk for disruption and vulnerability” (Conley et al., 2014, p. 195).

Developmental Transition: Theory of Emerging Adulthood

The theory of emerging adulthood arose as psychologists began to recognize the need for another period of psychological development which was to be situated between adolescence and young adulthood (Arnett, 2000; Arnett, 2004, Arnett, 2007; Nelson, 2021). Arnett (2007) recognized that some of the more dominant models of developmental psychology, like Erickson’s (1950) stages of psychosocial development, suggested that the period of “adolescence [which lasted] from the beginning of puberty until the late teens, was followed by young adulthood, lasting from the late teens to about age 40 when middle adulthood began” (Arnett, 2007, p. 68). Arnett pointed out that this may have been the natural trajectory of life for the first half of the 20th century, but that a shift in cultural norms (including a higher marriage age and an increase in the number of people attending college) in the last 70 years has inserted a distinct developmental period (Arnett, 2000; Arnett, 2004; Arnett, 2007; Nelson, 2021). This new developmental period, emerging adulthood, is typically associated with individuals from age 18 to 25 and consists of five features that set this period of life apart from that of adolescence and young adulthood.

Emerging adulthood is the age of: (a) identity exploration, a period where emerging adults tend to focus their identity exploration on three main areas: love, work, and worldviews, (b) possibilities, the idea that emerging adults often approach this time

of their lives with great hope for the future, (c) self-focus, which explains that the untethered period of emerging adulthood allows individuals to focus on themselves during a time of freedom without commitments (d) feeling in-between, emerging adults' feelings about the fact that they are no longer an adolescent, but they are not quite an adult either (Arnett, 2004; Arnett, 2007) and (e) instability, the changes which occur for emerging adults who choose to attend college which can include an entire change in their living conditions and environment (Conley et al., 2014; Leary & DeRosier, 2012), support system (Conley et al., 2014; Kroshus, et al., 2021; Leary & DeRosier, 2012), and increased financial pressures and instability (Leary & DeRosier, 2012).

Identity Exploration. Emerging adults tend to focus their identity exploration on three main areas: love, work, and worldviews (Arnett, 2000; Arnett, 2004). During this period, the intensity and length of romantic relationships increases as emerging adults begin to examine the kind of person they want to have as a partner in relation to their own personality (Arnett, 2000; Arnett, 2004). When it comes to work, emerging adults begin to take a more serious view of their jobs. In adolescence, most teens' work is about simply making money (ostensibly to fuel their growing independence), but during the emerging adulthood period, the focus of work begins to shift toward preparation for their future careers. It is during this time that emerging adults often find themselves wondering what kind of work they like, what kind of work they are good at, and what kind of work could help build their experiences toward their future careers (Arnett, 2000; Arnett, 2004; Arnett, 2007). Emerging adults also experience a shift in their worldview during this tumultuous period of life. For emerging adults who attend college, this shift in worldview

is likely based on their exposure to new people, new places, and new experiences (Arnett, 2000; Arnett, 2004; Arnett, 2007).

Possibilities. The constant exploration of one's identity, as mentioned in the previous section, means that all potential versions of oneself are still on the table. As a result, emerging adults often approach this time of their lives with great hope for the future. Very few of their life choices have been fully decided, so they maintain an attitude of exploration as they face their future (Arnett, 2004). Arnett put it a little more pessimistically when he stated, "it tends to be an age of high hopes and great expectations, in part because few of their dreams have been tested in the fires of real life" (Arnett, 2004, pp. 15-16). The combination of seemingly endless possibilities and exploration of one's own identity naturally causes emerging adults to be centered in thoughts about their current and future selves.

Self-Focus. After emerging adulthood, people become tied to various commitments and obligations like spouses, careers, credit cards, and mortgages (Arnett, 2004). The untethered period of emerging adulthood, however, allows individuals to focus on themselves during a time of freedom without commitments. In adolescence, individuals typically live with one or more adults who keep them safe, provide them with standards for living, and generally keep them on track. When these individuals reach emerging adulthood, these supports are removed, and along with them the "obligations and commitments to others" (Arnett, 2004, p. 13). While this period of untethered self-focus may be exhilarating, it can also be a difficult time for emerging adults who may be accustomed to outside support, leading to feelings of being "in-between" stages in life.

Feeling In-Between. The period of life between ages 18-25 is a time when people feel like they are no longer an adolescent, but they are not quite an adult either. Studies carried out with emerging adults have shown that this group consistently identified three top criteria for adulthood:

1. Accept responsibility for yourself,
2. Make independent decisions, and
3. Become financially independent (Arnett, 2004, p. 15).

Arnett pointed out that the “Big Three” criteria are “gradual, incremental, rather than all-at-once” (2004, p. 15) which can increase the in-between feeling in emerging adults. The incremental movement from adolescence to adulthood is unsettling and can lead to general feelings of instability.

Instability. The period of emerging adulthood can be a time of constant change and instability. Those emerging adults who choose to attend college often experience an entire change in their living conditions and environment (Conley et al., 2014; Leary & DeRosier, 2012), support system (Conley et al., 2014; Kroshus, et al., 2021; Leary & DeRosier, 2012), and increased financial pressures and instability (Leary & DeRosier, 2012). The amount of change and upheaval during this period can often cause stress and feelings of instability that can be difficult for some students (Leary & DeRosier, 2012).

Ecological Transition: New Academic, Social, and Living Contexts

While the developmental aspects of an emerging adult have an undoubted effect on the internal transitions experienced by undergraduate freshmen, there are also external, ecological changes during this period that can have a significant impact on undergraduate freshmen. These ecological transitions often have to do with the changes

in environment which are experienced by students who transition from the high school setting to the higher education setting, specifically the changes in academic demands, which require strong self-regulation and coping skills (Conley et al., 2014; Leary & DeRosier, 2012), social interactions, which includes the shift that many students make from dependence on their family and the students they have known since childhood to a dependence on a new set of social connections made in college (Leary & DeRosier, 2012; Ruberman, 2014), and living arrangements, which, for most college freshmen, includes their first experience living away from their families for a sustained period of time (Arnett, 2000).

Stress

“The first year of college, with all its requisite transitions, is said to be one of the most stressful periods in life” (Amirkhan et al., 2020, p. 2231). The previous section highlighted the developmental and ecological transitions that occur during a typical (non-COVID) year in this period of life. The following section will outline some additional stressors that the COVID Freshmen may have experienced while making this transition amid a global pandemic.

The section will begin by clarifying some of the terminology that is commonly used in discussions surrounding stress. Next, a review of the current literature will reveal some of the academic-related stressors which may have been exacerbated by the COVID-19 pandemic, along with the additional health and lifestyle-related stressors which had the potential to cause stress overload for some undergraduate students.

Distress and Eustress

Stress is not always detrimental to one's health and mental well-being. Some researchers have found that one's reaction to stressors can be divided into two categories: (a) eustress, a positive effect as a result of stress (also characterized as an "optimal amount of stress" (Rudland et al., 2018, p. 41) is related to the drive which can propel individuals to excel in academics, work, and sports, and (b) distress, a negative effect as a result of stress (also characterized as an overload of stress) can be detrimental to one's performance in academics, work, and sports (Gibbons, 2015; Rudland et al., 2018). Historically, the words "stress" and "distress," have been used interchangeably in much of the educational literature, thus ignoring the positive aspects of a healthy level of eustress. According to Rudland et al. (2018) "the words 'stress' and 'distress' have come to be casually equated" (p. 40). For the purposes of this paper the phrases "stress" and "stress overload" will be used to signify distress, the negative reaction to an overabundance of stressors. A discussion on how eustress, the positive reaction to stress, may have affected the COVID Freshmen, although interesting, is outside the scope of this study.

Stress Overload due to COVID-19

While increased stress is not uncommon among undergraduate freshmen, several studies reported a significant increase in undergraduate students' stress over the course of the COVID-19 pandemic. A thorough review of the literature indicates that the additional sources of stress overload for undergraduates during the COVID-19 pandemic can be generally broken into two categories: (a) academic-related stressors (Cao et al., 2020; Das et al., 2020; Mesghina et al., 2021; Son et al., 2020) and (b) health and lifestyle-related

stressors (Cao et al., 2020; Das et al., 2020; Lee et al., 2021; Son et al., 2020; Xiong et al., 2020).

Academic-related stressors. Stressors which may have impacted the academic experience of undergraduates during the COVID-19 pandemic included concerns related to their academic performance (Son et al., 2020), difficulty concentrating (Mesghina et al., 2021; Son et al., 2020), the abrupt shift in teaching modality which occurred during the earliest stages of the pandemic (Das et al., 2020; Son et al., 2020), the increased workload required for online and hybrid learning environments (Son et al., 2020), and the potential for unexpected academic delays due to COVID-19 (Cao et al., 2020).

Physical health-related stressors. Stressors which may have impacted undergraduate students' health during the COVID-19 pandemic can be broken into factors resulting from a disruption in physical health patterns (including sleep and eating) and factors related to mental health.

One study in particular (Son et al., 2020) provided a targeted view of the mental health and physical health patterns of undergraduates in the U.S. during COVID-19. Son et al. (2020) found that 86% of their participants "reported disruptions to their sleep patterns caused by the COVID-19 pandemic, with over one-third reporting such disruptions as severe" (p. 5) and 70% of the undergraduate participants in their study reported that COVID-19 had negatively impacted their eating patterns. While these abrupt changes in physical health, specifically those related to sleep and eating habits, may have had an impact on students' overall well-being, the mental health concerns associated with the pandemic may have a lasting impact on the students and higher education for years to come.

Mental health-related stressors. As COVID-19 research continues to emerge, it is becoming increasingly clear that for some undergraduate students, their mental health was significantly affected by the pandemic. It should be noted that the prevalence of mental health issues among undergraduates had been increasing steadily for many years before the rise of COVID-19. For example, “Between 2009 and 2015, the proportion of students with anxiety or depression increased by 5.9% and 3.2% respectively” (Lee et al., 2021, p. 522). Unfortunately, the stressors of the COVID-19 pandemic may have further exacerbated the prevalence of mental health issues among this vulnerable population of undergraduate students. One study (Lee et al., 2021) surveyed 1,412 undergraduate students at a large research university in March, April, and May of 2020 to ascertain the prevalence of stress, anxiety, and depression among these undergraduates. The study found that 88% of the participants reported moderate to severe levels of stress, 44% of the participants reported moderate to severe levels of anxiety and 36% of participants reported moderate to severe levels of depression (Lee et al., 2021). A smaller study (n=195) found that 71% of students surveyed reported increased levels of stress and anxiety related to COVID-19 (Son et al., 2020). The potential for heightened levels of stress, depression, and anxiety among undergraduates in relation to the COVID-19 pandemic may have connections to some of the lifestyle-related stressors that resulted from the pandemic including those related to social and economic concerns.

Lifestyle-related stressors. In March of 2020, the COVID-19 pandemic changed the day-to-day experience of everyone in the United States. Within a period of a few days, families were confined to their homes, schools and businesses shut down, and much of American life was canceled or had to be moved to the online space (TIME, 2020). For

most, the influence of the epidemic on everyday life was staggering and immediate, which may have impacted the stress level of undergraduate students, their families, and their communities (Cao et al., 2020; Das et al., 2020; Kira et al., 2021; Lee et al., 2021; Son et al., 2020; Xiong et al., 2020). The current literature reveals that some of the more salient stressors related to lifestyle during the COVID-19 pandemic were (a) decreased social interactions and feelings of isolation and loneliness (Das et al., 2020; Kira et al., 2021; Son et al., 2020), (b) changes in family dynamics and living environment (Cao et al., 2020; Das et al., 2020; Son et al., 2020), and (c) fears related to economic uncertainty (Cao et al., 2020; Das et al., 2020; Son et al., 2020).

The potential for elevated levels of stress and anxiety may have disproportionately affected students' executive functions, which, in turn, could have affected their ability to self-regulate, concentrate, prioritize tasks, and manage their time.

Executive Functioning (EF)

What is Executive Functioning (EF)?

Martha Bridge Denckla, a cognitive neuropsychologist who worked with children and adolescents with learning disabilities, described executive function (EF) skills, also called executive functions or executive functioning skills, to her patients using a cooking analogy (Denckla, 2019). She described one's cognitive capabilities (e.g., skills, knowledge base, cognitive functioning, etc.) as all the raw ingredients (vegetables, meat, spices, etc.) in their kitchen. While there are certainly some people who can throw together a tasty dish without ever looking at a recipe, most people need to use a recipe to make delicious and nutritious meals. The recipe in Denckla's (2019) analogy represents the executive functions. Recipes tell us what things we need to plan ahead for (e.g.,

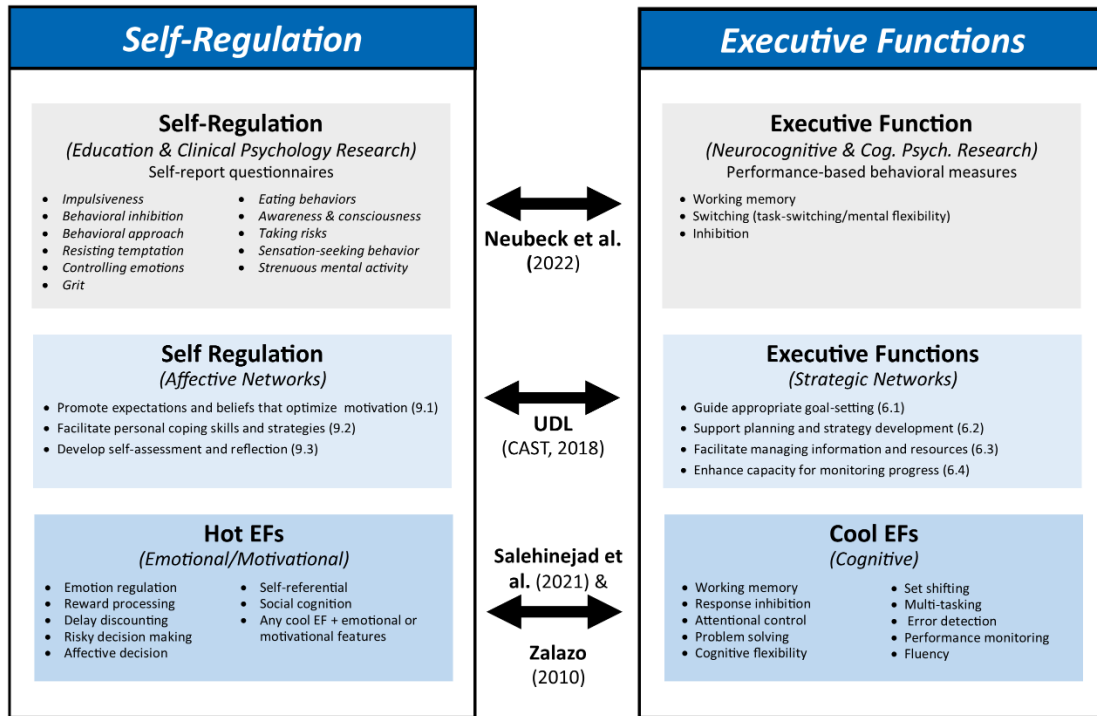
setting out the butter to soften), the ingredients we will need to collect or buy, the directions for making the dish, and the order in which these directions should be followed. Executive functions do many of these same things. They help us plan ahead, organize our materials, set a goal, plan the steps for getting to that goal, and they help us prioritize which things to do in which order. Without a fully stocked cognitive recipe book, learning can be a very difficult process.

Executive Functions vs. Self-Regulation

In the literature, the terms *executive functions* (EF) and *self-regulation* (SR) seem to be inextricably intertwined, as both are used to describe the collection of cognitive skills which are responsible for regulating one's thoughts, behaviors, and emotions (CAST, 2018; Hofmann et al., 2012; Neubeck et al., 2022; Salehinejad et al., 2021). A closer look reveals that these two terms (EF and SR) evolved out of two different fields. Neubeck et al. (2022) indicate that, "the term EF has mostly been used in neurocognitive research, while the term SR is more common in educational and clinical psychology" (p. 1). So, it is possible that EF and SR are simply different names that represent the same cognitive phenomena. However, some researchers have chosen to separate EF and SR into two different categories (see Figure 2).

Figure 2

Detangling the Terms Self-Regulation and Executive Functions



For example, the Universal Design for Learning (UDL) framework, a framework designed by developmental neuroscientists, separates EF and SR into two separate categories. The UDL framework (see Appendix A) places SR in a category that is associated with the affective brain networks (including the thalamus and the amygdala), and EF is placed in a different category which is associated with the strategic networks (including the pre-frontal cortex) (CAST, 2018).

Of the three definitions listed in Figure 2, the one that most closely aligns with my overarching definition of EF is hot and cool EFs as outlined by Zalazo (2010) and Salehinejad et al. (2021). According to Zalazo et al. (2010), cool EFs occur when the brain is in a relaxed, neutral state. These cool EFs are “often associated with [the] lateral prefrontal cortex” (Zalazo et al., 2010, p. 98) and assist with top-down cognitive controls.

The hot aspects of EFs are “seen in situations that are emotionally and motivationally significant” (Zelazo et al., 2010, p. 98), and are most often associated with the affective networks.

For this study, the term EF was used to indicate an overarching concept which includes both hot and cool EFs because the COVID Freshmen may have encountered difficulties with EF at a time that was emotionally significant (the COVID-19 pandemic). The section that follows will examine some of the instructional practices that researchers have shown to be effective in supporting students’ EF skills.

EF and Instructional Supports

Much of the literature discussing EFs refers to these skills in relation to individuals with learning disabilities (LD). In fact, EF expert, Lynn Metzler (2010) explained that “relatively few models exist for integrating strategy instruction systematically into the [general] classroom environment” (p. 30). bangass (2010) also explains that the “strategies that address executive function processes provide an entry point for improving academic performance” (p. 9) for all students, not just students with learning disabilities. Some instructional models, like Universal Design for Learning (CAST, 2018), have provided evidence-based recommendations for incorporating the teaching of EF (and SR) strategies into the everyday general classroom curriculum. The UDL Framework (CAST, 2018) lists the following instructional practices as being useful for supporting students’ development of EFs: (a) guiding appropriate goal setting, (b) supporting planning and strategy development, (c) facilitating the management of information and resources, and (d) enhancing students’ capacity for monitoring their own progress. The UDL Framework (CAST, 2018) suggests that educators use the following

instructional practices to support students' development of self-regulation: (a) promoting expectations and beliefs that optimize students' motivation, (b) facilitating students' development of personal coping skills and strategies, and (c) helping students develop self-assessment and reflection.

The evidence-based instructional practices outlined in the UDL Framework (CAST, 2018) tell teachers *what* they can do to support students' EFs (e.g., help students develop personal coping skills and strategies for self-regulation), other researchers have shown *how* educators can support students' development of EFs through the use of specific strategies for note-taking and studying (Rosen et al., 2014; Metzler, 2010), reading and comprehension (Daley & Rose 2018; Metzler, 2010), and writing (Daley & Rose, 2018; Metzler, 2010).

Note-taking and study strategies. Lynn Metzler (2010) points out that many academic tasks, including notetaking, studying, and test-taking, “require the coordination and integration of multiple subskills and processes” (p. 49). Metzler (2010) suggests that teachers can help students plan out a study schedule for upcoming tests as a way to support planning, and they can support working memory by requiring students to create their own mnemonic devices to remember information. Rosen et al. (2014) conducted a study where middle school students received explicit instruction on note-taking strategies. They found that explicitly teaching “effective cognitive strategies help[s] students bridge the gap between their weak EF skills and the academic demands they face” (p. 173-174). Rosen et al. (2014) suggest explicitly teaching EF strategies to help support students' EFs note-taking including the use of advance organizers for planning,

guided notes, graphic organizers, and chunking (i.e., breaking larger sections of information into smaller, more manageable, chunks).

Reading and comprehension. In terms of reading and comprehension, Daley and Rose (2019) suggest using highlighting in different colors, making notes in the margins of texts, and using symbols to mark important pieces in a text. Metzler (2010) recommends having students use symbols to mark specific aspects in a text (characters, climax, etc.) to support prioritization and having students use story organizers (or story boards) as a way to visually represent a story.

Writing. For writing, Daley and Rose (2019) suggest using templates to scaffold the structure of a given writing format. Metzler (2010) recommends having students create their own personalized editing checklists to help with self-checking, and providing templates, examples, or specific guidelines for writing assignments as a way to support organization.

In the following section, several different models of EF will be examined, but the model which will be used in this study (Brown, 2005) was chosen because it includes both aspects of EF and SR and because it makes connections to many of the EF strategies suggested above.

Multiple Models of EF

The concept of Executive Functioning (EF) is a complex one in that it evolved simultaneously through multiple fields (Denckla & Mahone, 2018). Over time, these fields have come to some agreement that EF is “an all-encompassing construct or an umbrella term for the complex cognitive processes that underlie flexible, goal-directed

behavior” (Metzler, 2018, p. 1). No one definition exists, however, that specifies exactly which cognitive processes count as being part of EF and which do not.

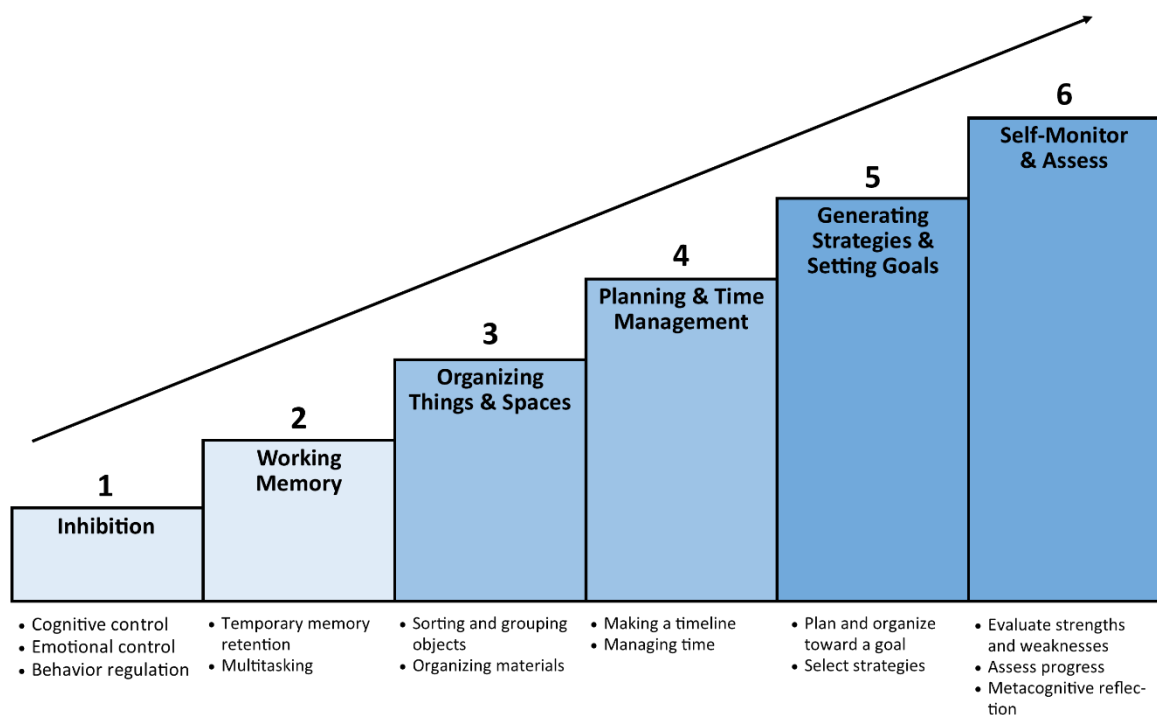
Three Foundational EFs (Miyake et al., 2000). Currently, Miyake outlined the most influential theory of EF et al. (2000). Miyake et al.’s so-called unity and diversity theoretical framework highlighted three foundational EFs: (a) inhibition, (b) information updating and monitoring (working memory), and (c) shifting (2000). Under this framework, inhibition includes “one’s ability to deliberately inhibit dominant, automatic, or prepotent responses when necessary” (Miyake et al., 2000, p. 57). Miyake et al. (2000) defined information updating and monitoring as including “monitoring and coding incoming information for relevance to the task at hand and then appropriately revising the items held in working memory by replacing old, no longer relevant information with newer, more relevant information” (p. 57). Shifting, also referred to as attentional or task-related switching, is defined as “shifting back and forth between multiple tasks, operations, or mental sets” (Miyake et al, 2000, p. 55). While this theory has ample representation in the literature, it is insufficient for this study because the three foundational EFs are a bit too broad, and they do not put much emphasis on some of the more academic-related parts of EF which apply to undergraduate students like organization, planning, and time-management.

Developmental Stages of EF (Denckla, 2019). Another model, from developmental neuropsychology, is Martha Bridge Denckla’s (2019) model of the developmental stages of executive function. Denckla’s model breaks EF down into six smaller chunks as opposed to the Miyake et al. (2000) model which focused on three foundational EFs. Denckla (2019) posited that one’s executive functions do not all

develop at the same time, but rather, they develop in a predictable order. While the timeline of an individual’s EF development may be different from another person’s, Denckla (2019) stated that the order tends to be about the same (see Figure 3). In looking through this lens of a developmental perspective, one could expect undergraduate students to have mastered some, but not all, of these skills. Denckla also stated that “cognitive control [is likely to mature] around age 25 and social-emotional control in the early 30s, probably around age 32” (2019, p. 45).

Figure 3

Model of Developmental Stages of EF (Denckla, 2019)



The first two sets of skills to develop, in infancy and early childhood, are those of inhibition and working memory (Denckla, 2019). Although these skills begin developing early in life, they continue to mature over time, so for an undergraduate student inhibition

includes cognitive controls (e.g., ignoring phone notifications during class), emotional controls (e.g., knowing when to take a study break), and behavior regulation (e.g., choosing to study instead of playing video games), and working memory includes temporary memory retention (e.g., holding spoken lecture notes in one's mind then writing them down in a notebook) and multitasking (e.g., trying to take notes on a phone interview while simultaneously answering questions). The next two sets of skills to develop are organizing things and spaces and planning and time management (Denckla, 2019). The skill of organizing things and spaces includes the ability to sort and group objects and the organization of materials (e.g., a student making sure they have all necessary books, notes, and links to complete an online course assignment). The skills of planning and time management include skills like making a timeline (e.g., making a plan for completing a long-term class project) and managing one's time (e.g., finding time to study while also taking classes and working). The last two sets of skills to develop are those related to generating strategies and setting goals and self-monitoring and assessing (Denckla, 2019). Generating strategies and setting goals refers to planning and organization toward a goal and the selection of appropriate strategies to achieve that goal (e.g., setting a phone reminder to go off 20 minutes before class starts). Self-monitoring and assessing include the evaluation of one's own strengths and weaknesses, the assessment of progress, and metacognitive reflection on one's goals and strategies (e.g., reflecting on one's own poor performance on a past exam and recognizing that simply re-reading the chapter was not a very effective way to study).

While the components of the Miyake et al. (2000) model and the Denckla (2019) model both contain many of the same cognitive skills, the difference is the organization

of these skills into groups: Miyake et al.'s (2000) three foundational EF's (inhibition, updating, and shifting) and Denckla's (2019) six stages of EF development (inhibition, working memory, organizing things and spaces, planning and time management, generating strategies and setting goals, and self-assessing and monitoring).

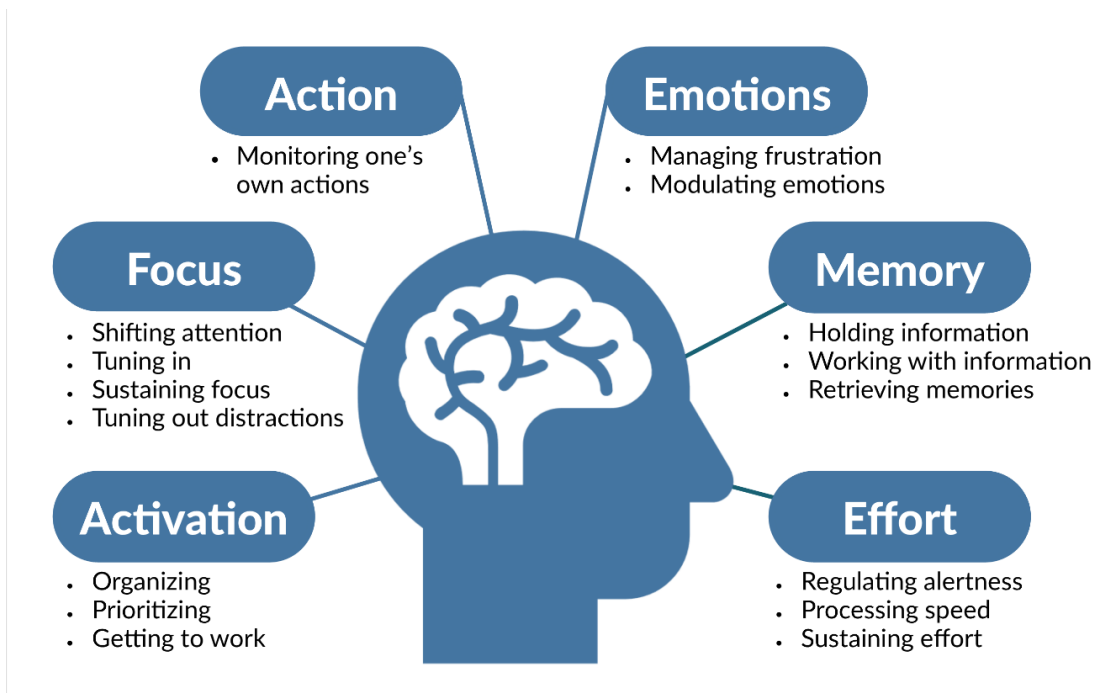
For the present study, the researcher will use a different organization of EF components which comes from the work of Thomas Brown (2005). Brown's (2005) model is most suitable for this study because of the attention it gives to some of the more salient aspects of EF that affect one's academic performance and emotional well-being. Miyake et al.'s (2000) model is insufficient because the three foundational EFs are too broad to clarify the many different aspects of executive functions, especially for people who are unfamiliar with the research-specific definition of terms like inhibition, updating, and shifting. This current study is designed to help undergraduate instructors understand which aspects of teaching students find most helpful in times of extreme stress. Because the intended audience of the study is undergraduate instructors from all fields, one cannot assume that they will be familiar with the terminology used in the Miyake et al. (2000) theory. The Denckla (2019) theory is much more accessible to individuals outside the research field, but it diminishes the role that emotions and SR play in one's overall executive functioning, and instead concentrates more on the organizational and goal-setting aspects of EF. Brown's (2005) model is ideal for this study because of its use of more user-friendly terminology, and because it provides a more well-rounded view of EF, including both the academic and self-regulation aspects of EF, which contribute significantly to the overall academic performance of undergraduate students.

Brown's (2005) Model of EF

In his 2005 book, Brown broke EF down into six larger clusters, each made up of one or more sub-skills (see Figure 4). These six clusters are activation, focus, action, emotions, memory, and effort. While Brown's (2005) book was dedicated to addressing EFs as they relate to students with ADHD, the EF deficits can often manifest in students (with and without ADHD) whose EFs are compromised for other reasons like trauma, stress overload, and elevated anxiety (Applehans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Kira et al., 2021; Shields et al., 2016). This current study will examine responses from the COVID Freshmen, students who navigated the transition to higher education during a global pandemic, so Brown's (2005) model can be particularly useful in understanding which aspects of college instructors' teaching were most helpful at a time when stress, anxiety, and trauma may have had a heightened impact on students, potentially causing a level of EF deficit similar to those levels experienced by students with ADHD and other learning disabilities. This means that undergraduate freshmen who would not normally struggle with EF skills like those outlined in Brown's (2005) six clusters of EF (activation, focus, action, emotions, memory, and effort) may have suddenly found themselves having difficulties with EF as a result of the extreme levels of stress they felt while transitioning from high school to higher education amid a global pandemic. See Figure 4 for a diagram depicting Brown's (2005) Model of EF.

Figure 4

Thomas E. Brown's (2005) Model of EF



Activation. According to Brown (2005), the cluster of EF skills dedicated to activation includes tasks related to planning like organizing (sorting out materials and tasks), prioritizing (determining which tasks are most important or time-sensitive, and determining the order in which these tasks should be completed) and activating (actually starting or completing tasks). For the COVID Freshmen, difficulty with activation could have included problems with time management, making a plan for study time, and organizing one's course materials, notes, and assignments in an online format.

Focus. In Brown's (2005) model the cluster of EFs labeled as focus includes skills like shifting attention (mentally pausing one's focus on one task or stimulus to attend to a different task or stimulus), tuning in (paying attention to a specific task or stimulus), sustaining focus (holding one's attention to the task or stimulus at hand, even when the task or stimulus is uninteresting), and tuning out distractions (determining which tasks or stimuli should be ignored). Among the COVID Freshmen, problems with

focus may have included tuning out the distractions inherent in working in an environment which was not designed to support studying (like one's bedroom, dorm room, or a family living room), ignoring notifications from one's phone or computer while listening to a lecture on Zoom, and getting back to work on an assignment after being interrupted by a text from a friend.

Action. In Brown's (2005) discussion of action, he relates this cluster of skills to monitoring and self-regulating one's own actions. When these skills are not functioning well, this can result in impulsivity and problems with controlling one's own actions and behaviors (Brown, 2005). Action, which is similar to inhibition, for the COVID Freshmen, may have presented as difficulties turning off TikTok (a social media video application that became increasingly popular with teens and young adults during the COVID-19 pandemic) so they could study, or even having problems with controlling their responses to minor inconveniences.

Emotions. This cluster referred to difficulties with managing frustration and regulating one's own emotions. While other models of EF, like Denckla's (2019) developmental model, include emotional regulation as a sub-skill of inhibition, Brown (2005) separated this piece due to his experience working with individuals with compromised EF, like those with ADHD. Brown discussed how executive functioning deficits can cause some people to "appear to have a low tolerance for frustration and often find it difficult to persevere through the many stresses of daily life; they readily experience feeling 'overwhelmed' or 'stressed out'" (Brown, 2005, p. 40). For the COVID Freshmen, difficulty with emotional regulation may have meant that they were

quicker to anger, more likely to become sad or even weepy and that they potentially had more and faster mood swings than before COVID.

Memory. In Brown's (2005) model of EF, the cluster labeled memory includes sub-skills related to working memory and stored (or longer-term) memory. These sub-skills include holding and working with information (the intake, temporary storage, and processing of information) and retrieving (or recalling) information or memories from one's long-term memory (Brown, 2005). Difficulties with memory, for the COVID Freshmen, could have included problems like forgetting appointments, or not being able to recall information they had previously studied, but it could also have meant that it took students longer to read and comprehend new information.

Effort. The last of Brown's (2005) six clusters of EF skills is effort. In this context, effort refers to becoming and staying alert, sustaining effort over longer-term projects and tasks (i.e., writing a dissertation), and regulating processing speed which includes speeding up processing speed for some tasks and slowing it down for others (Brown, 2005). For many COVID Freshmen, learning in an online environment may have been less stimulating than being in a face-to-face classroom, which meant that they became bored more easily in this online setting. This could have led to problems with alertness and sustaining attention like accidentally falling asleep while reading, watching a lecture video, or while participating in an online Zoom class.

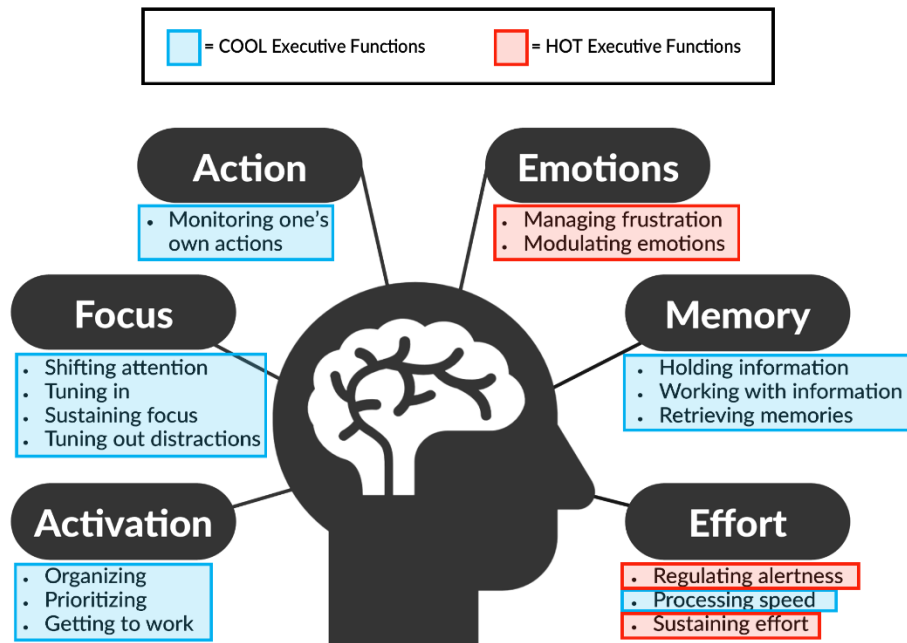
Each of these six clusters of EF skills has the potential to be negatively affected when internal (i.e., ADHD, dyslexia, autism, etc.) or external (i.e., stress, trauma, anxiety, etc.) factors overwhelm one's ability to cope. Returning to the cooking analogy shared above: think of trying to prepare a recipe in which some or all the directions are illegible

or missing entirely- this would reduce one's chances of success. In some cases, when external influences like stress and anxiety are elevated (or persist for a sustained period), these factors can have an adverse effect on executive functions which can compromise learning. So, when a student could not find their assignment in the online Canvas course (similar to a recipe that is missing its second page), they may not have been able to regulate their emotional response which could have led to frustration or even giving up on the assignment. Or, when they were sitting in an online Zoom meeting, but their Apple Watch kept sending them notifications, they may have had more difficulty with focusing on the lecture than they would normally have had.

Earlier in this section, I discussed the differences in definitions of EF as related to self-regulation (SR), and I noted that the definition which most closely aligns to my overarching definition of EF (which includes aspects of SR and EF) is the hot and cool model of EF (Salehinejad et al., 2021; Zelazo et al., 2010). To make connections between the hot and cool definition of EF (Salehinejad et al., 2021; Zelazo et al., 2010) and the Brown (2005) model of EF, I have created a crosswalk diagram to illustrate the hot and cool elements of EF within the Brown model (see Figure 5).

Figure 5

Crosswalk: Hot and Cool EFs and Brown's (2005) EF Model



The extreme levels of stress that the COVID Freshmen may have endured during the pandemic had the potential to cause profound difficulties with their executive functions (including both hot and cool aspects of EFs), which, in turn, could have impacted their academic performance. The next section will examine the literature on the links between stress and executive functions.

Connections Between EF and Stress

Stress has long been known to impact EF (Appelhans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Kira et al., 2021; Shields et al., 2016), but the literature is less clear on exactly *how* stress affects EF. In a 2016 meta-analysis, Shields et al. sought to determine the mechanisms by which stress affects EF. This meta-analysis examined three theories:

1. Stress causes cognitive resources to be shifted to the thing causing the stress,
2. Stress shifts cognition from top-down control (higher-level cognitive controls like EF) to bottom-up controls (sensory and reactive controls),
3. Stress causes a spike in cortisol, a stress hormone, which floods the pre-frontal cortex (PFC) causing disruptions to EF (Shields et al., 2016).

Findings from this meta-analysis of 51 studies point to the first theory as being the most likely mechanism by which stress affects EF, which suggests that stress causes cognitive resources to be reallocated to the most salient information, the stressor (Shields, 2016).

When one's cognitive attention is on the stressor, there are minimal cognitive resources left over for higher-level cognitive processes like EF. The COVID Freshmen may have experienced this same reallocation of cognitive resources from what their focus should have been on (their academic work) to the stressors at hand (transitioning to college and issues related to the COVID-19 pandemic).

Other scholars have found that the third theory is the likely mechanism by which stress and anxiety affect EF. Bangasser and Shors indicated that “stress hormones and neurotransmitters act directly on learning circuitry to modify processes of learning and memory” (2011, p. 3). They went on to state that stress has a direct impact on the neural connections in the brain, causing dendrites (the tree branch-like structures that receive input from cell to cell in the brain) to retract which can be “accompanied by deficits in working memory, behavioral flexibility, and attentional set shifting” (Bangasser & Shors, 2011, p. 4), all of which are key components of executive functioning. Neuropsychologist Martha Bridge Denckla reinforces this idea about anxiety:

“One of the most important things to realize is that anxiety itself can impair executive function. Anxiety can operate through the connection between the emotional brain (for example, the amygdala), which can flood the frontal system with excessive levels of a neurotransmitter that pushes the system into the impaired side of the executive domain, resulting in [executive dysfunction] EDF” (Denckla, 2019, p.50).

While researchers tend to disagree on exactly *how* stress and anxiety affect EF, there seems to be a consensus that excessive or elevated levels of stress and anxiety can impair EF.

Summary

The COVID Freshmen had the potential to have elevated stress due to the confluence of stressors related to the transition from high school to higher education and stress overload due to COVID-19. In a typical, non-COVID year, the transition from high school to higher education can be one of the most difficult periods in one’s life because of developmental transitions occurring through the period called emerging adulthood (Arnett, 2000; Arnett, 2004; Arnett, 2007; Nelson, 2021), in addition to ecological transitions related to the new academic, social, and living contexts in which these emerging adults often find themselves (Conley et al., 2014; Kroshus et al., 2021; Leary & De Rosier, 2012).

The global COVID-19 pandemic may have exacerbated many of these problems by adding additional stressors related to the pandemic itself: academic-related stressors (Cao et al., 2020; Das et al., 2020; Mesghina et al., 2021; Son et al., 2020) and health-

and lifestyle-related stressors (Cao et al., 2020; Das et al., 2020; Lee et al., 2021; Son et al., 2020; Xiong et al. 2020).

While stress overload has the potential to affect students in many different ways, it is possible that difficulties related to students' EFs which influenced their perspective on which teaching aspects were most helpful during this tumultuous period. Executive function (EF) skills are those cognitive skills that allow individuals to plan, organize, regulate emotions and actions, and set and monitor goals (Brown, 2005; Denckla, 2019; Denckla & Mahone, 2018, Metzler, 2018; Miyake et al., 2000; Salehinejad et al., 2021; Zelazo et al., 2010). This study will use Brown's (2005) model which groups EFs into six clusters: (a) activation, (b) focus, (c) action, (d) emotions, (e) memory, and (f) effort.

The COVID Freshmen, who may have been experiencing extreme levels of stress, could have also been struggling with skills related to EF. So, one could surmise that at least some of the student responses to the COVID survey question, "Which aspects of the instructor's teaching were most helpful to you? Why?" will be teaching aspects that helped to support students' struggling executive functioning skills.

CHAPTER 3

Methods

Research Design

This study was an exploratory study of secondary (i.e., previously collected) data. The primary study (the study where the data were originally collected) utilized a survey design to ascertain the state of teaching and learning among undergraduate students and their instructors during the global COVID-19 pandemic.

In this exploratory study of secondary data, the researcher used purposive sampling to examine freshmen college students' open-ended survey responses which were collected in the fall of 2020. This allowed the researcher to utilize a large, already-existing body of data that may otherwise have gone unexplored due to the large volume of data collected for the primary study.

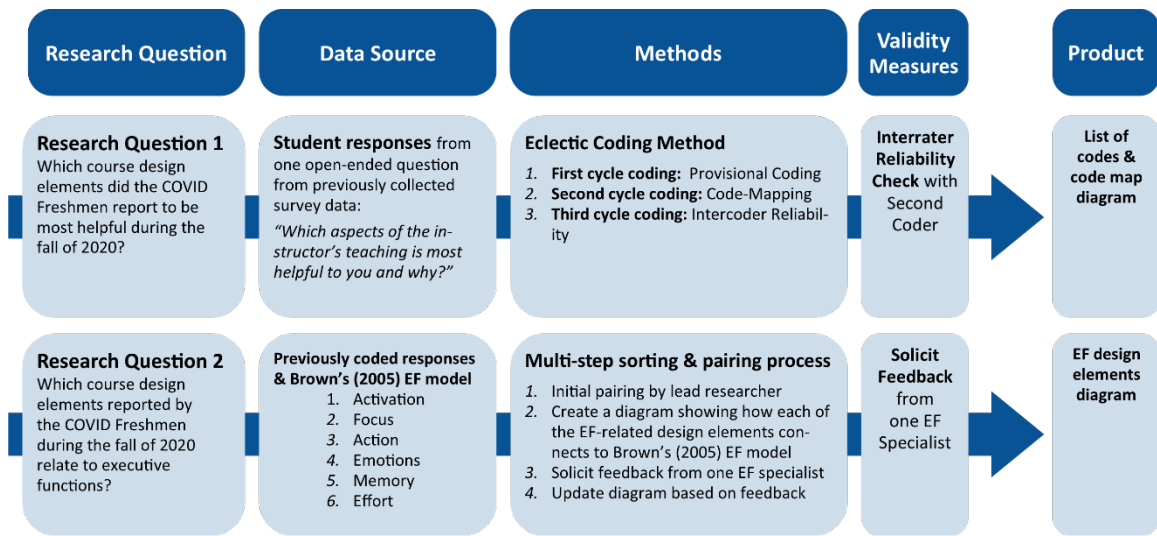
An exploratory research design was selected for evaluating the secondary data for two main reasons: (a) exploratory studies use a bottom-up approach, meaning that they start with the data and allow connections to emerge (Johnson & Christensen, 2017) and (b) exploratory studies are typically utilized when there are a minimal number of studies on a given topic (Nardi, 2018; Stebbens, 2001).

Organizing and making sense of qualitative open-ended responses is a time-consuming process, but it is crucial in that it provides the field with a look into the unique lived experiences of the participants which can then be used to inform current and future work in the discipline. Once data had been analyzed, the researcher consulted the existing literature and created a diagram to (a) explain which teaching aspects these *COVID Freshmen* found to be most helpful in the fall semester of 2020, and (b) determine which

teaching aspects, reported by the COVID Freshmen in the fall semester of 2020, were related to executive functions. The diagram in Figure 6 shows the source of the data, the methods used to analyze that data, the validity measures, and the resulting product for both research questions alluded to above.

Figure 6

Research Question Plan

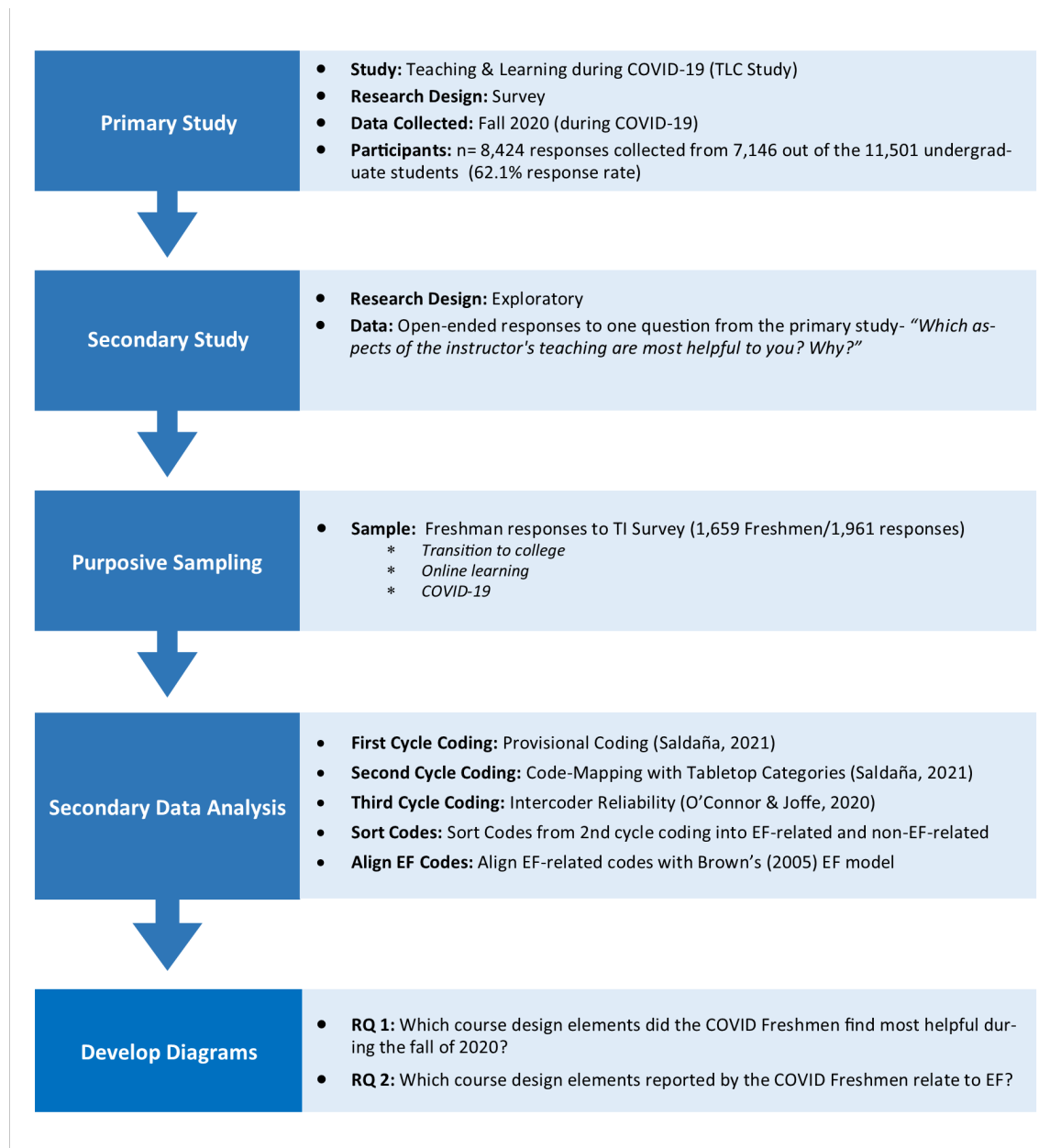


First, the bottom-up approach was ideal for this study because the researcher had access to a large number (over 7,000) of open-ended responses from the primary study which provided ample data for making connections. Second, due to the abrupt changes to education that resulted from the COVID-19 pandemic, research on a shift to online education during a global pandemic simply did not exist prior to 2020. This dissertation is being written during the fall of 2022 and spring of 2023, so at this time, research on the human experience during the COVID-19 pandemic is just starting to emerge, and unfortunately, the COVID-19 pandemic is still affecting K-12 and postsecondary education as new strains of the virus make their way around the globe. The relative

newness of this topic, and the specificity of the sample, undergraduate freshmen who graduated high school and subsequently started college in the middle of COVID-19 (a.k.a. the COVID Freshmen), made this study primed for exploratory research. Figure 7 depicts the research design for this study.

Figure 7

Research Design for the Exploratory Study of Secondary Data



Background on the Primary Study

The primary study was a large-scale survey that was carried out amid the COVID-19 global pandemic with undergraduate students at a large Research 1 university in the southeastern United States. The original study, titled COVID19: Teaching and Learning (IRB #61595) was internally referred to as the *Teaching and Learning during COVID-19* (TLC) study. This primary study surveyed 111 undergraduate instructors and the students enrolled in their courses during the fall of 2020. The student surveys yielded 8,424 responses. Data collected from this survey included both closed-ended (e.g., multiple choice, yes/no, and Likert-type questions) and open-ended questions. This exploratory study of secondary data examined responses to one open-ended question designed to understand what aspects of a course were helpful to students' learning during a global pandemic.

The researcher was a member of the research team for the primary study but joined the team after data collection had begun. As a result, the researcher was neither a part of designing the questions for the primary study nor a part of soliciting or collecting data.

Participants

A total of 8,424 survey responses were collected from 7,146 out of the 11,501 undergraduate students enrolled in the course sections taught by instructors who agreed to participate in the study (a 62.1% response rate overall). The researcher examined responses from the first version of the survey (T1- Time 1), given in September of 2020. Additionally, the researcher of the secondary study narrowed the sample from all undergraduate students (freshmen, sophomores, juniors, and seniors) to just the responses

from students who were freshmen during the fall of 2020. This unique group of students, who were referred to in this study as the *COVID Freshmen*, transitioned from high school to college during one of the most tumultuous times in the history of higher education, the COVID-19 pandemic. Transitioning from high school to college is typically a stressful and uncertain time for students, but the added complications of the pandemic and a shift to online learning may have influenced the *COVID Freshmen*.

There were a total of 1,659 unique freshmen who returned 1,961 responses to the T1 survey. Unfortunately, the enrollment data provided by the university only showed the total number of students enrolled for each course section, so the researcher was unable to determine the number of freshmen enrolled in each course, and consequently, was only able to report how many freshmen completed the student survey.

It is important to note that some of the freshmen in the purposive sample took the survey in multiple courses, thus the difference between the 1,659 unique individuals who returned a total of 1,961 surveys. Freshmen taking the primary survey were instructed to answer all questions through the lens of the course in which they were taking the survey. For example, in one section of the survey, students were given the following prompt, “Now think about your instructor in [course]. To what extent do you agree with the following statements?” For this reason, the researcher of the secondary study allowed multiple responses from the same students because each response showed the students’ perspective in a different course context.

Sample Selection

To provide a full explanation of the sample selection for this current study, it was necessary to describe both the sample selection of the primary Teaching and Learning

during COVID-19 (TLC) study and the sample selection of the secondary exploratory study. For clarity, the overarching study which focused on all undergraduate students (i.e., freshmen, sophomore, junior, and senior) is referred to as the *primary study*, and the exploratory study of secondary data (the current study), which is focused solely on students who were freshmen in the fall of 2020, is referred to as the *secondary or current study*.

Sampling for the Primary Study. The primary TLC study made use of convenience sampling due to the easy access to undergraduate students and instructors which exists on the typical college campus. Convenience sampling “is a type of nonprobability or nonrandom sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study” (Etikan et al., 2016). Due to the time-sensitive nature of the unpredictable COVID-19 pandemic, the research team was eager to collect data from students and instructors who were still living, teaching, and learning amid a global pandemic. A convenience sampling technique made the most sense in such a fast-paced setting, as the research team had access to a large body of undergraduate students and their instructors. The instructors self-selected their participation in the study, and they sent out the student version of the survey to the undergraduate students enrolled in one or more of the instructors’ course sections during the fall of 2020.

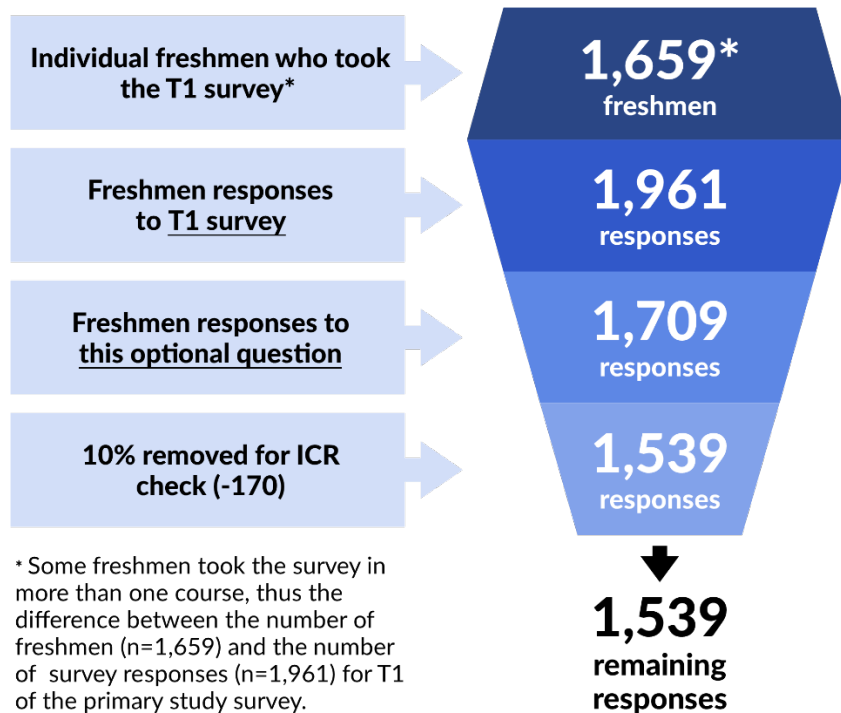
Sampling for the Secondary Study. The exploratory study of secondary data (the current study) used purposive sampling to examine student responses from undergraduate freshmen who graduated high school in the spring of 2020 and

subsequently started college in the fall of 2020, during COVID-19. Purposive sampling “is the deliberate choice of a participant due to the qualities the participant possesses” (Etikan et al., 2016). At the time of this writing, there is little to no research on this specific group of students and their experience transitioning to college during a global pandemic, so this area is primed for exploratory research.

This study analyzed 1,961 survey responses from undergraduate freshmen in their first semester of college (fall 2020) to the question, “Which aspects of the instructor’s teaching are most helpful to you? Why?” to determine which course design factors were most helpful to students during this very difficult school year (see Figure 8). This secondary study only examined freshman responses from T1 of the primary survey. Because the question being analyzed was an optional question, only 1,709 freshmen responses to the T1 survey (out of a total of 1,961 freshman survey responses collected in T1) included a response to this question. Additionally, 10% (n=170) of the 1,709 responses was removed from the sample for an intercoder reliability (ICR) check with a second coder. This left the researcher with a total of 1,539 freshman survey responses to the aforementioned optional question from T1 of the original study.

Figure 8

Funnel Diagram Depicting Sampling for Secondary Study



The students who were undergraduate freshmen during the 2020-2021 school year are largely the same group of students who finished the last few months of their high school years attempting to learn remotely, during a global pandemic, from teachers who had no training in teaching in an online setting (TIME, 2020). The students who were college freshmen in the fall of 2020 are the same students who did not get to participate in their senior prom, their final year of high school musicals and band concerts, or even their last chance to win the district, region, or state tournaments in winter and spring sports like basketball and track (TIME, 2020). These students not only spent the end of their senior year isolated in their own homes, but most did not even get the opportunity to walk across the graduation stage to receive their high school diplomas (TIME, 2020). These same incoming college freshmen may have developed or exacerbated preexisting

mental health problems of depression and anxiety as they faced an uncertain future with the threat of sickness, suicide, and shutdowns serving as a constant reminder that they had little to no control of the world around them (Camacho-Zuniga et al., 2021).

Starting college is already an uncertain time for most freshmen, but the added stress, trauma, and compromised mental health that many of the 2020 freshmen class endured may have enhanced the learning barriers which these students encountered during their first year of college. It is for this reason that the researcher seeks to examine students' open-ended responses to discover which teaching aspects were most helpful to the COVID freshmen during the fall 2020 semester and which of these aspects are related to EF.

Participant Demographics

The sample consists of 1,961 completed surveys taken by 1,659 unique freshmen undergraduate students during the fall of 2020. The racial/ethnic distribution of the students in this sample is consistent with the overall racial/ethnic makeup of the university where the original study took place and is within one percentage point of the racial/ethnic breakdown of the university (see Table 1). The sample of 1,961 student responses taken by 1,659 unique freshmen consists of 1,071 responses from female students (65%) and 588 responses from male students (35%). Twenty-six percent (26%) of the responses were submitted by first-generation college students (meaning, students who are the first in their family to attend college), and 10% of the total responses were submitted by students who are from the Appalachian region of the state in which the university is located.

Table 1*Ethnic/Racial Makeup of the Sample vs. All Undergraduates*

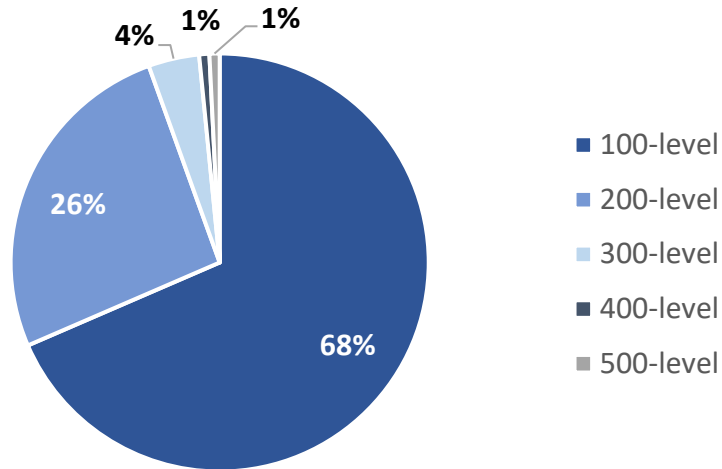
Ethnicity/ Race	Sample		All Undergrads	
	n	%	n	%
White	1222	74%	16,625	75%
Black	136	8%	1,580	7%
Hispanic	119	7%	1,241	6%
Unknown	67	4%	1,178	5%
Multiracial	64	4%	876	4%
Asian	47	3%	691	3%
American Indian or Alaskan Native	3	0%	43	0%
Native Hawaiian or Other Pacific Islander	1	0%	12	0%

Course-Level and College Information

In the United States, college courses are typically numbered according to the level (also called grade or year) of undergraduate students. For example, a 100-level course would be an introductory type of course that is most commonly taken by freshmen, a 200-level course is most commonly taken by sophomores, etc. The sample consisted of responses from freshmen students enrolled in all four levels of undergraduate course sections (100, 200, 300, & 400), and one undergraduate/graduate course section (500). There were responses from freshmen enrolled in 87 different 100-level course sections (66%), 33 different 200-level course sections (26%), five 300-level course sections (6%), one 400-level (1%) and one 500-level (1%) course section (see Figure 9).

Figure 9

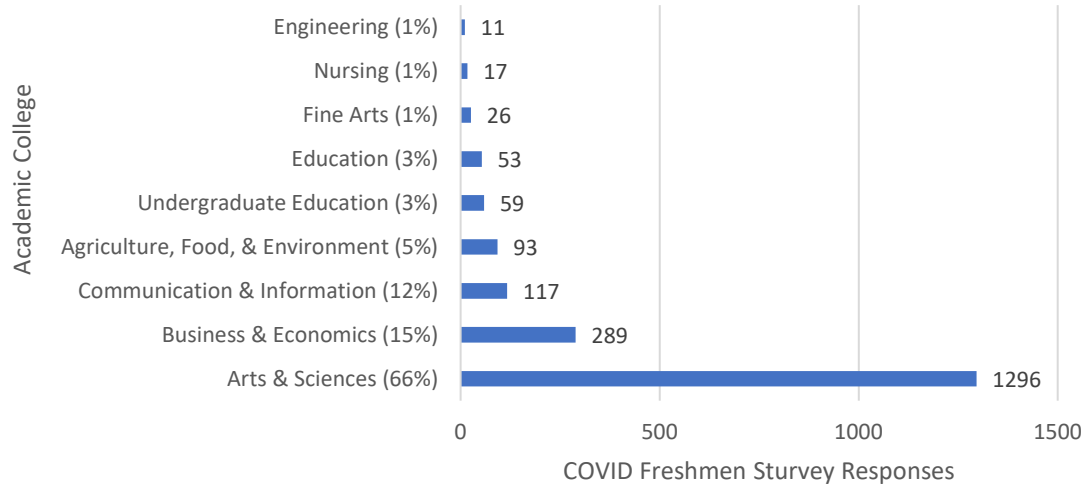
Course Levels Taken by Freshmen in the Sample



Additionally, the sample included course sections from ten of the university's 16 academic colleges, plus one course section listed as "Undergraduate Education" (see Figure 10). It should be stated that many freshmen enroll in general education courses during their first year, many of which are housed in the university's College of Arts and Sciences. This may help to explain the relatively large number of responses from the College of Arts and Sciences as compared to the other academic colleges.

Figure 10

Survey Responses by Academic College

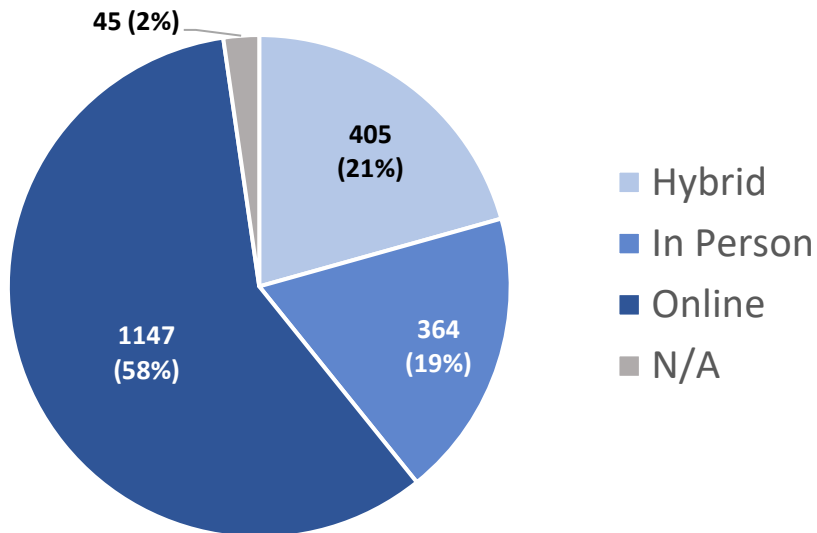


Course Modality

Of the 1,659 unique freshmen who returned 1,961 survey responses, 1,147 (58%) took their course online, 364 (19%) took a face-to-face course, and 405 (21%) took their course in a hybrid (sometimes in person and sometimes online) format (see Figure 11). There were 45 (2%) student responses which did not include a course modality designation, so these have been labeled as N/A (not applicable).

Figure 11

Course Modality for COVID Freshmen (T1)



Context

The data used in this study were collected as part of a large-scale research project designed to ascertain the state of teaching and learning during the COVID-19 pandemic. The study, aptly named the “Teaching and Learning during COVID-19 (TLC)” study, surveyed over 7,000 unique undergraduate students and 111 instructors at a large, Research 1 university in the southeastern United States twice during the fall of the 2020-2021 school year. Students and instructors were asked questions on a multitude of topics, and some participants were selected to participate in subsequent interviews on specific areas of interest.

The TLC survey was given to participants two times over the fall 2020 semester: once in September 2020 (time 1- T1) and again in November 2020 (time 2- T2). For the purposes of this current study, the researcher only examined student responses from T1 because when the COVID Freshmen took this survey, in the first half of September of

2020, they would have had less than one month of the college experience. Because this transition took place during a global pandemic, it is likely that the COVID Freshmen would still be experiencing elevated stress as they continued to adjust to their new environment.

Students and instructors were asked quantitative (mostly Likert-style questions) and open-ended qualitative questions on many different topics. The student responses which will be analyzed for this current study are answers to the open-ended question, “Which aspects of the instructor's teaching are most helpful to you? Why?” All the responses included in this purposive sample group are from surveys taken during the September version of the study.

Data Sources

The data for this current study were collected from students via an online Qualtrics survey. The survey included a total of 107 questions organized into 19 categories (see Table 2).

Table 2

Student Survey Question Categories and Types

Question Category	Quantitative	Qualitative	Total	%
Demographics	8	3	11	10%
Course Modality	4	0	4	4%
Reason for Taking Course	3	0	3	3%
Course Structure	7	1	8	7%
Instructor Interactions	4	0	4	4%
Self-Efficacy in the Course	5	0	5	5%
Self-Efficacy in General Areas	8	0	8	7%
Self-Efficacy for Self-Regulation	6	0	6	6%
Learning Experience in Course	2	1	3	3%
Goals	10	1	11	10%
Engagement	6	0	6	6%
Procrastination	4	0	4	4%

Connection	5	1	6	6%
Bias	5	1	6	6%
Diversity	3	0	3	3%
Value-Cost	7	0	7	7%
Experience	0	4	4	4%
Mindset	6	0	6	6%
Other	1	1	2	2%
Total	94	13	107	100%
%	88%	12%	100%	

This current study examined freshmen students' responses to the open-ended question, "Which aspects of the instructor's teaching are most helpful to you? Why?" which was part of the *Course Structure* category but was physically located after the *Instructor Interactions* section in the survey itself (see Figure 12).

Figure 12

Excerpt From the Student Survey of the TLC Study (T1)

To what extent do you agree with the following statements? Remember, your instructor will not see your answers.

	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
My instructor is prepared for class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My instructor seems to believe that some students are smart, while others are not.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My instructor provides resources and advice to students on how to improve their learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My instructor uses technology effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My instructor tries to connect course content to students' interests.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My instructor seems to believe that students have a certain amount of ability, and they really can't do much to change it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My instructor presents material clearly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

< [Progress Bar] >

< [Progress Bar] >

Which aspects of the instructor's teaching are most helpful to you? Why?

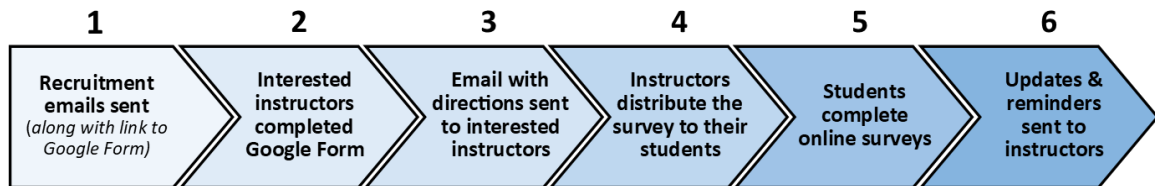
Data Gathering Procedures

The TLC study was designed to collect information from instructors and the undergraduate students in their courses so that relationships between student factors and instructor factors could be investigated. To facilitate this complex design, the research team began by first recruiting instructors who were willing to participate. These instructors were asked to complete the instructor version of the survey, then they were asked to disseminate the student surveys to the students enrolled in their specific course

sections. The data for the overarching TLC study were collected through a multi-step process designed to maximize survey return rates and participation from instructors and students (see Figure 13).

Figure 13

Steps in the Data Gathering Process



First, a recruitment message was crafted, with two different versions, intended for two different audiences. One message was written directly to instructors, and the other message was written to administrators to encourage dissemination to instructors. The instructor-focused message was sent to the listserv of the university’s teaching and learning center, and the administrator-focused message was sent to the associate deans of the academic colleges. Inclusion on the teaching and learning center’s listserv is voluntary and instructors sign up to receive emails from the listserv by completing a short form on the center’s webpage. Because signing up for the teaching and learning center’s listserv is a self-selective process, the research team also sent a message to the associate deans of the academic colleges as a means of collecting a more balanced sample. The administrator-focused message was sent to the associate deans by the Associate Provost for Teaching, Learning, and Academic Innovation who was also a member of the research team for the TLC study. Both versions of the email included a link to a Google Form that instructors could fill out if they were interested in participating in the study.

Next, interested instructors filled out the Google Form, indicating which course section(s) they would like to include in the study. Then, the interested instructors received an email from the research team with clear directions on the next steps they would need to take for sending out survey links to the undergraduate students in their course section(s). This email indicated that instructors had two options for disseminating the survey: through a link or by loading a pre-created Canvas (the university's learning management system) assignment into their course's Canvas page. The instructor email also included the due dates for the survey and optional ideas for instructors who wanted to offer students extra credit for participating in the survey.

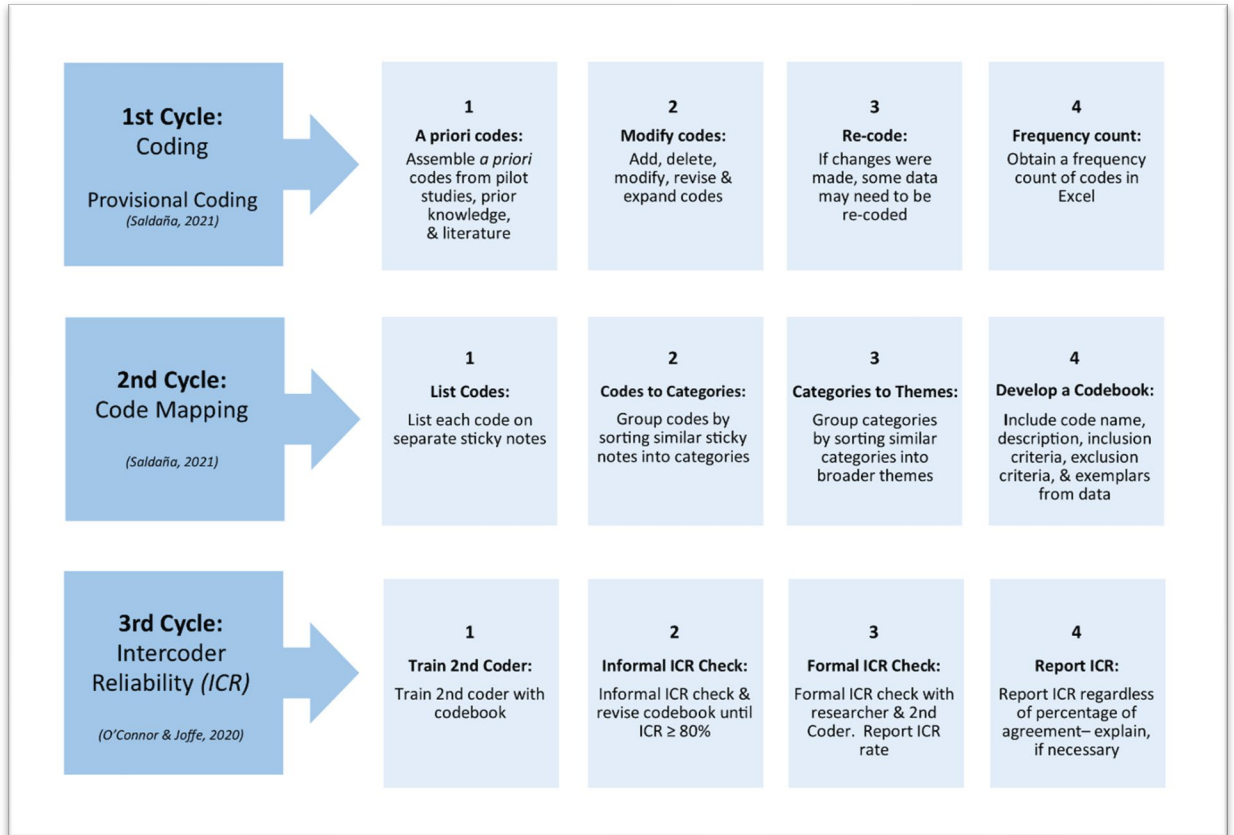
Once students accessed the survey online, they were asked to read and agree to the consent form before filling out the survey. In the consent form, students were informed that their instructors would not have access to their survey responses and that the instructors would only be told if students had completed the survey or not. The research team sent regular emails to participating instructors letting them know which students had completed the survey and the completion rate for their entire course section. Finally, the research team sent reminder emails one week and one day before the student and instructor surveys closed. Once all surveys were closed, instructors were sent a final email to thank them for their participation in the study and to communicate the final list of students who participated in the survey in addition to the final response rates for their course sections. Student and instructor survey responses were downloaded from Qualtrics into spreadsheets for use in Microsoft Excel and SPSS.

Data Analysis Procedures

Data analysis for the exploratory secondary study took place in three different cycles. As a pragmatist, the researcher believes in using the methods that are best suited for the study (Patel, 2015), and as such, has formulated an eclectic coding process that combines different methods for each of three coding cycles: (a) first cycle coding, (b) second cycle coding, and (c) third cycle coding. In the 2021 version of his definitive guide to coding and analyzing qualitative data, Saldaña, stated that “there are many occasions when qualitative data can be appropriately coded using a repertoire of methods simultaneously” (p. 223). He goes on to explain that this eclectic use of data methods is particularly useful for novice qualitative researchers (Saldaña, 2021). For a visual overview of each cycle of the data analysis process, see Figure 14. A more detailed textual description of each cycle is presented below.

Figure 14

Diagram of Data Analysis Procedures



Coding Structure

The data from the primary TLC study were stored in Microsoft Excel spreadsheets which include all responses from one student (including all quantitative answers and all open-ended qualitative responses) in the same row of data. For this reason, the researcher used *cell-by-cell* coding, in which each cell (which contains one student’s response to the question about helpful teaching aspects) made up one data unit. Each cell was labeled and color-coded with a specific color that represented one of the initial codes.

First Cycle Coding: Provisional Coding

For the first cycle of coding, the researcher employed a *provisional coding* method, which utilized a predetermined list of codes as a starting point for the development of a more comprehensive coding structure (Saldaña, 2021). The predetermined, or a priori, codes stemmed from several different sources including literature, prior knowledge, and pilot studies with the data (Saldaña, 2021). One pilot study examined the same “helpful teaching aspects” student responses from all undergraduate grade levels in the original TLC study to determine which helpful course design elements related to the organization of instructors’ courses. The second pilot study included interviews with several undergraduate students (and their instructors) who took the TLC study, to ascertain which organizational course aspects were being used in courses during COVID-19 and which organizational course aspects students found to be most helpful. The results from these two pilot studies helped form the foundation for the a priori codes used in the provisional coding steps which are described in detail below.

Provisional coding, as used in this study, made use of two major steps. First, the researcher assembled a list of a priori codes which emerged as the result of two previous pilot studies and added any additional codes that seemed relevant from the researcher’s previous knowledge and the relevant bodies of literature. Each a priori code was assigned a title and a color. Cells were color-coded in Microsoft Excel to provide the researcher with a way to visually scan the data while also allowing the data to be easily sorted using Excel’s data sorting features. The researcher of this current exploratory secondary study had previously conducted two informal pilot studies with this dataset as part of their work on the primary TLC study research team and in preparation for their qualifying exams. In

both instances of the pilot studies, the researcher examined *all* student responses (including freshmen, sophomores, juniors, and seniors) to the question about helpful teaching aspects, but this study focused in on responses from the COVID freshmen only. Thus, the researcher anticipated the possibility of new or different codes emerging from the data as they focused on a more narrowed subset of the data: responses from the COVID Freshmen.

The second step in the first cycle of the coding process occurred as the researcher read through all the data. During this reading and coding process, the provisional coding method encouraged the researcher to add, delete, modify, revise, and expand the a priori list of codes until they reached saturation, the period where “no new information seems to emerge during coding” (Saldaña, 2021, p. 312). All added codes were assigned a color and corresponding title, and cells continued to be color-coded as the researcher read through the rest of the data. The researcher knew that data saturation had been reached when they were able to complete a coding session (consisting of 10% of responses) without having to add, delete, modify, or revise the list of codes.

The researcher recognized that the wording of the question for which responses are being coded, “Which aspects of the instructor's teaching are most helpful to you? Why?” suggested that there may be more than one aspect of teaching that the COVID Freshmen found helpful. Data were, therefore, multiply coded during the first two coding cycles, where applicable. Additionally, in the third coding cycle (intercoder reliability) the researcher divided the codes into smaller phrases to avoid any potential confusion which could have led to an inaccurate intercoder reliability rate. This procedure is described in detail in the section on third cycle coding. Because each response had the potential to be

coded in multiple ways, the frequency counts used in later steps totaled more than 100% because some data units were coded multiple times.

Once saturation was reached, the third step consisted of the researcher using the new list of codes to go back and re-code any cells which may have been adjusted in light of the revised list of codes. At the end of the re-coding step, all data were coded using the revised codes.

For the fourth step in the provisional first cycle coding process, the researcher used the sorting feature in Excel to sort the data by color. Then, they obtained a frequency count for each code. This frequency count was obtained as a means of providing more information to the researcher, rather than having significance for this study. For this reason, it was not necessary to provide the frequency count which was obtained during the first cycle of coding.

Second Cycle Coding: Code-Mapping

The second coding cycle utilized code-mapping to group the many codes obtained from the first cycle of coding into categories, then finally into themes. The researcher used a sticky note sorting technique to visually organize similar codes (Saldaña, 2021). The list below outlines the steps the researcher used for the code-mapping process:

1. **List Original Codes:** Each first cycle (or original) code was written on an individual sticky note, along with the frequency count for that code, as obtained from coding all data responses.
2. **Original Codes to Categories:** Original codes were grouped by sorting similar sticky notes into categories. A new color of sticky note was used to denote categories.

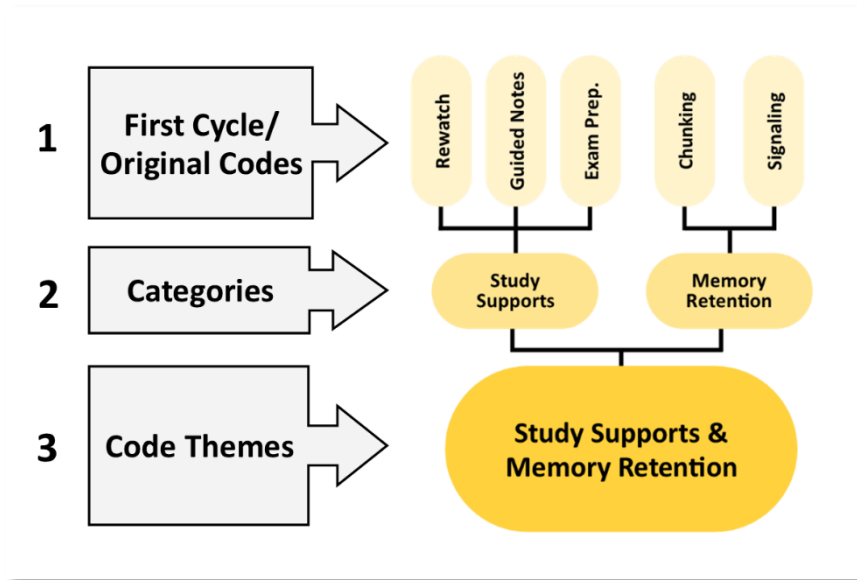
3. Categories to Themes: Group similar categories to establish overarching themes.

These themes became the code themes that served as the basis for the codebook

(see Figure 15).

Figure 15

Example of Code Mapping Process



4. Developing a Codebook. Developing a codebook, also called a coding frame,

“constitutes the analytic instrument with which the raw data is reduced, classified, and synthesized into a more conceptual framework” (O’Connor & Joffe, 2020, p.

2). This codebook, which utilized the code themes, included the following items:

(a) the code name, (b) a description or definition of the code, (c) the inclusion

criteria, which outlines the parameters of the kinds of data that should be assigned

to the code, (d) exclusion criteria, which kinds of comments should *not* be

assigned to the code, and (e) exemplars from the data.

Third Cycle Coding: Intercoder Reliability (ICR)

Before sharing data and the codebook with the second coder, the researcher prepared the data by dividing the original student responses into separate phrases, based on the six code themes which were derived from the first two coding cycles. In the first coding cycle, the researcher added additional columns to the Excel file so that responses which were related to more than one code could be multiply coded. However, this solution, while adequate for the first coding cycle, was somewhat clunky and did not lend itself to the MAXQDA program. MAXQDA is a data analysis tool that helps qualitative and mixed methods researchers manage, organize, and visualize patterns throughout their coding process (MAXQDA, n.d.). So, in order to simplify the multiple coding aspect for MAXQDA, the researcher divided each original student response into phrases. The section below outlines the process the researcher followed for dividing the original student responses into separate phrases.

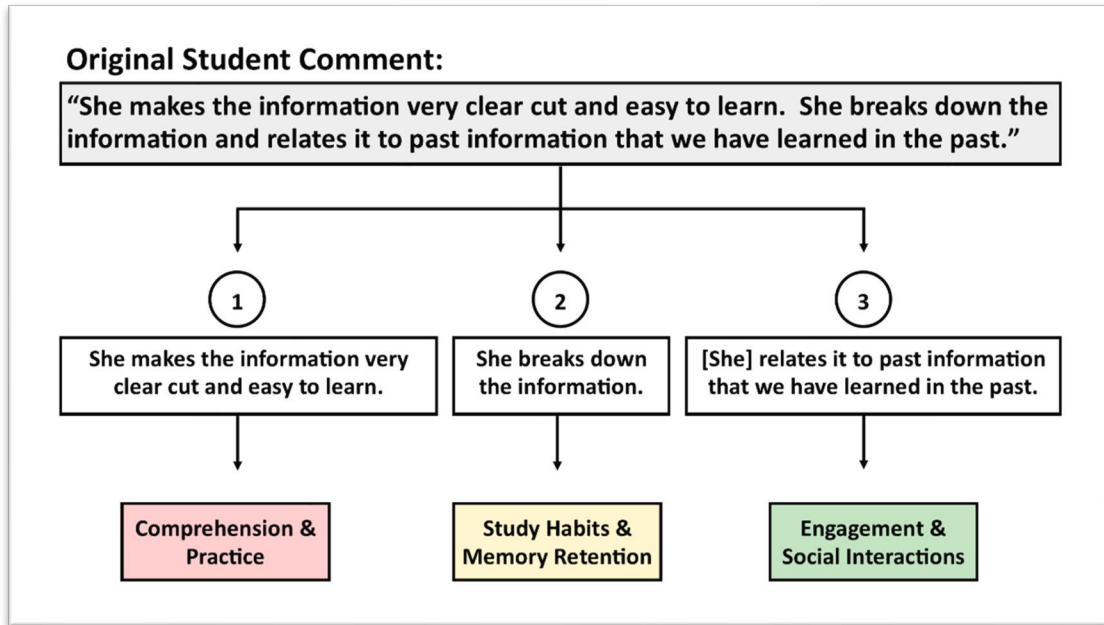
Preparing Data for Second Coder. The researcher examined responses from 1,539 unique COVID Freshmen to the survey question, “Which aspects of your instructor’s teaching were most helpful to you? Why?” These responses were divided into phrases for the purpose of obtaining a more accurate intercoder reliability rate, the response of one student could have included between one and four phrases, each dealing with different code areas. For example, one student responded to the question above, saying, “She makes the information very clear cut and easy to learn. She breaks down the information and relates it to past information that we have learned in the past.” This student response was broken down into three separate phrases: (a) she makes the information very clear cut and easy to learn, (b) she breaks down the information, and (c)

[she] relates it to past information that we have learned in the past (see Figure 16 below).

Each phrase was coded individually, so the number of individual phrases was much greater than the number of student responses.

Figure 16

How One Example Response Was Divided Into Phrases



There was a total of 1,539 student responses from 1,539 unique students. Each of these 1,539 responses included at least one phrase. Of this group, 508 students had responses with at least two different phrases, 105 students had responses with at least three different phrases, and 17 students had responses with four different phrases (see Table 3).

Table 3

Number of Phrases Per Student Response

# of Phrases Per Response	# of Student Responses	% of Total
At least 1 Phrase	1539	71%
At least 2 Phrases	508	23%
At least 3 Phrases	105	5%
4 Phrases	17	1%

Total	2169	100%
-------	------	------

In addition to the fact that many student responses consisted of more than one phrase, 41 of the phrases were assigned two different codes. In MAXQDA, there were a total of 2,210 codes assigned.

Finding a Second Coder. Once the responses were divided into phrases and the codebook was developed (based on the code themes which emerged as a result of the first and second cycle provisional coding processes) the researcher solicited a colleague to serve as a second coder. The researcher asked another member of the original TLC study research team to serve as a second coder.

Intercoder Reliability and Qualitative Research. The use of a second (or multiple) coder(s) is a common practice used to enhance the trustworthiness and validity of qualitative studies (Johnson & Christensen, 2016; O'Connor & Joffe, 2020; Saldaña, 2021). According to Johnson and Christensen, "Intercoder reliability adds to the objectivity of the research, and it reduces errors due to inconsistencies among coders" (p. 1170).

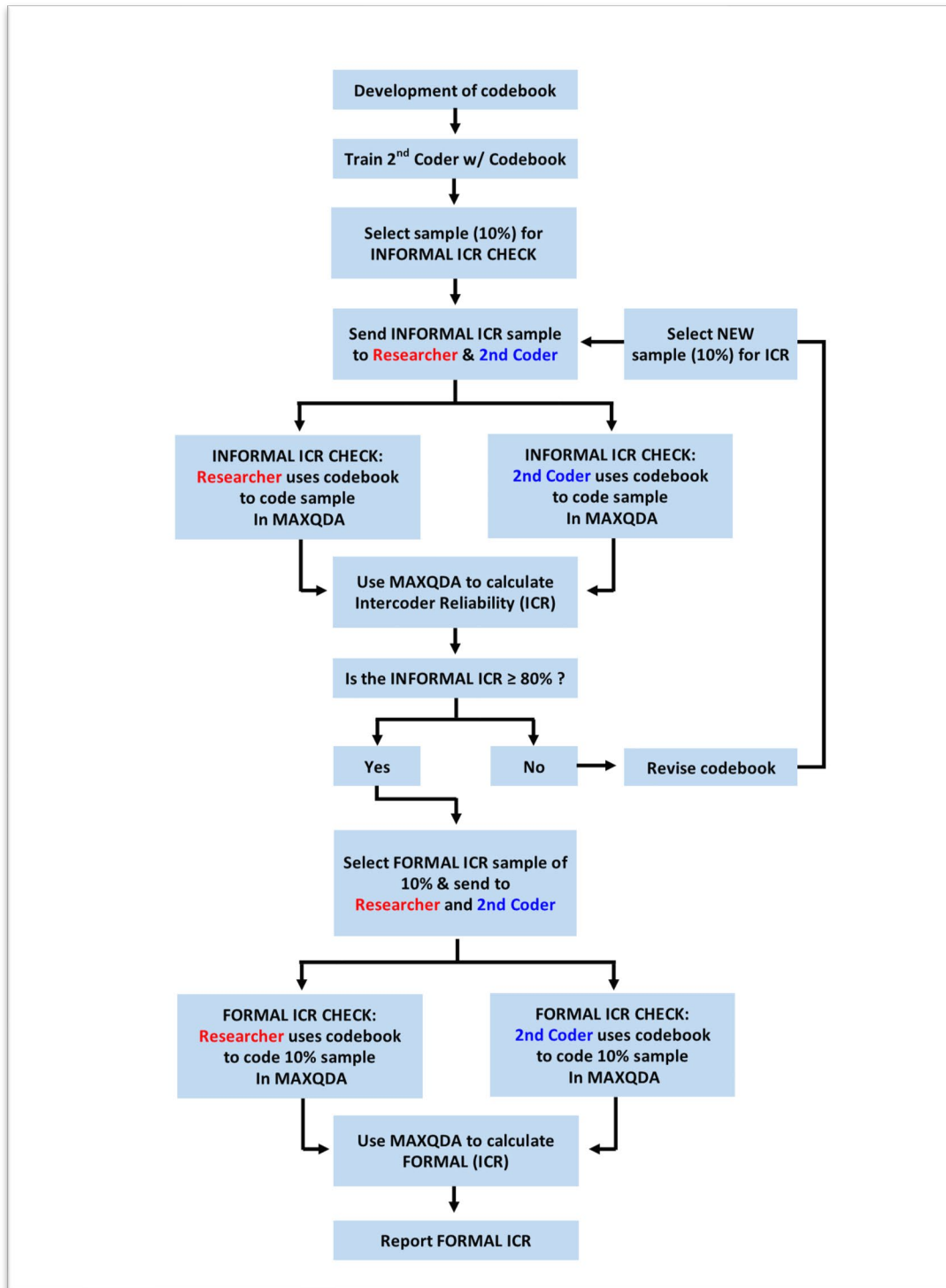
While some scholars object to the use of intercoder reliability measures in qualitative studies because it "essentially contradicts the interpretive agenda of qualitative research" (O'Connor & Joffe, 2020, p. 4), in this study ICR was used because the dialogic and reflexive nature of the ICR process served as a structured way of ensuring that the codes that emerged were not based solely on the researcher's imagination (O'Connor & Joffe, 2020). O'Connor and Joffe (2020) suggest that it is ideal to include ICR as early in the coding process as possible because "coding is the first place where the analysis begins to move beyond the raw data into a more abstract conceptual framework.

Haphazard or inappropriate coding at this stage fundamentally compromises the analysis' claims to offer a faithful and trustworthy characterization of the data" (p. 2). For this reason, the researcher utilized ICR after the second cycle of coding.

The ICR Procedure. The researcher adapted O'Connor and Joffe's (2020) suggested ICR procedure (p.10) and created a new version to align with the data and methods of this study. This step-by-step procedure is depicted visually in Figure 17, followed by a textual description.

Figure 17

Intercoder Reliability (ICR) Procedure for the Current Study



After the researcher developed a codebook and contacted a second coder, the researcher met with the second coder to train them on the use of the codebook. Instead of using data from the COVID Freshmen for coding practice, the researcher used a sample from the Sophomores who also took the same survey. For the coding practice, a random sample of 10% of responses from Sophomores was selected using the RAND() formula in Microsoft Excel (O'Connor & Joffe, 2020). This random sample was uploaded to the MAXQDA program and sent to the researcher and the second coder. This was an informal ICR check where the researcher and second coder individually coded their responses in the program. MAXQDA was used to calculate ICR, with a goal of 80% reliability. If an ICR score of $\geq 80\%$ was not achieved, the codebook was revised and a new sample of 10% of the data was re-coded by the researcher and the 2nd coder. This process of revision and recoding continued until a score of $\geq 80\%$ ICR was achieved. Once an ICR score of $\geq 80\%$ is achieved, the researcher selected the formal ICR sample from the Freshmen's responses, which was comprised of 10% of the total responses (O'Connor & Joffe, 2020).

Final ICR Score. In the formal ICR coding check, the researcher and the 2nd coder individually coded items, in MAXQDA, and a finalized ICR score of 89.5% was obtained. The ICR score of 89.5% represents the accuracy of both coders when coding at the level of the six code themes which will be discussed in Chapter 4.

Examining Sub-Codes. After obtaining the final ICR score, the researcher further examined the six code themes as a means of explaining the contents of each code theme. In exploring each code theme, many common sub-codes emerged. These sub-codes were very similar to the original codes used in the first coding cycle. From this

point forward, the researcher will refer to these as “sub-codes.” The researcher read through the phrases assigned to each of six code themes, one at a time and labeled sub-themes in MAXQDA by adding a comment in the comment section. It should be noted that some of the responses were applicable to more than one sub-theme, so these items were counted twice. This meant that the original number of phrases, 2,169, resulted in a total of 2,541 sub-code phrases. Once the researcher had assigned sub-themes to each response, the data for each code theme was downloaded as an Excel file to obtain a distribution of sub-codes for each code theme.

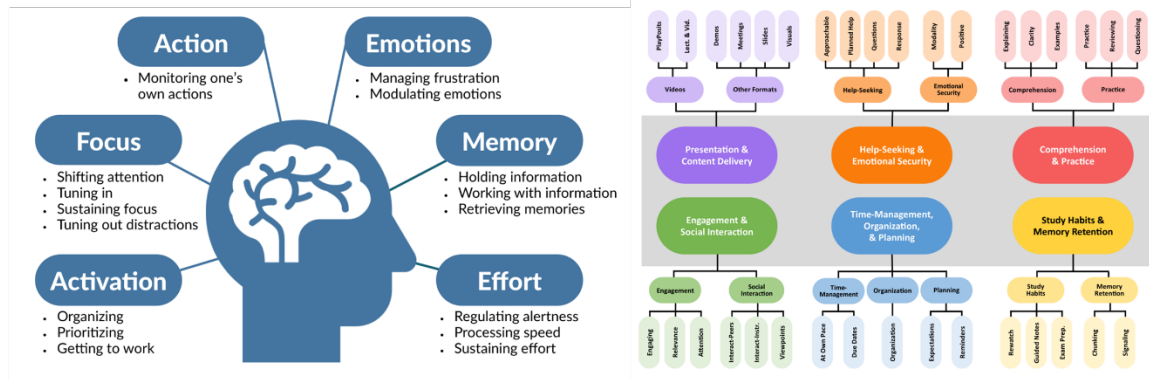
How Relation to EF Was Determined

To answer research question two, “Which course design elements reported by the COVID Freshmen in fall 2020 relate to executive functions?” I followed a four-step process: (a) make an initial pairing of sub-codes to each EF cluster (Brown, 2005), (b) create a diagram showing how each of the EF-related design elements connects to Brown’s (2005) EF model, (c) solicit feedback on the diagram from one EF specialist, and (d) update the diagram based on the EF specialist’s feedback.

To separate out the sub-codes that did and did not relate to EF, the researcher visually compared the Brown (2005) model of EFs with the diagram created for research question one (see Figure 18).

Figure 18

Side-by-side: Brown (2005) Model and Diagram from RQ 1



Each sub-code was compared to the Brown (2005) model to determine if it was related. For example, the original code labeled “relevant to students” aligned with the “focus” cluster in the Brown (2005) model because when content is made relevant to students, it helps them to sustain focus (CAST, 2018). Another original code, “lectures” was deemed as not being related to EF because it did not directly connect with any of the clusters in the Brown (2005) model. Once the researcher went through this comparison process for each of the original codes, they compiled a list of the sub-codes they determined were related to EF and assembled these items into a diagram. Next, the researcher contacted an EF expert and shared the list and diagram to obtain feedback on both. The EF expert and the researcher met via Zoom to discuss any discrepancies and the diagram was modified as needed. You will find a copy of this diagram in Chapter 4.

Positionality Statement

I am a white, middle-class, cisgender, straight, married, female, parent of two teenage daughters who is also an adult with attention-deficit hyperactivity disorder (ADHD): the inattentive variety.

Former Teacher at School for Students with Specific Learning Disabilities

I am a former teacher who taught at a K-8th grade school for students with specific learning disabilities (SLD). This experience opened my eyes to the learning barriers that exist in the education system for students who learn differently and helped to explain many of my own struggles in school. Teaching students with SLD showed me that despite their barriers, students with all manner of learning needs can find academic success when they are provided with support that helps remove these learning barriers.

One teaching framework, Universal Design for Learning (UDL) (CAST, 2018) provides instructors with nine research-based guidelines, based on the three brain networks most involved in the learning process (the affective network, the recognition network, and the strategic network) that instructors can proactively build into their teaching to enhance students' learning.

Teaching students with learning disabilities gave me insight into the small design decisions, most of which are included in the UDL framework (CAST, 2018) that can be *game-changing* for students with a variety of learning needs. I believe that higher education instructors can help proactively reduce learning barriers in their teaching environment by building in support from the beginning.

My research is informed by my own experience teaching students with ADHD and dyslexia, as well as navigating the educational system as a person with ADHD myself. These experiences give me a unique view of teaching and learning from the vantage point of a person for whom the “education system” was not designed. To retain my unique perspective, while also attempting to remain open to what the data will tell me, I used regular memo-writing to keep these potential biases at the forefront of my

mind throughout the coding process. Saldaña (2021) describes the process of memoing as “private and personal written musings before, during, and about the entire enterprise” (Saldaña, 2021, p.58). He goes on to say that the process of reflective memoing as being equally as important as the methods involved in the research itself (Saldaña, 2021). Furthermore, Johnson and Christensen (2017) list reflexivity as one of a list of strategies used to promote research validity in qualitative research.

My Work as a Universal Design Consultant at a University Teaching Center

I work as the Universal Design Consultant for a teaching center at a university in the Southeastern United States where I help postsecondary instructors incorporate proactive design into their courses to support learning for all students. Many postsecondary instructors are thrown into teaching with little to no experience, training, or knowledge of the academic field of teaching and learning, except for their own experience as students. Since college instructors, many with a terminal degree, are typically individuals who have excelled in academic settings, they often approach their own teaching based on what has worked well for them, and students who may learn differently can quickly get lost. Luckily, there are many strategies and elements that instructors can build into their courses to support students with a variety of learning needs. And, these same strategies and elements, which are necessary for some students to succeed, will usually allow *all* students to learn at a higher level. “What is essential for some can be good for all” is a phrase commonly associated with Universal Design for Learning (UDL) and this simple concept of proactive instructional design can often be easily employed in the postsecondary classroom.

In my role as a member of the university's teaching center I regularly participate in hosting mid-semester feedback (MSFB) sessions where I survey a class of students, in the middle of the semester, and provide feedback to their instructor. In addition to serving as the deliverer and analyst for many of these MSFB sessions, I have also done an informal review of multiple years' worth of data collected from MSFB sessions and presented these informal findings at a UDL conference (Pusateri, 2019). Having this level of exposure to students' comments on their instructors' teaching gives me a general idea of the "usual suspects," meaning the items that students commonly point to as being particularly helpful. I used these a priori "usual suspects" as the foundation for my initial codes (Johnson & Christensen, 2017), but added, deleted, or modified codes as they emerged throughout the first cycle provisional coding process. To keep an open mind, I utilized a reflexive memoing practice at the end of each coding session where I engaged in purposeful reflection over what I may have implicitly expected to find compared with what I actually found.

Member of the Research Team for the Primary Study

As a member of the research team for the primary TLC study, I had already read and coded a sample of data from all undergraduates (freshmen, sophomores, juniors, and seniors), so I had a general idea of some of the common themes that may emerge. However, because I am only reading responses from the COVID freshmen, I am anticipating that some new themes may be brought to light, due to the unique experience of the COVID Freshmen. I acknowledge that I may have some preconceptions based on my interactions with the larger body of primary data, so I made a conscious effort to remain as open as possible to what the data told me, rather than what I anticipated the

data might have said. I utilized the memoing process mentioned above to examine my own expectations about the codes emerging from the data.

One thing that is important to note, in relation to my involvement with the primary study, is that I was asked to be a part of this research team after the surveys had been designed and distributed, and data had been collected. Although I have access to all data from my work on this research team, I was especially interested in understanding what things instructors were doing during the COVID-19 pandemic that helped support EF in the COVID Freshmen, so I have selected one open-ended question from the large body of data to examine for this current study.

I have emerged from this study with a list of instructional design elements, including those which helped support the EFs of students, based on the “helpful aspects of instructors’ teaching” recognized by the COVID Freshmen.

Role of the Researcher

In this exploratory secondary study, the researcher’s role was that of *non-participation*. Non-participation, in a qualitative study, occurs when a researcher is separated from the participants, rather than collecting data from participants directly (Sandiford, 2015). Because this current study is utilizing previously collected (or secondary) data, it makes sense that the researcher of this study was separated from the participants in the collection of data. Additionally, as mentioned earlier, although the researcher was a member of the research team for the primary TLC study, she joined the team after data were collected, so she had no interaction with participants.

Summary

This exploratory study utilizes previously collected data to examine which teaching aspects were most helpful to the COVID Freshmen, and which helpful aspects were related to EFs, as they navigated the transition from secondary to postsecondary education amid a global pandemic. Students' open-ended responses from the primary study were analyzed using an eclectic coding process comprised of three coding cycles: (a) first cycle coding, which used provisional coding based on a flexible combination of a priori codes and additional emergent codes to develop a codebook, (b) second cycle coding which used a code-mapping strategy to examine overarching categories and themes in order to create a set of code themes and (3) third cycle coding, which incorporated the use of a second coder to increase the trustworthiness (or validity) of the code themes. These code themes were sorted according to their alignment with the behaviors associated with and governed by EFs, and a diagram was created to highlight the instructional aspects that were most helpful in supporting students' EFs during this tumultuous period in postsecondary education.

CHAPTER 4

Findings and Discussion

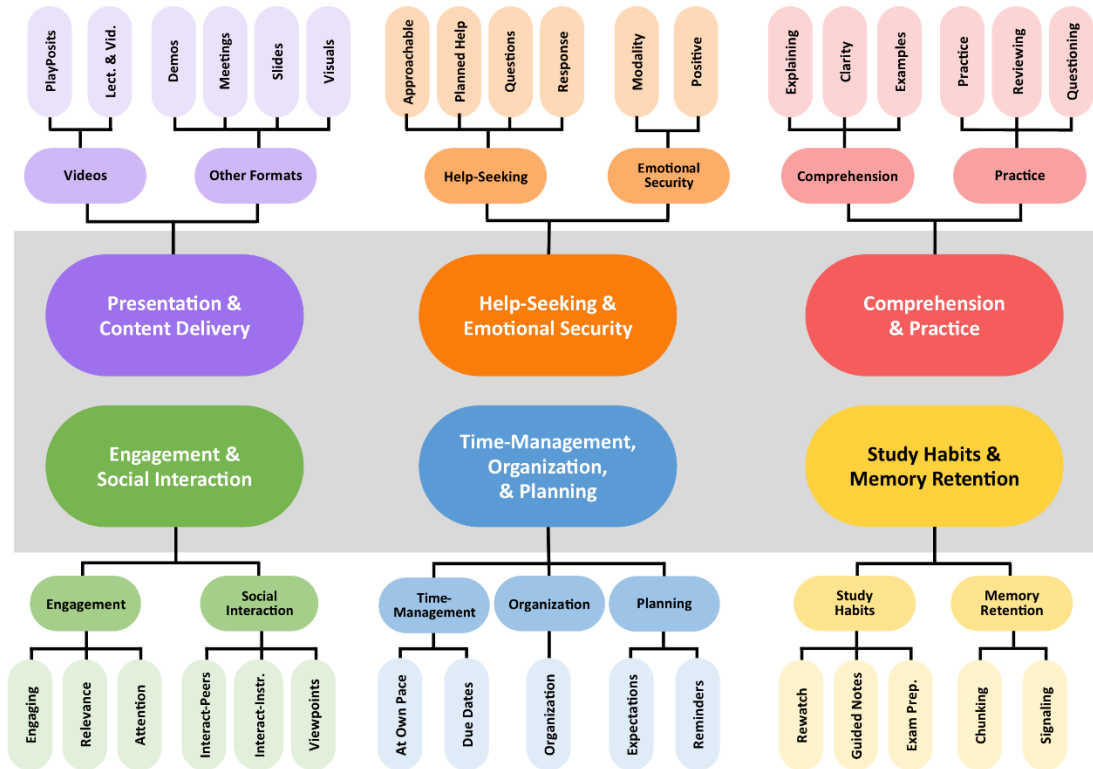
The purpose of this study was to ascertain which course design elements (specifically, course design elements that relate to students' executive functions) the COVID Freshmen reported to be most helpful during a time when they may have been experiencing heightened levels of stress, the fall semester of 2020. This chapter will begin with the findings related to the first research question (RQ1), "Which course design elements did the COVID Freshmen report to be most helpful during the fall semester of 2020?" Next, the findings related to the second question (RQ2) will be presented. The discussion portion of this study, which is also included in this chapter, includes a summary of the findings and connections to current literature.

Course Design Elements the COVID Freshmen Found Helpful

Six code themes emerged through the coding process. These six code themes showed how instructors supported students with: (a) presentation and content delivery, (b) help-seeking and emotional security, (c) comprehension and practice, (d) engagement and social interactions, (e) time-management, organization, and planning, and (f) study habits and memory retention (see Figure 19). Each of the six code themes was grouped according to the student behaviors or skills that were supported by the professor's instructional design choices. For an enlarged version of Figure 19, see Appendix B.

Figure 19

Course Design Elements the COVID Freshen Found Helpful



Presentation and Content Delivery

Presentation and content delivery refers to the ways that instructors presented or delivered new information to students. This code theme includes the many ways that the content was initially transferred from the instructor to the students (lectures, recorded videos, slides, etc.), but does not include items which referred to students practicing, re-watching, or studying content.

One student commented, “Dr. [Name] provides lessons in an easy to follow [sic] format, called "playposits." This format, if used correctly is a highly effective way for students to ensure that they are absorbing material as it is taught (Student 233650).”

Another student mentioned that, for them, delivering content via video and recorded

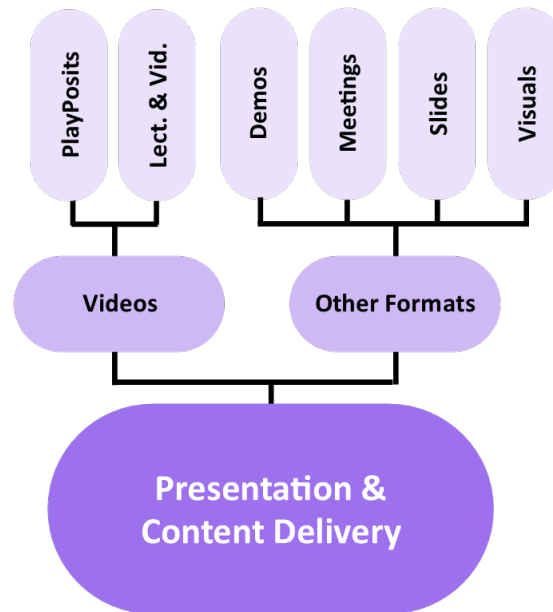
lecture was more effective than reading, “We watch films based on what we are learning and that helps because sometimes reading it doesn’t always make sense (Student 118731).” Student 125224 discussed how helpful tutorials were as they initially learned to use a specific program, “The tutorials she has posted [are helpful] because I am very new to photoshop.”

The *Presentation and Content Delivery* code theme reflected the largest proportion of responses, encompassing 20% of the total response phrases (n=518). This code theme may have had the most student response phrases because during the fall of 2020, the COVID Freshmen were navigating a college-level teaching format (typically lecture-based) in the midst of the chaos created by the COVID-19 pandemic. Obviously, the main part of an instructor’s teaching is the presentation and delivery of content, but to the COVID Freshmen, the formats in which this content was being delivered must have stood out as being especially helpful. Perhaps their main priority during the fall of 2020 was getting every bit of information they possibly could from the presentation and delivery of content, so they pointed to things like videos, visuals, lectures, and slides as being the most helpful aspect of their instructor’s teaching. It is also possible that some of the COVID Freshmen did not find their instructors’ teaching as being very helpful, so their response may have indicated that the *only* thing they found helpful about their instructor’s teaching was that they were delivering content.

Once coded, student responses were further categorized into six different sub-codes: (a) PlayPosit videos, (b) lectures and videos, (c) demonstrations, (d) class meetings, (e) slides, and (f) visual representations of content (see Figure 20).

Figure 20

Code Theme and Sub-Codes for Presentation and Content Delivery



PlayPosit Videos. *PlayPosit* is an interactive video platform that allows instructors to embed quizzes and activities directly into the middle of videos. So, rather than a student simply watching a video, they can interact and check understanding in real time (PlayPosit, n.d.). There are other platforms that can also embed quizzes into a video (e.g., Yuja), so the PlayPosit sub-code refers to any interactive videos with embedded quizzes. These videos are typically used for the initial delivery of content with a built-in check for understanding in the form of an embedded quiz. Many students reported the PlayPosit videos created by their instructor as being helpful during the fall of 2020, including Student 220490 who said, “Playposit. Good way to learn the content,” and Student 138741 who commented, “The playposits really make the information clear.”

Lectures & Videos. *Lectures and Videos* include any reference to the initial watching of (a) a video, regardless of whether that video was created by the instructor or an outside source (e.g., YouTube) that the instructor linked to, (b) any form of lecture,

whether that was delivered in-person or online through Zoom, (c) the initial watching of a pre-recorded lecture video created by the instructor, and (d) any comments that mentioned “videos” but did not provide any additional clarification. Videos and lectures were originally two separate sub-codes, but there was a lot of overlap in student comments which referred to *lectures*, *lecture videos*, pre-recorded lectures (which implies a video), *YouTube videos*, and just *videos*. This overlap is likely due to the online nature of much of the teaching during the pandemic which made many of the instructional activities into video versions. Any lecture or video that referred to the initial delivery of content as belonging to the videos and lectures sub-code. This sub-code did not include comments which referenced the re-watching of, or the potential to re-watch videos, such as *posted videos*, or *uploaded videos* (these were categorized under the *Study Skills and Memory Retention* code theme because they seemed to point more to the ability to re-watch videos rather than to the initial delivery of content via a videos or lectures) or videoed labs (which were categorized under the *Demonstrations* sub-code).

The comments that fell into the videos and lectures sub-code comprised almost half of the total comments in the *Presentation and Content Delivery* code theme. This makes sense considering the shift to a predominantly online modality during the fall of 2020 which meant that a majority of content was initially delivered through videos or video lectures. Some students felt that the video and recorded lecture format helped clarify the content being taught, “The lecture videos help me understand what is going on a lot easier (Student 111293).” Other students felt that recorded lectures and videos offered an experience that was somewhat similar to what they would have experienced in

person, “She makes videos with the material we would see if we were in person (Student 125555).”

Demonstrations. In the context of instruction during the COVID-19 pandemic, a demonstration referred to any instance where an instructor was visually modeling a skill for students. Due to social-distancing restrictions, many disciplines which included a hands-on component found themselves scrambling to find alternative ways for students to receive this content during COVID-19. In many cases, faculty opted to record a video of these hands-on demonstrations which may have included things like videoed labs (which would have previously taken place in a physical lab space), tutorials (which may have previously been presented in an in-person lecture or computer lab setting) and working through practice math problems (which typically took place during live, in-person class meetings). The video labs were separated from the video and lectures sub-code because the most salient aspect was the fact that students still got to experience a lab, the fact that the lab was viewed through a video was secondary to the lab itself. One student echoed this idea by pointing out how helpful it was to be able to watch a video lab during a time of social distancing, “The most helpful aspects are her use of video labs. Since it is not possible for us to be in person, using recordings of the labs is very effective (Student 117656).”

Live Class Meetings. For the purposes of this study, a live class meeting was when (a) students and at least one instructor gathered together in an in-person, online, or hybrid format, (b) at the same time, (c) in order to deliver new content (d) in an environment where students have the opportunity to participate. Watching a recording of a Zoom meeting that happened earlier in the week would not count as a live class meeting

because the student would not have been able to actively participate in a class that met two days before. An asynchronous class meeting would not count either, as the students and instructor were not all online together at the same time. It is also important to note that during the fall of 2020, many instructors did not require attendance at all class meetings to accommodate students who may have had difficulty logging on at a specific time (such as students who may have been sharing one laptop with other family members). So, when students commented that attending class meetings was helpful, they may have also been referring to the fact that they felt they learned better in the live session than if they watched the recorded session after the fact. This category included references to *Zoom*, *Zoom meetings*, and *Zoom calls*, but did not include references that indicated that being in-person was more beneficial than meeting online. Comments that alluded to the benefits of in-person vs. online learning belong in the *Help-Seeking and Emotional Security* code theme because the modality seemed to help some students feel more comfortable in their learning environment.

Many of the COVID Freshmen mentioned that their live class meetings, whether in-person or online via Zoom, were especially helpful during the fall of 2022. Student 116037 stated, “The zoom calls [are helpful] because it [*sic*] actually helps me to pay attention.” Another student shared that, “Having zoom meetings regularly instead of being only online and not holding meetings (Student 113838).”

Slide Presentations. A slide presentation is any digital collection of slides, often called a slide deck, that is projected onto a screen during a lecture. Slide presentations are typically created in a software program or online platform like PowerPoint, Google Slides, Keynote, Presi, etc., and include a combination of text, images, and videos.

Although slide presentations often include images and diagrams, student comments that specifically singled out visuals, diagrams, or images were not included in the slide presentation sub-code, but rather, visuals were included in the visual representations sub-code. Lectures also frequently include slide presentations, so if a response included comments about slides presentations during lectures, these responses would have been split into two separate phrases and coded accordingly. The slide presentation sub-code includes any general mention of slides, including comments stating the program or platform name (PowerPoint, Google Slides, etc.).

Many of the COVID Freshmen mentioned that they found their instructors' slide presentations to be helpful. Some students mentioned that having slides shown on Zoom meetings via the Screen Share feature was beneficial to their learning, "The fact that the PowerPoint is constantly screen shared (Student 118547)." Other students appreciated having the PowerPoint presentations made available to them online, "I like how the powerpoints are available after lectures so we can go back and reference informations [*sic*] for assignments (Student 110436)."

Visual Representations of Content. Visual representations of content (in contrast to text-based, or textual representations of content) include drawings, images, figures, icons, graphic organizers, diagrams, charts, or tables that depict concepts and information in a non-text-based format. Videos and slide presentations were not included in this sub-code, but rather they were included in the video or slide presentations sub-codes. In order to be included in this sub-code, a response had to specifically mention one of the visual components mentioned above, but it is important to note that responses

referring to visual elements within a slide presentation may have been double-coded and counted as both visual representation and a slide presentation.

Several freshmen discussed that they found the different visual representations of information to be helpful in fostering understanding. Student 115034 stated, “She provides lots of...diagrams which is [*sic*] helpful to me as a visual learner.” Another student echoed this idea saying, “I enjoy... visual lessons, I think that a lesson sticks with me better when I can form a picture in my head (Student 113422).” Student 110496 also points to diagrams as being particularly useful, “I like how the teacher condenses our reading in his powerpoints. The diagrams he makes help make the content much easier to understand.”

While the *Presentation and Content Delivery* code theme received the most response phrases from the COVID Freshmen, a close second was the code theme of *Help-Seeking and Emotional Security*.

Help-Seeking and Emotional Security

The *Help-Seeking and Emotional Security* code theme refers to the instructor characteristics and actions that made students feel comfortable asking for help, and the support and flexibility that helped students feel more emotionally secure during the fall of 2020. An instructor who was not supporting help-seeking and emotional security would be one who was unapproachable, who did not hold additional or flexible office hours, one who punished students for missing class meetings, was unapproachable, or one who ignored or belittled students who asked questions.

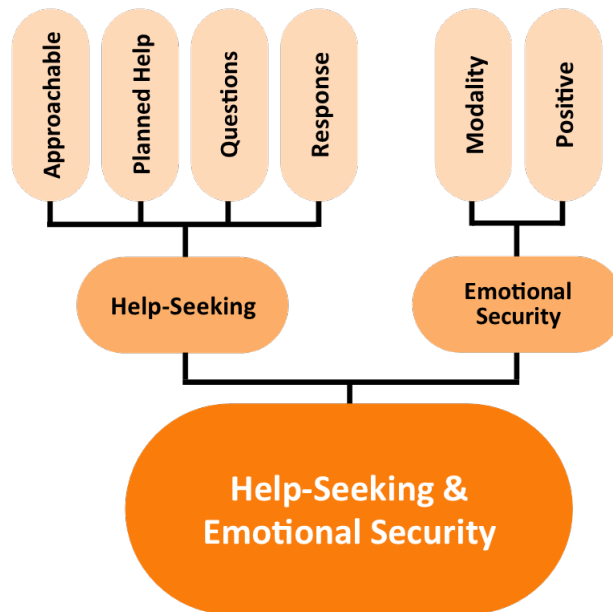
This code theme differs from the *Engagement and Social Interaction* code theme because this code theme refers to activities which took place outside of normal class

meeting time, whereas the “interaction with instructors” part of the *Engagement and Social Interaction* code theme deals with interactions that occurred during class meeting times. *This* code theme is made up of 482 response phrases (19%) that pointed to the ways in which instructors were helping to support how comfortable students felt in their learning environment, with their instructor, and in asking for help.

Once coded, the responses were further categorized into the following sub-codes: (a) the instructor is approachable, (b) planned help, (c) willingness to answer questions, (d) quick response time, (e) course modality, and (f) a positive impression of their instructor (see Figure 21).

Figure 21

Code Theme and Sub-Codes for Help-Seeking and Emotional Security



Instructor is Approachable. In this context, an approachable instructor was one who was down-to-earth, personable, easy to talk to, welcoming, friendly, and relatable. In short, an approachable instructor was someone who made students feel comfortable about

approaching them with questions. The antonym of an approachable instructor would be an instructor who was rigid, forbidding, stand-offish, inflexible, condescending, or pretentious.

Out of all the phrases that were included in the *Help-Seeking and Emotional Security* code theme, about half of the comments pointed to how much more likely students were to ask for help if they felt that their instructor was approachable. One freshman said, “She is very approachable, makes it easier to ask questions (Student 114705).” Other students discussed that it is easier to approach their instructor if they are a little less formal in how they interact with students, “I really like that he's able to be chilled out with the students. It's the worst when a teacher/prof is all serious and can't mess with students sometimes (Student 129351).” Another student's response echoed these comments saying, “She's really cool and down to earth and makes it so that it's really easy to talk to her, whether it's face to face or through email (Student 112106).”

Planned Help. The planned help sub-code refers to the ways in which the instructor proactively planned times, above and beyond the two office hours required by the university, which were specifically designated for students to obtain help. Planned help included additional office hours, optional review sessions, question and answer platforms like Piazza, additional teaching assistant (TA) hours, and open study hours. Many students pointed to virtual office hours (some students referred to these as “student hours”) as being especially helpful, “The fact she knows learning online is difficult for most people so she makes herself readily accessible [*sic*] at all times and even holds 3 days worth [*sic*] of office hours for a run through of problems missed as a group (Student 230332).” Several other students referred to an online platform called Piazza, which touts

itself as a “Q&A platform” where students can ask each other questions, and the instructor can endorse responses or correct misconceptions in real time (Piazza, n.d.), “We use piazza which is a website that allows us to get help from our classmates when we are struggling on any work or if we have any questions about the class (Student 239257).”

At this university, all professors are required to hold two office hours each week, but some students mentioned that the additional office hours their instructor provided were very helpful during this time (during COVID-19) of disrupted and unpredictable scheduling. Having additional office hours seemed to make it easier for students to get help during times that were more aligned with their schedules. One student even shared their appreciation for the instructor providing office hours each day, “Holding the office hours with the professor as well as having plenty of TA student hours. There are possible review hours everyday [*sic*] to make sure it fits in your schedule. These are very nice to join before the exams (Student 135498).”

Willingness to Answer Questions. The willingness to answer questions code theme includes instances where instructors were willing to answer questions, perhaps in places where they had not expected to. This code differs from the planned help code above in that the questions students have referred to here seem to be questions that emerged organically during lectures or other times of direct instruction. This contrasts with planned times, set aside for the purpose of getting more targeted help.

While some may take it for granted that an undergraduate instructor would be willing to answer questions, the opposite is one who might ask students to hold all questions until the end of the lecture, or in some cases, they might become frustrated if

they are interrupted with questions. Students might perceive this as being unwilling, or at least, unenthusiastic about answering questions.

Some of the freshmen appreciated the instructor simply “Taking the time to explain our questions (Student 112215).” Others highlighted how this willingness to ask questions makes the classroom feel safe, “She does not discourage asking questions. This is most helpful because it reminds students our classroom is a safe space to learn and grow (Student 111845).”

Quick Response Time. For the purposes of this study, quick response time refers to the speed with which an instructor responds to texts and emails (most often with answers to students’ questions) and how quickly they return graded work. Answering questions quickly, especially via email, was different than being willing to answer questions because an instructor can be willing to answer students’ questions but might take longer than expected to respond. This sub-code was not used for responses to questions that students ask in class, but rather, it was for responses that occurred outside of regular class time. For students who were confused, lost, or frustrated, a quick email response with answers to their questions could be a lifesaver.

Several freshmen made comments about how helpful it was when instructors were quick to respond to emails during the fall of 2020. One student discussed how helpful it was that “when you have a question she is fast at responding and explaining [*sic*] (Student 124258).” Finally, one freshman equated their instructor’s swift response to the instructor wanting the students to do well in their course, “She is helpful and responds quickly to emails. She really wants us to succeed (Student 128574).”

Course Modality. In this context, course modality referred to the ways that students attended class during the fall of 2020. Some students attended class in-person (meaning they sat in actual campus classrooms during their scheduled class time), some students attended class online synchronously (meaning they logged into virtual class meetings at a certain day and time, through Zoom, a video-conferencing platform), others attended class online asynchronously (meaning they logged into the learning management system and completed class activities and assignments at their own pace), still others met in a hybrid format (meaning they met in-person for some class meetings, and online for other class meetings). This sub-code did not include comments about the benefits of simply attending class meetings, regardless of modality. Those comments were included in the class meetings sub-code within the *Presentation and Content Delivery* code theme.

During the fall of 2022, instructors had the difficult decision of whether to hold courses online-synchronously, online-asynchronously, in-person, or in a hybrid format (Aspegren & Zwickel, 2020). Some students felt very uncomfortable about being in an in-person setting due to the highly contagious nature of COVID-19. Several of these students added comments that pertained to their appreciation for not having to attend in person if they felt uncomfortable, “Allowing us to join via zoom due to covid (Student 110625).” Other students felt that they learned better in an in-person environment, and shared comments like, “My professor offers in person seating for students who work better when they are in the classroom as opposed to virtual learning (Student 224934).” Another group of students appreciated that they had the opportunity to have options for attending class, “Meeting in person once a week to still get the feel of being in a class room [*sic*]even with this virus happening (Student 340397).”

A Positive Impression of the Instructor. Having a positive impression of the instructor meant that students had affirming things to say about their instructor like being good with technology, conducting class well, being knowledgeable about the content, being a good teacher, and giving good advice. This does not include comments about an instructor being nice, kind, patient, personable, or down-to-earth. Those comments were included in the approachable sub-code. While the researcher's inclination was to discard these as being irrelevant, on second thought, it was decided that students having a positive view of their instructor likely increased their feelings of emotional security and comfort in the course.

Some students who reported a positive impression about their professor mentioned their abilities when it came to the use of technology, "They are innovative when it comes to being fully online. They were very determined to get the right technology for us to learn equally in person and virtually (Student 332109)." Other students pointed to the instructor's knowledge of the subject, "She is very knowledgeable on the subject (Student 124170)." Still others pointed to character traits like honesty and fairness, "She is a fair and structured person. This is helpful for me know that everyone is equal (Student 127100)."

The *Help-Seeking and Emotional Security* code theme highlighted the ways instructors helped support how comfortable students felt in their learning environment, with their instructor, and in asking for help, and boasted the second-highest number of student responses. The third highest number of responses pointed to the support that instructors were providing related to helping their students comprehend and practice content.

Comprehension and Practice

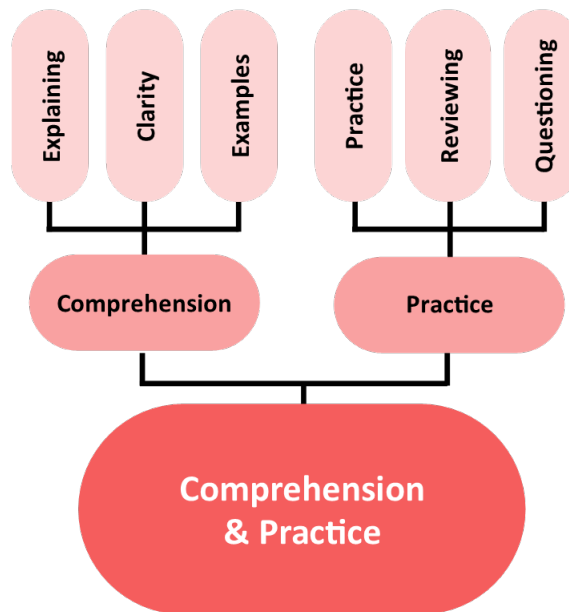
The *Comprehension and Practice* code theme referred to the ways in which instructors helped students understand content and provided them with opportunities to practice with new content. This code theme included how instructors helped explain and clarify content through examples and practice which were led by the instructor but did not include student-led practice or review like studying. Those responses were coded under the *Study Habits and Memory Retention* code theme.

One student commented, “She presents the material in a way that is easy to understand (Student 128227). Another student mentioned, “She is very clear about the material that we are going over in class and she explains how to use everything very thoroughly (Student 126963). Other students shared their appreciation for the multiple attempts on homework provided by their instructor during the pandemic, “Multiple attempts at quizzes/homework helps me to fully understand material because I get a chance to try and correct my mistakes (Student 224475).”

The code theme *Comprehension and Practice* included 437 student responses (17%) related to how instructors were supporting students’ comprehension and practicing of content. After coding, the *Comprehension and Practice* responses were further categorized into the following sub-codes: (a) explaining, (b) clarity, (c) providing examples, (d) opportunities for practice, (e) reviewing, and (f) questioning techniques (see Figure 22).

Figure 22

Code Theme and Sub-Codes for Comprehension and Practice



Explaining Content. For the purposes of this study, this sub-code includes any responses where students refer to the ways their instructors described new concepts. This sub-code does not include the format through which new concepts were presented (e.g., slides, lectures, etc.). Those comments were included in the *Presentation and Content Delivery* code theme. Although one might consider the act of explaining content to students to be an obvious part of an undergraduate instructor’s job, about 40% of the responses from the COVID freshmen mentioned that the way their instructor explained information was most helpful to their learning. The opposite of an instructor who was helpful in the ways they presented content would be a professor who simply presented information without going into detail or explaining how it works or why it is important in that context.

Student 222732 provided reasoning for listing explaining as one of the most helpful aspects of their instructor's teaching, "Instructor does a good job providing in-depth explanations of topics and subtopics rather than just reading off a slide. By explaining or reexplaining topics in other manners, information is more likely to resonate with students including myself." Another student stated, "I still feel as though Dr. [Name] thoroughly explains the course material in ways that make it easy for students to understand (Student 225684)." Finally, Student 123747 commented, "He explains the reading from the night before to make sure everyone understands it."

Clarity. In this context, clarity referred to how students' instructors explained information in ways that were exceedingly clear and easy to understand. While the original code of "clarity" is not unrelated to "explaining" it makes sense that students would highlight the clarity of their professor's instruction. After all, someone can explain something in a way that is not at all clear. It was the clarity in their instructors' teaching that students found to be the most helpful. An antonym for instructor clarity is confusing. In other words, the opposite of a clear instructor would be an instructor who explains content, but their explanations are confusing or unclear.

One freshman said, "She makes the content easy to understand while speaking and breaks the complicated things into simpler terms (Student 123026)." Another student pointed to their instructor's practice of restating information as being helpful in clarifying content, "He very clearly states and re-states each point to ensure comprehension (Student 122159)." Finally, Student 110250 points out that clear information can still be detailed if the instructor is being cognizant of their instructional practices, "Gives very clear, detailed information over the topic being covered."

Providing Examples. In this study, providing examples referred to ways that professors used characteristics, representatives, models, cases, standards, and patterns to elaborate on or further explain information, skills, or concepts. This sub-code did not include responses where students specifically referenced “real-world” or “relatable” examples. These were coded under the *Engagement and Social Interactions* code theme because they were more related to students’ affective (experiential and emotional) connections to material rather than to students understanding and comprehending content.

Many of the COVID Freshmen pointed to their instructors’ use of examples as being useful during the fall of 2020. Some students referred to examples that might be used to demonstrate or elucidate a concept, “She also gives lots of examples which makes it easier to learn (Student 114896).” Other students mentioned that the use of examples aids in memory retention, “Using examples so I can remember the material (Student 133889).” Still, other students referred to examples as in “solving example problems,” “Dr. [Name] helps out with example problems (Student 235861).”

Opportunities for Practice. This sub-code referred to any instructor-provided occasions for students to be able to attempt and work with new information or content. The opposite of an instructor who provided opportunities for practice would be professors who merely delivered content to students without providing any opportunities for them to practice or work with content. This sub-code does not include practice that students carried out on their own like rewatching videos or reviewing slides. Those responses were coded in the *Study Habits and Memory Retention* code theme. For example, student 233650 reported that they appreciated the “Intermittent knowledge checks in the form of questions and polls. The quizzes on sapling will mark your answer

wrong but give your [*sic*] hints and advice to check your knowledge and correct your answers as you progress.”

Freshmen during the fall of 2020 found that opportunities for practicing and working with the content helped solidify their learning. Student 237415 said, “I like that she gives us...practice work for the things we are learning. We are able to practice and apply what we learn in lectures and are better prepared for tests.” Student 116420 appreciated the feedback from practice activities, “Assignments/Practice Quizzes that give us feedback instead of just saying that something is right or wrong with no explanation why.”

Reviewing Content. In this context, reviewing content referred to instructor-provided opportunities to reexamine or go over previously learned content. Reviewing content differed from practicing content in that reviewing is simply a repeat of information rather than an opportunity to interact with the content which would be included in the *opportunities for practice* category.

Several students indicated that the review opportunities provided by their instructor were helpful in learning and remembering content. Student 112735 said, “My instructor always goes over the material we read for class and it helps me to revisit material I have already read and learn more from it.” Other students appreciated their instructors repeating and clarifying content students learned on their own, “I find it really helpful that the in person [*sic*] meetings are review sessions on the material we learned on our own, virtually. This has helped solidify the information (Student 116131).”

Questioning Techniques. For the purposes of this study, questioning techniques refer to the ways in which instructors ask students questions as a way of expanding or

reinforcing students' understanding of content. This sub-code is not related to instructors being willing to answer questions. Those responses would be included in the *Help-Seeking and Emotional Security* code theme. The questioning techniques sub-code is about instructors asking students questions.

According to the COVID Freshmen, one of the more beneficial practice methods utilized by their instructors was strategies for questioning students. Student 110981 said, "He poses questions all the time, and that is a good way to learn, especially considering active-recall learning." Another student talks about when their instructor asks a question, "...if you answer slightly wrong he really dives into the topic and helps you understand the meaning of what he's asking (Student 115466)." Other instructors used technology tools to support their questioning techniques, "I also love how this professor uses virtual polls for the students to answer the clicker questions because they're submitted anonymously (Student 117206)."

Engagement and Social Interaction

The *Engagement and Social Interaction* code theme was made up of 379 student responses related to intentionally engaging instruction, making content relevant to students, materials and activities that support attention and focus, interacting with peers, interacting with their instructor, and the opportunity to share and hear viewpoints. This code theme made up 15% of the total student responses.

Students may have chosen to include responses that related to this code theme for many different reasons, but one of the more salient reasons has to do with the environment in which students found themselves during the fall of 2020. During the fall semester of 2020, many students opted to stay at home with their families, taking classes

online remotely. Other students moved to on-campus or off-campus housing, taking some classes online and some classes in person. Regardless of their location, the COVID freshmen found themselves in front of a screen for most of their waking hours. The amount of time spent in Zoom meetings led to a phenomenon called “Zoom fatigue” which led to increased exhaustion, thus making it more difficult to focus (Shoshan & Wehrt, 2022). Therefore, attempts instructors made to hold students’ attention was appreciated, “My instructor is great at keeping students’ attention throughout class (Student 126091).”

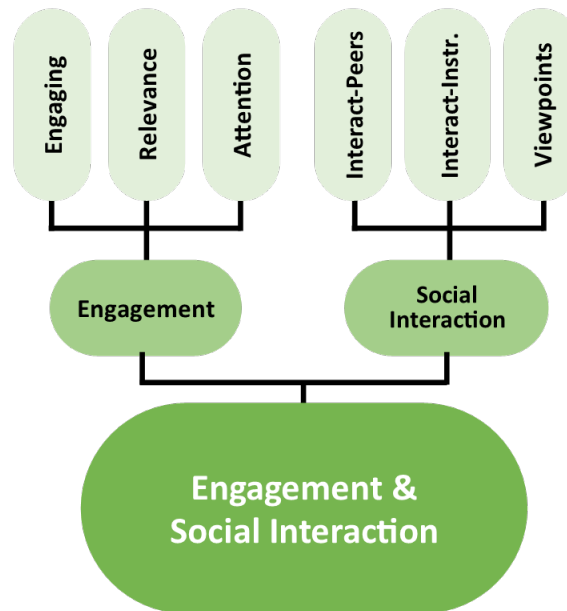
Additionally, the constant notifications from email and social media and the fact that students may have been learning in environments that were not conducive to learning, may have made it difficult to get and stay focused on academic work. Other students pointed to the opportunities for interacting with peers and instructors as being especially helpful during the fall of 2020. One student shared that “Zoom breakout meetings allow us to connect with other students (Student 224706).” Social interaction was likely front of mind for the COVID Freshmen as many students were asked to remain isolated in their dorms or homes due to the social distancing guidelines recommended by health organizations during the pandemic (World Health Organization, n.d.).

The *Engagement and Social Interaction* code theme represented 15% of student responses, making this the code theme with the fourth highest number of responses. After coding, the *Engagement and Social Interaction* responses were further separated into sub-codes: (a) engaging instructional practices, (b) relevance to students’ interests, (c)

attention and focus, (d) interacting with peers, (e) interacting with the instructor, and (f) sharing viewpoints (see Figure 23).

Figure 23

Code Theme and Sub-Codes for Engagement and Social Interaction



Engaging Instructional Practices. In this context, engaging instructional practices refers to ways that instructors intentionally made efforts to increase students’ engagement. Engaging instructional practices are activities, materials, strategies, and methods that intentionally increase students’ engagement in the act of teaching. An engaged student is one who is paying attention, thinking about, or actively doing work that is related to the content being taught.

Some students talked about their instructors’ enthusiasm for the content as being especially engaging, “They are excited to teach students which helps to get excited about the course content and learning information (Student 111815).” Other students simply

shared their appreciation for the thought, preparation, and energy that their instructor proactively built into their lectures, “Professor’s [Name]’s energy and effort that he puts into his presentations. He eliminates the boredom that comes with most online lectures (Student 114511).”

Relevance to Students’ Interests. Relevance to students’ interests, in this context, referred to connections to something the students were familiar with. In other words, instructors were being intentional about tying content to things to which students could easily relate. Students expressly used terms like “real-world examples,” “relatable to students,” and “real life ideas” to explain how these personal, affective connections were helpful to their learning.

Many of the COVID Freshmen made it a point to share how beneficial it was when their instructors helped them connect the content to things that were relevant to their interests. One freshman stated, “If I can relate or remember a concept by connecting it to my real life I have a better chance of learning and understanding the information (Student 115871).” Another student recognized that these personal connections helped to bridge some of their learning gaps, “Examples or scenarios that relate to us at this stage in our lives. It makes it easier for me to understand complex concepts and why they are important/relevant to me (Student 226300).”

Attention and Focus. Attention and focus referred to students being able to tune out distractions, and tune into their academic work. Comments included phrases like “pay attention” and “stay focused.” Some of the COVID Freshmen recognized that they were having difficulty with paying attention and focusing on classwork, so their comments centered on ways that their instructors were helping them with focus and attention, like

one student who said, “She makes the class very interactive. [It] helps people like me with a limited attention span pay attention and stay engaged (Student 112059).” Other students mentioned specific instructional design choices that helped with engagement like this student who said, “The way he engages us by using comical videos. If he didn’t have me engaged I wouldn’t pay attention (Student 114286).”

Interaction with Peers. Interaction with peers referred to students talking to or working directly with other students in any format including in-person discussions, discussions online, Zoom chat boxes, and Zoom breakout rooms. The social distancing and isolation that most COVID Freshmen encountered during the fall of 2020 may have made them more aware of opportunities to interact with their peers. In fact, many students pointed to the ways their instructors set up opportunities for interaction with peers as being especially helpful.

One student connected interaction with their peers to engagement, “Going into break out rooms and making us converse because it makes it more interesting (Student 118066).” Another freshman talked about how working with peers helped support their comprehension, “I also find the team aspect go [*sic*] the class helpful because it a concepts-based class and this way we can bounce ideas off each other to gain a better understanding (Student 118755).” Finally, one freshman hinted at their lack of opportunities to meet other people during this isolated period of COVID when they said the most helpful aspect was, “the interaction, helps me meet people (Student 336913).”

Interaction with the Instructor. Interaction with the instructor referred to students communicating individually, or in small groups, with their instructor during class. This could be in any format including in-person discussions, discussions online,

and Zoom chat boxes. This sub-code does not include interactions outside of class like office hours, nor does it include interactions through email or asking questions. Those kinds of comments would be included in the *Help-Seeking and Emotional Security* code theme.

Some of the COVID Freshmen also pointed out that they appreciated opportunities to interact with their instructor during the fall of 2020. One student simply stated, “I enjoy being able to go to class and have interaction with my professor (Student 220536).” Other students pointed to creative ways that instructors were interacting with students in the online learning space by utilizing tech tools like the Zoom chat box, “I like that he lets us put our thoughts in the chat so that we don’t have to disrupt the lecture to add to an idea or ask a question (Student 112651).”

Sharing and Hearing Viewpoints. In this context, sharing and hearing viewpoints referred to students communicating their opinions, views, and beliefs with their classmates in both an in-person and an online setting. This sub-code differs from the interactions with peers sub-code in that the sharing of viewpoints seemed to take place in a large group (whole class) setting rather than in an interpersonal, one-on-one setting.

A number of response phrases mentioned that Freshmen found it helpful when their instructor provided opportunities for students to both share their own viewpoints as well as learn from hearing the viewpoints of others. For example, one student mentioned that they enjoyed “hearing all the opinions that students have to offer since facilitating healthy discussions in this class is critical to the operation and success of the course (Student 119255).” Another student referred to the Canvas discussion board posts as being helpful, “I actually think the discussion posts are very helpful because it allows us

to get other points of view on the material we're learning and maybe see a different perspective from usual (Student 117451).”

The supports that instructors provided to help students with engagement and social interaction helped keep students interested and on-task, but many students also pointed to supports instructors provided that were related to time-management, organization, and planning.

Time-Management, Organization, and Planning

The *Time-Management, Organization, and Planning* code theme referred to ways instructors helped students remember when assignments were due, plan ahead, easily navigate the learning management system (LMS), find materials, and monitor their progress through clear instructions and expectations. This code theme was made up of 322 student responses, comprising 13% of the total student responses. While this code theme included planning ahead for study time, it did not include the actual act of studying. All comments related to studying were included in the *Study Habits and Memory Retention* code theme.

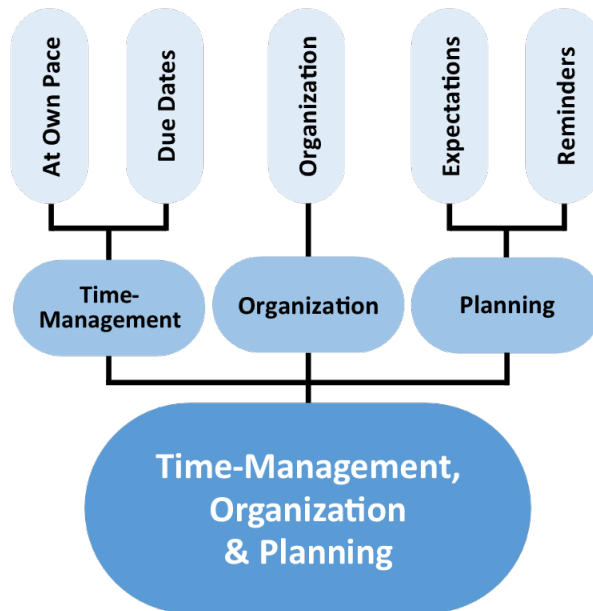
Previous research has shown that online learning, while equally as effective as in-person learning, requires that students have well-developed skills of time-management, organization, and planning (Harel-Gadassi, 2022), three behaviors commonly associated with executive functioning. It makes sense that if the COVID Freshmen were struggling with EFs during this time of stress overload, they would find it very helpful if their instructors were doing things like sending weekly reminders, maintaining a well-organized LMS course, and providing clear expectations and instructions. One student stated that the most helpful aspect of their instructor's teaching was “How organized she

is in canvas. I can clearly see under modules when everything is due and the correct order to be working on things (Student 110074).” Another student reported, “That she gives us multiple reminders while this class is online so we don’t forget to do things (Student 115538).”

The *Time-Management, Organization, and Planning* code theme was derived from 322 student responses (13%) related to the ways in which professors’ instructional design choices supported how students managed their time, organized their materials, and made plans to meet their goals. After coding, responses were further categorized into the following sub-themes: (a) working at one’s own pace, (b) clear due dates (c) course and LMS organization, (d) expectations, and (e) reminders (see Figure 24).

Figure 24

Code Theme and Sub-Codes for Time Management, Organization, and Planning



Working at One’s Own Pace. In this context, working at one’s own pace referred to students being able to access materials and complete assignments in a way that

made the most sense for their schedules. In many cases, this meant that students did not have to attend class at a certain time or day of the week, but rather, the lecture videos and materials were posted online so students could access them at all times of the day. In other words, a student who was at home with their family during the fall semester of 2020 might have to share a computer with their younger siblings during the day, so for this student, being able to watch their lecture videos in the evenings allowed them a great deal of flexibility to work at their own pace and in their own time frame.

The COVID Freshmen indicated that one of the most helpful aspects of their instructor's teaching in relation to time-management, organization, and planning was the fact that they had the ability to work through the course content at their own pace. One student indicated that working at their own pace made it easier to balance the workload between multiple classes, "I can work at my own pace. I have other classes to attend to and with that option it makes this class easier (Student 119074)." Another freshman alluded to the autonomy experienced in a course where students can work at their own pace, "I can go at my own pace; pausing and reflecting on anything I need to and quickly going past subjects I believe I'm proficient enough in (Student 116844)." While the flexibility of working at one's own pace was reported to be useful to some of the COVID Freshmen, others shared about how helpful it was when their instructors were very clear about the due dates of course activities and assignments.

Clear Due Dates. Clear due dates referred to how instructors entered the dates that assignments were required to be submitted in the LMS so students could see when they needed to turn in assignments for all their classes on their Canvas (LMS) calendar and in the Canvas "to-do list" and also, how instructors strategically spread due dates out

across the week, or stayed consistent with due dates (e.g., always having the same kinds of assignments due on the same day each week) across the semester. This sub-code differs from reminders in that clear due dates had to do more with the distribution, consistency, and display of due dates, whereas the reminders sub-code is more closely related to additional actions instructors took to send out reminder emails and announcements weekly.

Several freshmen mentioned that having clear, consistent due dates was helpful for supporting their time management. One student pointed out the benefits of having an instructor who spaced out the due dates so they did not all fall on one day of the week, “Due dates throughout the week. The due dates are helpful because not everything is crammed into one day and things are spread-out (Student 111862).” Other students pointed out how they appreciated their instructor having consistent due dates for assignments from week to week, “Same scheduled assignments each weeks [*sic*] helps me plan when to complete (Student 129048).”

Organization. Organization, in this context, referred mainly to the arrangement of an instructor’s Canvas (LMS) course shell through the use of modules, the fact that all necessary materials were provided in one location, and that the LMS course was easy to navigate, and students could find what they were looking for quickly and efficiently.

Some freshmen compared their instructor’s course to other, less organized, courses they were also taking in the fall of 2022, “Everything is organized and accessible. Some of my other classes are not as organized and it makes it harder to get things done effectively (Student 127986).” One international student shared how helpful it is to have an instructor who has a well-organized course, “She looks organize [*sic*] and that helps

me a lot because I am an international student, so I am little bit lost (Student 116157).”

Another freshman mentioned the importance of easy navigability, “It's easy to find course material and assignments in Canvas for this class. Some of my other classes are very inconsistent, and it's hard to find assignments and required materials. So I enjoy that this class is easy to navigate (Student 121954).”

Expectations. Providing clear expectations for students, referred to how instructors were transparent in the design of their assignments with clarity of instructions at the forefront. Clarity, in the context of instructions and expectations for assignments, is different than clarity in the context of explaining content. Clarity, related to explaining content, was included in the *Comprehension and Practice* code theme.

One freshman’s comment alluded to the idea that when instructors make their expectations clear, students are able to avoid many pitfalls and mistakes, “Explicit details in the instructions. This results in almost no mistakes (Student 115745).” Another student’s comment suggested that clear expectations allow students to perform at a higher level, “My instructor clearly lays out what she expects out of each assignment. This is helpful because it eliminates confusion and allows us to know exactly what we need to do to best complete everything she gives us (Student 112114).”

Reminders. For the purposes of this study, reminders referred to any additional action instructors took to prompt students on upcoming assignments or due dates. These reminders were most often sent in the form of emails or Canvas (LMS) announcements, like the comment from Student 114948, “She’s always in communication with students and makes sure we’re aware of our assignments and due dates. In a time of online

learning this is especially helpful to students and I'm beyond grateful for her communication and organization.”

Some instructors also chose to add a “what’s coming up” slide to their slide deck at the beginning or end of their lectures to remind students of quickly approaching due dates. Other instructors were providing regular reminders in the form of a weekly to-do list, organized by day, “[The instructor] provides a day-by-day suggested schedule to keep students on track. EXTREMELY helpful since navigating different online platforms for six classes makes my schedule very difficult to keep track of (Student 117810).”

In addition to these supports for time-management, organization and planning, many students pointed to supports their instructors provided for study habits and memory retention.

Study Habits and Memory Retention

Study habits and memory retention referred to the ways in which instructors were supporting the development of the skills needed to process information, organize information for efficient recall (in situations like exams), and store information in long-term memory through scaffolded note-taking strategies (e.g., guided notes), materials provided for review (e.g., videos to rewatch), materials provided for exam preparation (e.g., study guides), and the intentional structuring of content in ways that make it easier to remember information (e.g., chunking). This code theme differs from the “practice” and “review” parts of the *Comprehension and Practice* code theme because this code theme includes active practice and review activities that students carried out on their own, whereas the *Comprehension and Practice* responses related to “practice” and “review”

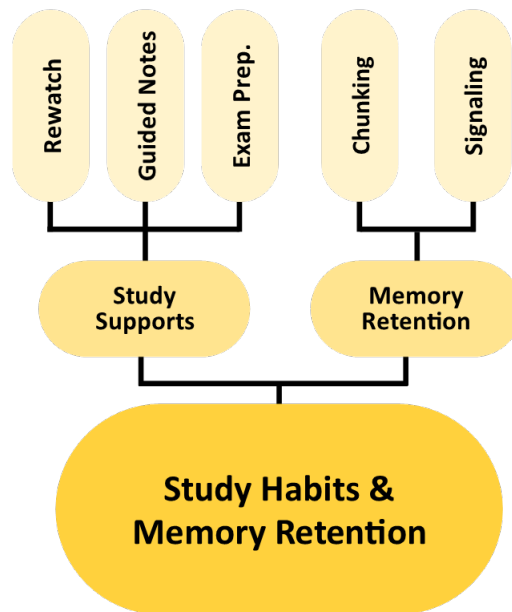
are those which were led by instructors. The *Study Habits and Memory Retention* code theme was made up of 313 responses which represents 12% of the total responses.

Like some of the other code themes, it is likely that students mentioned supports for study habits and memory retention because they were struggling with so many other areas of the teaching and learning process that anything instructors provided to reduce cognitive load, including guided notes, rewatching videos, and signaling key ideas, was viewed as helpful to their learning. One student commented, “My instructor creates note packets that I can print out, which makes note taking 100 times easier and less confusing (Student 123561).” Additionally, most of the sub-codes in this code theme helped students determine which information is the most important, and which information was less important. For example, Student 120889 pointed out how guided notes helped with knowing what information is most important, “...guided notes so the concepts are easy to follow and students know exactly what to write.” This ability to differentiate between more and less important information is difficult for novice learners in a field because they do not yet have the schema (mental constructs) in place to help determine a hierarchical understanding of the concepts (Knapp & D’Avanzo, 2010).

Once coded, the responses were further categorized into sub-codes: (a) the ability to rewatch videos, (b) guided notes, (c) resources for exam preparation, (d) chunking information, and (e) signaling (see Figure 25).

Figure 25

Code Theme and Sub-Codes for Study Habits and Memory Retention



Rewatching Videos. The act of rewatching videos included any recorded video which was posted online for students to access throughout the duration of the course. This did not include the first time students watched videos, also referred to as the initial transfer of content via video. Responses related to the initial watching of lecture videos, YouTube videos, PlayPosit videos, or just videos were included in the *Presentation and Content Delivery* code theme. The rewatching videos sub-code included any instances where students returned to a video to watch it again.

Approximately one-third (1/3) of the student responses in the *Study Habits and Memory Retention* code theme pertained to the instructor making recorded videos and lectures available on the learning management system (LMS), Canvas, so students could rewatch them multiple times. Several students mentioned that they liked the fact that they could pause lectures to take notes, something that would be impossible in a live lecture

setting, “I can pause and go at my own pace in the recorded lectures (Student 119226).” Other students commented that they like having the recorded lectures available so they can re-watch them to improve their understanding, “She leaves them on canvas to access them if we need them at a later date as well. This helps me because I can go back and go over material from the videos or PowerPoints if I need to reteach myself something (Student 118901).”

Guided Notes. The term “guided notes” included any outlines, partially-completed notes, graphic organizers, or note-taking supports that the instructor provided to help students take more efficient notes. This sub-code did not include graphic organizers used in the delivery of content. These would be included in the *Presentation and Content Delivery* code theme as they dealt with how content was delivered to students through visual representations.

Note-taking seemed to be an area of concern for the COVID Freshmen, as many included comments about how helpful they found their instructor’s guided notes. One student mentioned that the guided notes may actually aid in memory retention, “Note taking handouts help me retain information better (Student 115387)!” Another student posited that guided notes help the students visually see the overall structure and hierarchy of the lecture, “[The instructor] gives us a guide sheet to base our notes off so we are sure to get the most important parts of the lecture (Student 126341).”

Resources for Exam Preparation. Resources for exam preparation referred to any additional materials provided by instructors which helped students narrow down or focus in on content that may or may not appear on an upcoming exam. Responses included references to study guides, practice quizzes, and practice essay questions. For

example, Student 111979 explained how they appreciated that their instructor “gives us study guide[s] to use for preparing for the exams.” Many of the COVID Freshmen shared how much they appreciated the resources their instructors provided for preparing for exams. Some students referred to the benefits they derived from practice quizzes, “The practice quizzes help me with studying for exams (Student 122291).” Other students pointed to the instructor clarifying what kinds of items might be on upcoming exams as being helpful, “I like the way she clearly tells us what to study and how to do it (Student 125767).”

Chunking Content. The term “chunking” referred to the act of breaking larger items (videos, lectures, assignments, papers, etc.) or information into smaller pieces, or chunks, to make them more manageable for students. Several freshmen indicated that they appreciated how their instructors chunked some of the content to make learning more efficient, “The discussions help to break down the information from the books and lectures and make them more digestible (Student 116111).” Other freshmen mentioned that chunking videos helped them manage their time better, “The videos are shorter, which helps me manage my time better than one really long video where I doze off (Student 222922).”

Signaling Key Points. In this context, the term signaling meant that the instructor was clearly pointing out, or signaling, which concepts were most important. Signaling could be in the form of key takeaways, main points, summaries, or in simply stating that a particular fact or skill was very important. One student said, “The in-depth explanations of important topics during lecture is very helpful for me. It reiterates the main points of

the course and why it is important (Student 119174).” Another student stated that “during class she goes over key points (Student 114832).”

While most of the COVID Freshmen who took the original survey provided responses that fit into the six aforementioned categories, there were some students whose responses were either unclear, irrelevant, or provided negative (non-helpful) responses. These were labeled as N/A.

Not Applicable, Negative, and Unclear

The Not Applicable, Negative, and Unclear code theme referred to comments that did not actually answer the question, “Which aspects of your instructor’s teaching are most helpful to you? Why?” but rather, they provided answers that were not applicable, negative, or unclear. In fact, some students used this open-ended response to share their frustration rather than answering the question.

Not Applicable. Many students simply answered by saying “N/A,” or “none,” or “IDK (I don’t know).” These comments were coded as not applicable because the students didn’t seem to have an answer that applied, so they just may have just typed N/A or none as a filler. In fact, some students used this open-ended response to share their frustration rather than answering the question.

Negative. Negative responses may have referred to one of the six code themes, but instead of sharing what was helpful, the student shared what was not helpful. For example, Student 117660 commented, “To be honest though we do not do much during instructional time.” Another student had a more direct, negative comment, “This instructor is not very organized online, though. She is not consistent with assignment

names, is not clear about what is expected of students, and relies on Piazza for every question (Student 238457).

Unclear. Other students added comments that did not provide enough information for their response to be coded. For instance, Student 110225 answered, “The topics covered.” Student 113912 simply said, “talking.” Does this comment mean “talking” in terms of interacting with their peers? Or with their instructor? Or maybe, this refers to “talking” in response to their professor’s questioning techniques? Because there was not enough information to accurately code student 113912’s comment into one of the six code themes, this particular comment, and others like it, were coded in the N/A category as being unclear.

The previous sections talked about the findings related to each of the six code themes and the N/A category, and the next section will discuss all the findings from research question one.

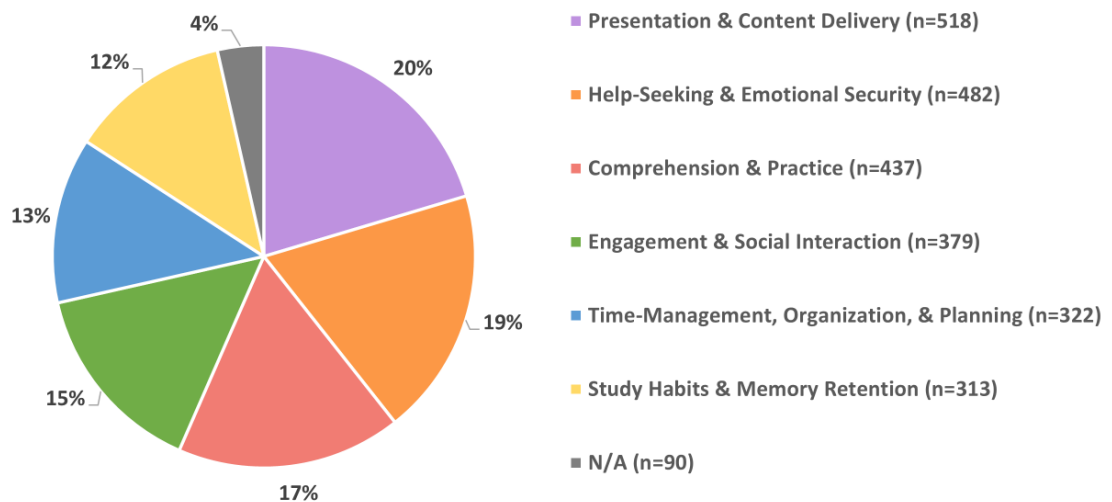
Distribution of the Student Responses by Code Theme

The *Presentation and Content Delivery* code theme included the largest number of phrases, 518, which represented 20% of the total student responses. The code theme which had the next largest number of phrases was the *Help-Seeking and Emotional Security* code theme which included 482 phrases (19%). The *Comprehension and Practice* code theme was made up of 437 phrases, representing 17% of the total responses. The next largest code theme was *Engagement and Social Interaction*, which was made up of 379 phrases, accounting for 15% of the total phrases. *Time-Management, Organization, and Planning* accounted for 322 phrases (13%) and *Study Habits and Memory Retention* had 313 phrases (12%). Ninety (90) of the phrases (4%) were either

negative, irrelevant, or unclear, so they were coded as N/A. The chart in Figure 26 shows the distribution of the phrases by code theme.

Figure 26

Distribution of Student Phrases by Course Design Elements the COVID Freshmen Found Helpful



It is interesting to note that the six code themes had a similar distribution to one another. In other words, no one code theme dominated the student responses. Each of the six code themes was represented somewhat equally. This idea reinforces one of the main tenets of Universal Design for Learning (UDL), which states that variability is the rule, not the exception (Novak, 2022). While some of the COVID Freshmen needed help with comprehension and practice, others may have needed help with time-management, organization, and planning, and still others may have needed help with engagement and social interaction. The findings from this study suggest that the COVID Freshmen may have needed help with nearly all aspects of the teaching and learning process during the COVID-19 pandemic.

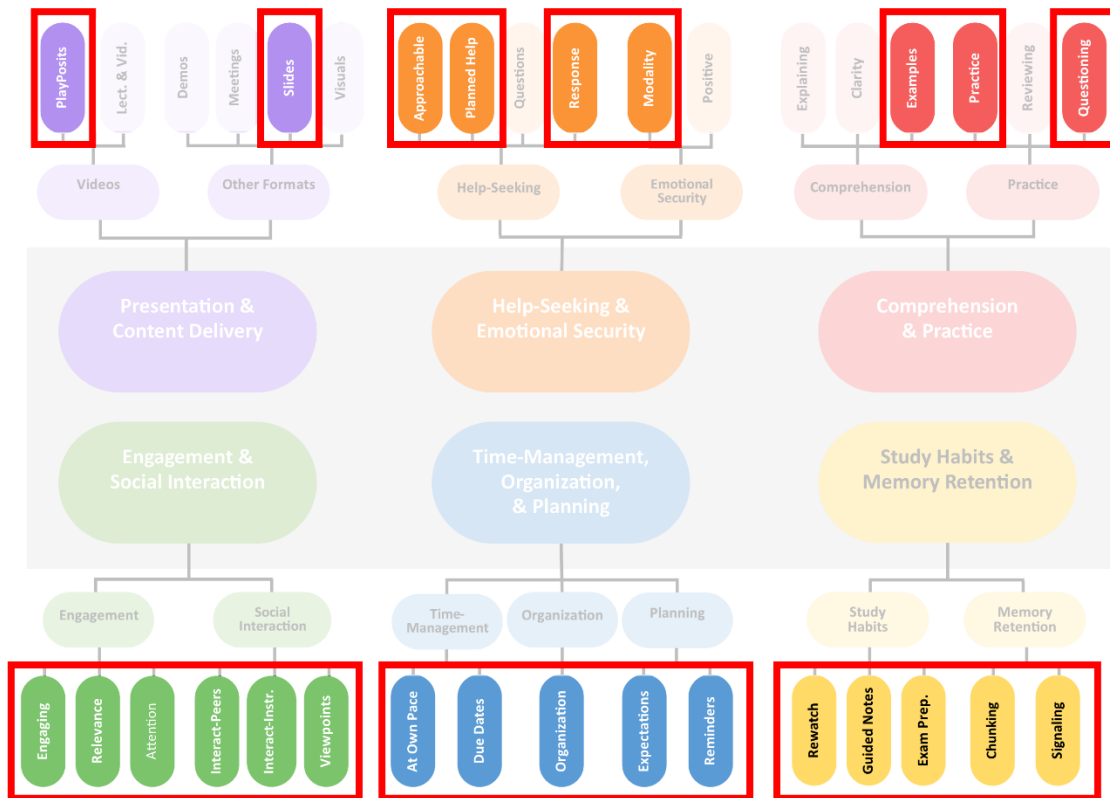
Helpful Course Design Elements Related to Executive Functions

The second research question in this study was “Which course design elements, reported by the COVID Freshmen during the fall semester of 2020, are related to executive functions?” To answer research question two, the researcher followed a four-step process: (a) make an initial pairing of codes to each EF cluster (Brown, 2005), (b) create a diagram showing how each of the EF-related design elements connects to Brown’s (2005) EF model, (c) solicit feedback on the diagram from one EF specialist, and (d) update the diagram based on the EF specialist’s feedback.

The researcher found that there were elements of EF within each of the six code themes, however, all the sub-codes did not directly relate to EF. The diagram in Figure 27 depicts all the sub-codes related to EF (shown in bright colors and surrounded by red boxes). A larger version of this diagram can be found in Appendix C.

Figure 27

Course Design Elements the COVID Freshmen Found Helpful that Relate to EFs



Presentation and Content Delivery

The sub-codes related to EF in the *Presentation and Content Delivery* code theme are: (a) interactive videos with embedded quizzes, (e.g., PlayPosits) and (b) the use of slides. These two sub-codes are aligned with EF skills and behaviors related to focus and attention. Students may have found it easier to focus on the interactive videos because they were constantly being prompted to answer embedded quiz questions, and they may have been more inclined to pay attention to direct instruction if it was accompanied by slides.

Help-Seeking and Emotional Security

The sub-codes related to EF in the *Help-Seeking and Emotional Security* code theme are: (a) an approachable instructor, (b) pre-planned opportunities for students to get help, (c) instructors who are quick to respond to students' emails and questions, and (d) the modality in which the class was taught (online, in-person, hybrid). These sub-codes are closely related to the EF skills of emotional regulation. When students feel that their instructor is approachable, is quick to respond, and is able to provide planned opportunities to get help, they may find it easier to regulate their emotions. In a similar manner, giving students the option to attend class in-person or online during a global pandemic removes anxiety, thus enabling students to manage their emotions and frustration.

Comprehension and Practice

The sub-codes in the *Comprehension and Practice* code theme that relate to EF are: (a) the use of examples to support understanding, (b) opportunities to practice content, and (c) the use of questioning techniques by instructors. These subcodes are aligned to the EF skills related to effort and persistence. If students are given examples, asked questions about content, and provided with opportunities to practice, they may be more likely to sustain effort and persist in their learning.

Engagement and Social Interaction

The sub-codes in the *Engagement and Social Interaction* code theme that relate to executive functions are: (a) intentionally engaging instruction, (b) making content relatable to students' interests and lived experiences, (c) interactive materials and activities that support focus and attention, (d) opportunities for students to interact with

their peers, (e) opportunities for students to interact with their instructor, and (f) opportunities to hear and share viewpoints. All six of the sub-codes from the engagement and social interaction theme are related to the EFs that support focus and attention. In other words, students are more likely to be focused on their work and paying attention if the instruction is intentionally engaging and relevant, and if they have opportunities to interact with their instructor and peers.

Time-Management, Organization and Planning

The sub-codes in the *Time-Management, Organization, and Planning* code theme that relate to executive functions are: (a) the opportunity for students to work at their own pace, the clear use of due dates, (c) organization of the course and the learning management system (LMS) course shell, (d) the instructor providing clear expectations for assignments, and (e) the instructor sending weekly reminders of upcoming assignments and due dates. These sub-codes can be aligned with the EF skills related to activation which include organizing, prioritizing, and getting started with work. Students are more likely to organize their study and work time if they have reminders, clear due dates, a well-organized LMS, clear expectations, and the ability to work through content at their own pace.

Study Habits and Memory Retention

The sub-codes in the *Study Habits and Memory Retention* code theme that relate to EF are: (a) the ability to rewatch recorded lectures and videos, (b) guided notes which are provided by the instructor, (c) the availability of resources to help students plan for exams (i.e., study guides), (d) chunking content (breaking content down into smaller pieces), and (e) the instructor pointing out, or signaling, key ideas throughout the lecture.

All five of the sub-codes in the *Study Habits and Memory Retention* theme align with the EF skills and behaviors related to memory. This means that students are more likely to be able to hold, work with, and retrieve information from their memory if they are provided with supports like guided notes, exam study guides, chunked content, signaling of key points, and the ability to rewatch videos.

Summary and Discussion

In this section a summary of the findings from this study are presented along with a discussion and interpretation of those findings. The first part will examine course design elements the COVID freshmen found helpful, which answers the first research question, “Which course design elements did the COVID Freshmen report to be the most helpful during the fall semester of 2020?” That will be followed by an exploration of the course design elements the COVID Freshmen found helpful that relate to EF, which answer the second research question, “Which course design elements reported by the COVID Freshmen during the fall of 2020 relate to executive functions?”

Alignment to Current Research

This section will begin by examining connections to current research for each of the six code themes: (a) presentation and content delivery, (b) help-seeking and emotional security, (c) comprehension and practice, (d) engagement and social interaction, (e) time-management, organization, and planning, and (f) study habits and memory retention.

Presentation and Content Delivery

The *Presentation and Content Delivery* code theme reflected the largest proportion of responses, encompassing 20% of the total response phrases (n=518). This

code theme may have had the most student response phrases because during the fall of 2020, the COVID Freshmen were trying to navigate a college-level teaching format (typically lecture-based) in the midst of the chaos created by the COVID-19 pandemic. In fact, several recent studies show that during COVID-19, many undergraduate students reported that they were experiencing additional stress about their academic performance due to factors like the abrupt shift to online teaching (Das et al., 2020; Son et al., 2020), and the increased amount of work that is required for learning online (Son et al., 2020).

The findings of this study, which point to the use of many different forms of presentation and content delivery, align with the previous research to suggest that providing multiple formats (including videos, lectures, demonstrations, slides, and visuals) was most helpful to enhance students' learning. Previous research has indicated that providing multiple ways to perceive or take-in information is particularly useful for comprehension and memory retention and aids in meeting the needs of diverse learners (CAST, 2018; Paivio, 1986). Both Universal Design for Learning (CAST, 2018) and Dual Coding Theory (Paivio, 1986), suggest that providing a combination of text (either spoken or in print) and visuals is beneficial for learning and memory retention.

Help-Seeking and Emotional Security

The *Help-Seeking and Emotional Security* code theme may have received such a large number of responses because the COVID Freshmen could have found themselves unexpectedly needing help, with many experiencing heightened mental health problems during the fall of 2020 (Lee et al., 2021). So, when students felt like their instructor cared about them, was willing to offer extra help to them, and was cognizant of their fears and concerns related to attending class in person or online, they may have felt more

comfortable in their learning environment. These findings also make sense with some of the predictable stressors associated with the feelings of instability among those in the period of emerging adulthood (Leary & DeRosier, 2012). The change and turmoil that emerging adults often feel during this transitional period of life may have been ameliorated by having instructors who made them feel more comfortable in the learning environment.

Research published recently has also shown that undergraduate students had a much higher prevalence of depression, anxiety, stress, and feelings of isolation during COVID-19 (Das et al., 2020; Kira et al., 2021; Lee et al., 2021; Son et al., 2020). When students had instructors who were intentional about helping them feel safe and supported, they may have found this learning environment to be especially helpful during this unusual period of the COVID-19 pandemic. Another finding suggested that students were much more likely to engage in behaviors like asking for help when they felt that their instructor was approachable. This finding aligns with UDL checkpoint 7.3 which suggests that instructors can recruit interest and increase engagement by “minimizing threats and distractions” (CAST, 2018).

Comprehension and Practice

The Comprehension and Practice code theme elevated the importance of practice as part of the learning experience, which aligns with one of the UDL checkpoints (5.3) which suggests that instructors “build fluencies with graduated levels of support for practice and performance.” The concept of providing opportunities for students to practice retrieving information from their stored memory also makes connections to the work of Brown, Roediger, and McDaniel who elevate retrieval practice as one of the

most effective learning strategies in their 2014 book, *Make It Stick: The Science of Successful Learning*. Additionally, two other studies which looked at undergraduate perceptions of helpful learning aspects, indicated that students pointed to reviewing information as another beneficial learning practice (Henderson et al., 2017; Lumpkin et al., 2015), which further supports my findings for this code theme.

Engagement and Social Interaction

Many students in the present study shared that they also found it helpful when their instructors made learning relevant by tying content to “real world” contexts or making it relatable to college students. This finding aligns with another one of the UDL checkpoints (7.2) which explains that in order to help recruit students’ interest (which increases engagement), professors can “optimize relevance, value, and authenticity” in their instruction (CAST, 2018). Another finding from the present study pointed to the sharing and hearing of viewpoints to be helpful. This finding was supported by another study which showed that sharing and hearing “opinions and stories helped when talking about different subjects,” further stating that doing so helped them remember information as well (Lumpkin et al., 2015).

The present study also found that students appreciated the opportunity to interact with their peers and their instructor during COVID-19. This makes sense with several COVID studies which showed that during the pandemic many undergraduate students experienced feelings of social isolation and loneliness (Das et al., 2020; Kira et al., 2021; Son et al., 2020). So, when instructors were intentionally designing opportunities for students to interact, they were supporting students who may have been experiencing decreased social interactions in their day-to-day lives due to COVID-19.

Time-Management, Organization, and Planning

The COVID Freshmen in the study indicated that when instructors made expectations for their assignments clear, it was easier for students to plan ahead and meet their goals in the course. This aligns with one of the UDL checkpoints (6.1) which states that in order to support students, instructors should help students “guide appropriate goal-setting” (CAST, 2018). Another finding that makes connections to the literature is the organization of instructors’ learning management system (LMS) course pages. While this is supported by UDL checkpoint 6.3 which suggests facilitating students’ management of information and resources, it also relates to one of the findings from a study by Henderson et al. (2017) in which undergraduate students reported that one of the most useful aspects in online courses was how the LMS helped with “organizing and managing the logistics of studying” (p. 1571).

Study Habits and Memory Retention

One of the findings related to the *Study Habits and Memory Retention* theme indicated that students found it helpful when their instructors used signaling to point out key information during lectures. This finding aligns with UDL checkpoint 3.2 which recommends that in order to aid in understanding, instructors should “highlight patterns, critical features, big ideas, and relationships” (CAST, 2018). Another finding highlighted the importance students placed on the instructor providing guided notes. This finding is supported by previous research which suggests that instructor-provided notes resulted in higher posttest scores (Raver & Mayosz, 2010). One more finding highlighted the importance of students being able to rewatch lecture videos as a study strategy. This

finding aligns with a 2017 study by Henderson et al. which found that students reported that replaying or rewatching lecture videos was especially helpful in studying.

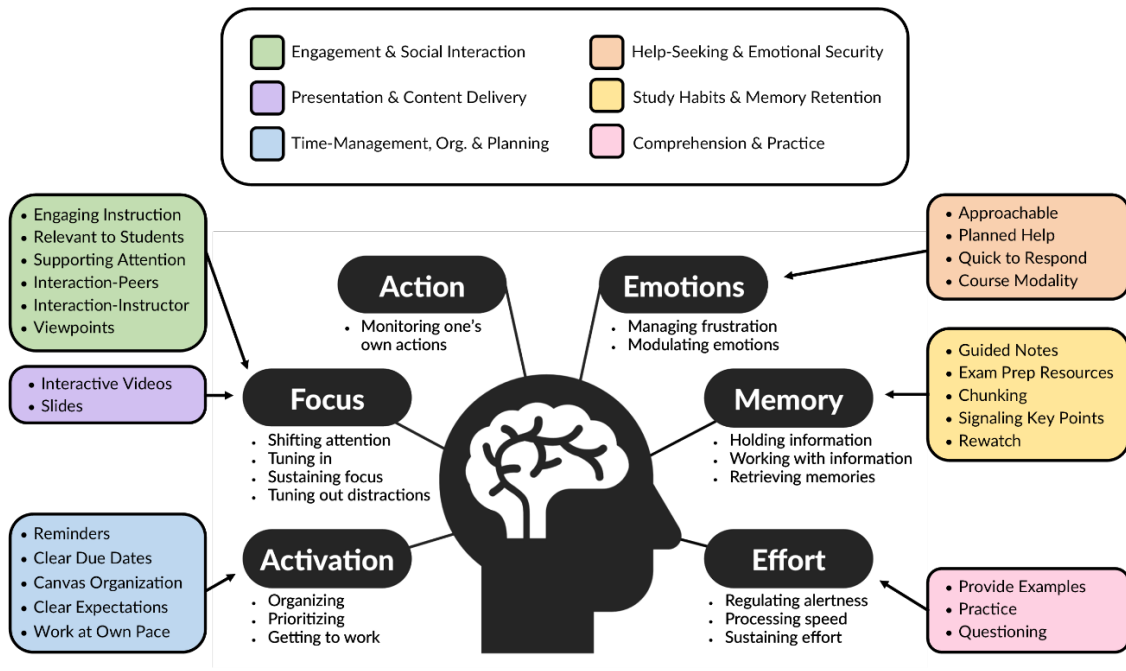
Course Design Elements the COVID Freshmen Found Helpful that Relate to EFs

A vast body of research shows that high levels of distress, the negative version of stress caused by an overabundance of stressors and a lack of coping strategies, can cause problems with executive functioning (Applehans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Kira et al., 2021; Shields et al., 2016). Research has also shown that many students experienced heightened levels of stress during the COVID-19 pandemic (Lee et al., 2021). Therefore, it makes sense that many of the helpful teaching aspects pointed out by the COVID Freshmen were related to ways their instructors were supporting executive functioning.

In order to make connections to Brown's EF model (2005) which was selected for use in this study, the researcher has created a diagram that displays all the sub-codes that align with each of Brown's six clusters of executive functioning (see Figure 28).

Figure 28

Crosswalk: EF-Related Sub-Codes and Brown's (2005) EF Model



In the diagram above, the sub-codes are displayed in color-coded boxes that align with the legend at the top of Figure 28. The descriptions below will begin with the bottom left corner of the diagram, with *Time-Management, Organization, and Planning* (in light blue), and follow around the diagram in a clockwise manner.

Time-Management, Organization, and Planning

All the *Time-Management, Organization, and Planning* sub-codes which the researcher and EF expert determined to be related to EF are shown in the light blue box in Figure 28 (reminders, clear due dates, Canvas (LMS) organization, clear expectations, and working at their own pace). All these particular sub-codes aligned with Brown's (2005) *Activation* cluster because they were all instructional strategies that may have supported organizing, prioritizing, or getting to work.

Another area where we can see a clear association between the study's findings and the current body of literature is in student responses related to instructors sending reminders and making due dates clear. These strategies align with what Lynn Metzler (2010), an EF expert, recommends to instructors: giving students supports for planning their study time.

Presentation and Content Delivery

The two sub-codes in light purple, from the *Presentation and Content Delivery* code theme (interactive videos and slides) are most closely aligned with the *Focus* cluster in Brown's (2005) EF model because they were supports that may have helped students shift attention, tune in, sustain focus, and tune out distractions.

The UDL Framework (CAST, 2018) supports the EF-related findings in the Presentation and Content Delivery code theme in three checkpoints: (a) checkpoint 1.2 "offer alternatives for auditory information" aligns with the *slides* sub-code because the presence of slides is providing a visual alternative to the auditory information of a spoken lecture, and (b) checkpoints 2.5- "illustrate with multiple media" and 4.1 "vary the methods for response and navigation" both align with the *interactive videos with embedded quizzes* sub-code.

Engagement and Social Interaction

All six of the sub-codes from the *Engagement and Social Interaction* code theme (intentionally engaging instruction, relevance to students, activities that supported attention, interaction with peers, interaction with the instructor, and sharing and hearing viewpoints), aligned most closely with Brown's (2005) *Focus* cluster because they were supports that, like the sub-codes related to *Presentation and Content Delivery* above, may

have helped students with shifting their attention, tuning into the content while also tuning out distractions, and sustaining focus.

As mentioned above, the UDL Framework (CAST, 2018) supports all of the findings in the *Engagement and Social Interaction* code theme in three of its checkpoints: (a) checkpoint 7.2 “optimize relevance, value, and authenticity” (CAST, 2018) aligns with the findings related to the *relevance* and *viewpoints* sub-codes, (b) checkpoint 7.3 “minimize threats and distractions” (CAST, 2018) aligns with the findings related to *engaging* instruction and *attention*, and (c) checkpoint 8.3- “foster collaboration and community” (CAST, 2018) aligns with the findings related to the *interaction with peers* and *interaction with the instructor* subcodes.

Help-Seeking and Emotional Security

The four sub-codes in light orange, from the *Help-Seeking and Emotional Security* code theme (an approachable instructor, pre-planned opportunities for getting help, quick responses from instructors, and a choice in modality), aligned most closely with Brown’s (2005) *Emotions* cluster because they were supports that may have helped students manage frustrations and modulate their emotions.

The UDL Framework (CAST, 2018) supports the sub-codes related to EF in the Help-Seeking and Emotional Security code theme through three UDL checkpoints. Checkpoint 7.3 “minimize threats and distractions” (CAST, 2018) aligns with the findings related to the *approachable* sub-code because when students feel safe in approaching their instructor, they are doing so because a threat has been minimized. Checkpoint 8.4- “increase mastery-oriented feedback” (CAST, 2018) aligns with the findings related to the *planned help* and *quick to respond* sub-codes because students are

seeking feedback from their instructors in these “planned help” and “emailed question” situations. Finally, checkpoint 7.1 “optimize individual choice and autonomy” (CAST, 2018) aligns with the findings related to the course modality sub-code because students were appreciative of the ability to choose whether they attended class in person or online during a global pandemic.

Study Habits and Memory Retention

The five sub-codes in light yellow, from the *Study Habits and Memory Retention* code theme (the ability to rewatch lectures and videos, guided notes, resources for exam preparation, chunking content into smaller pieces, and signaling key ideas during lectures), are most closely aligned to Brown’s (2005) *Memory* cluster because they are supports that may have helped students hold information, work with information, and retrieve memories.

One of these sub-codes, instructor-provided guided notes, is supported by Rosen et al.’s (2014) suggestion to explicitly teach strategies like notetaking using graphic organizers and guided notes. The UDL Framework (CAST, 2018) also suggests that instructors can support memory retention by helping students guide their own information processing and visualization (checkpoint 3.3) by using memory-retention strategies like chunking and signaling to condense large amounts of content into smaller structures for remembering.

Comprehension and Practice

Finally, the three sub-codes in light pink, from the *Comprehension and Practice* code theme (providing examples to support understanding, providing opportunities to practice content, and using questioning techniques), are most closely aligned to Brown’s

(2005) *Effort* cluster because these are supports that may have helped regulate alertness, monitor processing speed, and sustain effort while studying.

As mentioned above, the *practice* sub-code is supported by UDL checkpoint 5.3 “build fluencies with graduated levels of support for practice and performance,” while checkpoint 3.3 “guide information processing and visualization” aligns with the findings related to *questioning techniques* and *providing examples*.

Brown’s Action Cluster

The EF expert and the researcher concluded that Brown’s (2005) *Action* cluster is related to, and a part of, all the sub-codes identified as being related to executive functioning because monitoring one’s own actions is fundamental to the other five of Brown’s clusters (activation, focus, emotions, memory, and effort). The fact that these EF-related findings align so closely with Brown’s EF model (2005) justifies the use of the Brown model (2005) as the choice that best explains the findings from this study and further supports the development of a more comprehensive, holistic definition of the behaviors and skills governed by and associated with executive functions.

Summary

The COVID Freshmen responded to the question “Which aspects of your instructor’s teaching was most helpful to you? Why?” with comments on a diverse range of topics related to teaching and learning. These topics were sorted into the following six code themes: (a) presentation and content delivery, (b) help-seeking and emotional security, (c) comprehension and practice, (d) engagement and social interaction, (e) time-management, organization, and planning, and (f) study habits and memory retention.

The researcher and an EF expert sorted these code themes and sub-codes according to whether they related to executive functions. Their findings showed that all six of the code themes contained helpful teaching aspects that relate to EFs. In all, 25 out of the original 34 sub-codes were determined to be teaching strategies that would help support students who were struggling with EFs. Additionally, when these 25 sub-codes were mapped onto Brown's (2005) EF model, they fit nicely in the same cluster as other sub-codes in that same code theme. EF-related sub-codes from the *Time-Management, Organization, and Planning* code theme all aligned with Brown's (2005) *Activation* cluster. EF-related sub-codes from both the *Presentation and Content Delivery* and *Engagement and Social Interaction* code themes aligned with Brown's (2005) *Focus* cluster. EF-related sub-codes from the *Help-Seeking and Emotional Security* code theme aligned with Brown's (2005) *Emotions* cluster. The EF-related sub-codes from the *Study Habits and Memory Retention* code theme aligned with Brown's (2005) *Memory* cluster and the EF-related sub-codes from the *Comprehension and Practice* code theme aligned with Brown's (2005) *Effort* cluster. The final chapter will include a conclusion, limitations, and implications of this study and will include suggestions for future research.

CHAPTER 5

Conclusions, Implications, and Suggestions for Future Research

This study set out to discover which teaching aspects the COVID Freshmen reported to be most helpful during the fall semester of 2020 (RQ1), and furthermore, which of the helpful teaching aspects uncovered through RQ1 were related to executive functioning (RQ2). The following section will include conclusions, limitations, implications for practice, and suggestions for future research.

Conclusions

The COVID Freshmen may have experienced heightened levels of stress during the fall of 2020 due to predictable stressors related to the transition from high school to college (Arnett, 2000; Conley et al., 2014; Kroshus et al., 2021; Leary & DeRosier, 2012; Ruberman, 2014) and to the additional stressors related to the COVID-19 pandemic including those related to academics (Cao et al., 2020; Das et al., 2020; Mesghina et al., 2021; Son et al., 2019), health (Das et al. 2020; Son et al., 2020), and lifestyle (Cao et al., 2020; Das et al., 2020; Kira et al., 2020; Lee et al., 2021; Son et al., 2020). A strong body of research has shown that elevated and chronic stress have the potential to negatively affect learning, specifically higher-order cognition, which is linked to executive functioning (Applehans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Kira et al., 2021; Shields et al., 2016).

The COVID Freshmen likely encountered many teaching and learning factors that were not beneficial during this unprecedented period in higher education history, including an abrupt shift to online learning (Aspegren & Zwickel, 2020) and taking courses from faculty without training in online teaching (Johnson et al., 2020). Despite

the more difficult aspects of teaching and learning during this time, there were some aspects of teaching that the COVID Freshmen found particularly helpful. Undergraduate instructors, specifically those who teach freshmen, can use the helpful teaching aspects indicated by students in this study, including those related to EFs, to proactively design their courses, instruction, and materials in their current and future courses. Doing so can help to remove learning barriers before they become a problem and will likely lead to more rigorous and lasting learning for students.

The primary findings of this study suggest that the COVID Freshmen found many different aspects of the teaching and learning process to be helpful during the fall semester of 2020. These helpful teaching aspects were grouped into six code themes which include (a) presentation and content delivery, (b) help-seeking and emotional security, (c) comprehension and practice, (d) engagement and social interaction, (e) time-management, organization, and planning, and (f) study habits and memory retention. Each of these six code themes included two to six sub-codes that were found to be related to executive functioning. For a complete list, see Figure 28 above.

Students may find certain teaching aspects helpful at a time when they are having difficulty with something related to those same teaching aspects. For example, if a given student was consistently capable of retaining all the information they learned in a video after only watching it one time, they probably would not report that it was helpful that their instructor gave them access to videos so they could rewatch them as many times as needed. They did not need the extra viewings, so, therefore, they did not find it especially helpful, and likely would not have mentioned it at all. Following this logic, we can extrapolate that the teaching aspects students pointed to as being helpful may have also

been related to the things they were struggling with the most. This suggests the idea that students may have been struggling the most in the six areas identified above, which is why they found the teaching aspects to be most helpful in supporting them in those same areas. Additionally, because sub-codes from within each of the six code themes listed above were identified as being related to EF, this also suggests that many of the COVID Freshmen may have also been struggling with executive functioning during the fall of 2020, and that the supports provided by instructors could have helped students navigate teaching and learning during this tumultuous period.

Limitations

This study, although informative, is not without some limitations. Because this was a secondary study of previously collected data, some of the limitations stem from the fact that the researcher of this current study did not have control over the design of the primary study questions themselves.

Limitations: Primary Study

One of the limitations related to the lack of control over the primary study was that student responses to the primary study were only self-reported and were not supported by additional measures like productivity or EF scales, so it is possible that there could have been discrepancies between what students believed to be most helpful and what benefitted them the most during COVID-19. Second, in the primary study, the question that was examined for this current study was not a required question, so there could be some sampling bias that caused students' responses to be skewed. For example, it is possible that students only responded to this question if they had strong negative or positive opinions about their instructor's helpful teaching aspects. Third, most freshmen

enroll in general education (or “core”) courses, many of which are housed within the university’s College of Arts and Sciences. It should be noted, however, that the academic college in which the course is housed may not be representative of the students’ major or program. So, a student who took the original survey in their “Introduction to Biology” course (which would be under the umbrella of the College of Arts and Sciences), may not actually be a biology major. But regardless, the fact that a majority of the freshman responses came from one academic college could have the potential to have skewed the results of the study.

In addition to limitations related to the design of the primary study, other limitations in the design of the secondary study may be problematic.

Limitations: Secondary Study

One limitation in the secondary study was that there were no questions on the primary study that specifically asked students about the impact of COVID-19 on their skills and behaviors related to EF. Students were simply asked to report which aspects of teaching were most helpful but were not asked if they felt that these teaching aspects were helpful in supporting EFs. This could have caused some problems with accuracy in that the researcher was attempting to answer questions with data collected for other reasons. Another limitation, which is related to the fact that this was an exploratory study, is that the researcher had no way of following up with participants to verify that the researcher’s interpretation of student responses was accurate. Finally, because the researcher chose to focus on responses from the COVID Freshmen, it is possible that students in other undergraduate grade levels (e.g., sophomores, juniors, and seniors) had responses that were markedly different from those reported by the freshmen.

Implications for Practice

Over the past three years, several studies have emerged which highlight the negative mental health impacts of the COVID-19 pandemic on undergraduate students, including academic-related stressors (Cao et al., 2020; Das et al., 2020; Mesghina et al., 2021; Son et al., 2020) and health and lifestyle-related stressors (Cao et al., 2020; Das et al., 2020; Lee et al., 2021; Son et al., 2020; Xiong et al., 2020). Even though most COVID-related restrictions (e.g., social distancing, mask mandates, and fully online learning) have been lifted, undergraduate professors should not expect that teaching and learning will return to “normal” any time soon. In fact, at the time of this study, students who attended Kindergarten in the fall of 2020 are in 2nd grade. This means that although the COVID Freshmen will move on, we can expect to see at least 10-15 more years of students who were directly impacted by chronic exposure to the stressors of living and learning during a global pandemic.

Additionally, those who teach undergraduate freshmen should assume that they will always be teaching students whose stress levels are elevated due to the stressors associated with transitioning from high school to college (Conley et al., 2014; Kroshus et al., 2021; Leary & DeRosier, 2012; Ruberman, 2014) and stressors related to the developmental period these freshmen are also navigating, the period called emerging adulthood (Arnett, 2000; Arnett, 2004; Arnett, 2007; Nelson, 2021).

Implications Related to RQ1

The results of this study can give undergraduate instructors a clear picture of which supports the COVID Freshmen found to be especially useful during a period of heightened exposure to stressors, the COVID-19 pandemic. Undergraduate instructors,

specifically those who teach freshmen, could use this information to proactively plan ahead to address the needs of their students by building these supports into their current and future courses. The results of this study provide many suggestions for undergraduate instructors wishing to use proactive design to support students exposed to heightened stressors.

This study revealed that the COVID Freshmen found many teaching aspects to be especially helpful during a very stressful semester. These helpful teaching aspects can be grouped into six code themes which represent supports for: (a) presentation and content delivery, (b) help-seeking and emotional security, (c) comprehension and practice, (d) engagement and social interaction, (e) time-management, organization, and planning, and (f) study habits and memory retention.

Findings related to *Presentation and Content Delivery* suggest that instructors should deliver content via a range of multimodal tools including delivering content via interactive videos with embedded quizzes, lectures and other videos, demonstrations, live class meetings, slides, and visual representations of content.

Findings related to *Help-Seeking and Emotional Security* suggest that instructors should encourage students to seek help by being approachable, being willing to answer questions, by responding quickly to emails and texts, and by planning additional opportunities for students to obtain help. Additionally, instructors can support students' emotional security by providing them with a choice of the modality through which they attend class and by being viewed positively by students.

Findings related to *Comprehension and Practice* suggest that instructors can support students' understanding of content by explaining (instead of simply delivering)

content and being clear in their explanations, by providing examples of content along with opportunities to practice content, by reviewing previously learned content, and by using questioning techniques to reinforce content.

Findings related to *Engagement and Social Interaction* suggest that instructors should use intentionally engaging practices, make content relevant to their students' interests and experiences, support attention and focus, foster student interaction with peers and the instructor, and foster the hearing and sharing of viewpoints.

Findings related to *Time-Management, Organization, and Planning* suggest that instructors can support students by allowing them to work at their own pace, providing clear due dates, using a well-organized, easily-navigable structure in their LMS course page, providing clear expectations for assignments, and providing regular reminders of upcoming due dates.

Findings related to *Study Habits and Memory Retention* suggest that instructors should help students build and strengthen study skills and memory retention by providing access to videos so students can rewatch them as needed, providing guided notes for students, providing resources for exam preparation (e.g., study guides), chunking or segmenting information into smaller, more manageable pieces, and intentionally highlighting important concepts.

The checklist in Figure 29 was designed to give professors a quick reference guide for supporting stressed students with the many helpful teaching aspects reported by the COVID Freshmen.

Figure 29

Checklist of Suggested Supports for Stressed Students

According to a 2023 study,

Professors Who Support Stressed Students...

In the fall of 2020, over 7,000 undergraduates were surveyed to ascertain the state of teaching and learning during the COVID-19 pandemic. A secondary qualitative study examined the responses of college freshmen to determine which aspects of teaching supported students during this unprecedented semester (Pusateri, 2023). The suggestions below outline the teaching aspects that these freshmen found to be most helpful.

<p>Presentation & Content Delivery</p> <ul style="list-style-type: none"><input type="checkbox"/> Use videos with embedded quizzes<input type="checkbox"/> Deliver content through videos & lectures<input type="checkbox"/> Deliver content through slides<input type="checkbox"/> Use visual representations of content<input type="checkbox"/> Model skills for students (demos)<input type="checkbox"/> Hold live class meetings	<p>Help-Seeking & Emotional Security</p> <ul style="list-style-type: none"><input type="checkbox"/> Are approachable and easy to talk to<input type="checkbox"/> Hold additional office hours<input type="checkbox"/> Are willing to answer questions<input type="checkbox"/> Respond quickly to emails and texts<input type="checkbox"/> Offer options for course modality<input type="checkbox"/> Are viewed positively by students
<p>Comprehension & Practice</p> <ul style="list-style-type: none"><input type="checkbox"/> Explain content instead of just delivering it<input type="checkbox"/> Are clear in their explanations<input type="checkbox"/> Provide examples of content<input type="checkbox"/> Provide opportunities to practice content<input type="checkbox"/> Review previously learned content<input type="checkbox"/> Use questioning to reinforce content	<p>Engagement & Social Interaction</p> <ul style="list-style-type: none"><input type="checkbox"/> Use intentionally engaging practices<input type="checkbox"/> Make content relevant to students<input type="checkbox"/> Support student attention and focus<input type="checkbox"/> Foster student interaction with peers<input type="checkbox"/> Foster student interaction with professor<input type="checkbox"/> Foster the sharing/hearing of viewpoints
<p>Time-Mgmt., Organization & Planning</p> <ul style="list-style-type: none"><input type="checkbox"/> Allow students to work at their own pace<input type="checkbox"/> Provide clear due dates<input type="checkbox"/> Have a well-organized LMS course page<input type="checkbox"/> Provide clear expectations for assignments<input type="checkbox"/> Provides regular reminders of due dates	<p>Study Habits & Memory Retention</p> <ul style="list-style-type: none"><input type="checkbox"/> Provide access to videos for rewatching<input type="checkbox"/> Provide guided notes for students<input type="checkbox"/> Provide resources for exam preparation<input type="checkbox"/> Chunk or segment information<input type="checkbox"/> Intentionally highlight important concepts

© 2023 J. Pusateri

In addition to the helpful teaching aspects reported by the COVID Freshmen, the second research question (RQ2) sought to ascertain which of the helpful teaching aspects were specifically related to executive functioning.

Implications Related to RQ2

Elevated levels of stress are known to impact some undergraduate freshmen (Conley et al., 2014; Kroshus et al., 2021; Leary & DeRosier, 2012; Ruberman, 2014), even in years that do not include the disruptions and additional stressors associated with a global pandemic. The literature has also revealed that elevated levels of stress and anxiety have long been known to negatively affect learning, specifically executive functioning, which is known to be compromised when stress levels are significantly or chronically heightened (Applehans et al., 2021; Bangasser & Shors, 2011; Bettis et al., 2017; Kira et al., 2021; Shields et al., 2016). In fact, informal reports are surfacing across the U.S. from undergraduate faculty who share that, despite a return to mostly in-person learning, students are continuing to struggle with things like focus, motivation, meeting deadlines, and studying (ChilcoteBacco, 2022; Fawcett, 2022); all skills related to executive functioning.

The EF problems that faculty are seeing in higher education are not likely to go away soon. However, the results from this study provide undergraduate instructors with student-generated suggestions of ways to support students' EFs through proactive design. Each of the six code themes listed above included multiple sub-codes, and when these sub-codes were examined through the lens of executive functioning, many were also found to be related to EFs.

Sub-codes that are related to the *Activation* cluster of EFs (which includes behaviors like organizing, prioritizing, and getting to work) (Brown, 2005) are supports like providing regular reminders of due dates, clarifying due dates in the syllabus and in

the LMS course, organizing the LMS for easy navigation, being clear about assignment expectations, and allowing students to work at their own pace, when possible.

Some of the sub-codes related to the *Focus* cluster of EFs (which includes behaviors like shifting attention, tuning in, sustaining focus, and tuning out distractions) (Brown, 2005) are supports like using intentionally engaging instructional practices, making connections between content and students' interests and experiences, giving students opportunities to interact with their peers and their instructor, giving students opportunities to hear and share viewpoints, using interactive videos with embedded quizzes, and accompanying all lectures with slides.

The sub-codes related to the *Emotions* (or emotional regulation) cluster of EFs (which includes behaviors like managing frustration and modulating emotions) (Brown, 2005) are supports like the instructor being intentionally approachable and easy to talk to, providing additional office hours, responding quickly to emails and texts, and when possible, allowing options for course modality (online, in-person, hybrid).

The sub-codes related to the *Memory* (or memory retention) cluster of EFs (which includes holding information, working with information, and retrieving memories) (Brown, 2005) are supports like providing guided notes for students, providing resources (e.g., study guides) for exam preparation, chunking or dividing up content, highlighting key ideas, patterns, and major concepts, and posting videos of lectures for students to rewatch as needed.

Some of the sub-codes related to the *Effort* cluster of EFs (which includes behaviors like regulating alertness, processing speed, and sustaining effort) (Brown, 2005) are supports like providing examples to clarify content, providing opportunities to

practice content, and using questioning techniques to reinforce content. The *Action* cluster of EF (which includes monitoring one's own actions) is related to all the aforementioned clusters, because self-monitoring is part of the metacognitive reflections that govern activation, focus, emotions, memory, and effort.

The researcher has compiled a second resource to help undergraduate professors learn how they can use intentional, proactive design to support students who are specifically struggling with executive functioning. Figure 30 includes several checklists, organized by Brown's (2005) model of EF, that instructors can use to support students' executive functions.

Figure 30

Checklist for Supporting EFs

Proactive Design for Supporting Executive Functions

In the fall of 2020, over 7,000 undergraduates were surveyed to ascertain the state of teaching and learning during the COVID-19 pandemic. A secondary qualitative study examined the responses of college freshmen to determine which aspects of teaching supported students' executive functioning during this unprecedented semester (Pusateri, 2023). The checklists below outline the teaching aspects related to executive functioning that these freshmen found to be most helpful. These suggestions will be grouped according to Brown's (2005) model of EF.

Brown's Model of EF (2005)

- Action**
 - Monitoring one's own actions
- Emotions**
 - Managing frustration
 - Modulating emotions
- Focus**
 - Shifting attention
 - Tuning in
 - Sustaining focus
 - Tuning out distractions
- Memory**
 - Holding information
 - Working with information
 - Retrieving memories
- Activation**
 - Organizing
 - Prioritizing
 - Getting to work
- Effort**
 - Regulating alertness
 - Processing speed
 - Sustaining effort

To Support Activation:

- Provide regular reminders of due dates
- Clarify due dates in syllabus & LMS course
- Organize LMS course for easy navigation
- Be explicit about assignment expectations
- When possible, allow students to work at their own pace

To Support Focus & Attention:

- Use intentionally engaging instructional practices to support attention
- Make connections between content and students' interests & experiences
- Give opportunities to interact with peers
- Give opportunities to interact with instructor
- Give opportunities to hear/share viewpoints
- Use interactive videos with embedded quizzes
- Accompany all lectures with slides

To Support Emotional Regulation:

- Be approachable and easy to talk to
- Provide additional office hours
- Respond quickly to emails and texts
- When possible, allow options for course modality (online, in-person, hybrid)

To Support Memory Retention:

- Provide guided notes for students
- Provide resources for exam preparation
- Chunk or divide up content
- Highlight key ideas, patterns, and major concepts
- Post videos of lectures for students to rewatch

To Support Effort & Persistence:

- Provide examples to clarify content
- Provide opportunities to practice content
- Use questioning techniques to reinforce content

© 2023 J. Pusateri

Universal Design for Learning (UDL)

Proactively designing instruction and materials to remove barriers to learning is not a new concept in the field of education. In fact, one framework, Universal Design for

Learning (UDL) has been advocating for this type of proactive planning for decades (Bacon, 2014). UDL is a framework that uses intentional design to proactively remove barriers in the learning environment, so it makes sense that many of the helpful teaching aspects reported by the COVID Freshmen align with the UDL Framework (Pusateri, 2022). UDL practitioners would suggest that there have always been (and there always will be) students in our classes who struggle with the levels of stress and anxiety that the COVID Freshmen were exposed to during the fall of 2020, so instructors can proactively remove learning barriers for these students and many others by designing instruction to support the development of skills like comprehension, executive functioning, self-regulation, and perception (CAST, 2018). In addition to the teaching aspects highlighted in this study (most of which align with the UDL framework), the researcher recommends using the UDL framework to anticipate additional learning barriers that may arise in an undergraduate classroom and suggests design instruction and materials through the lens of UDL to help remove these barriers for learners.

Suggestions for Future Research

This study was an exploratory study which is typically used to determine areas for future research, so the researcher has several suggestions for future research related to supporting students who are under extreme stress and students who are struggling with EFs. One area for future study would be to examine the responses of the other undergraduate grade levels mentioned above (e.g., sophomores, juniors, and seniors) to see if there are differences in the types of support that are helpful at different stages in one's undergraduate career. Another area for future study is using the EF supports checklist as an intervention in an experimental design, ideally with one instructor

modifying one section of a course they teach using one of the checklists (the experimental group) and leaving a second section of that same course as it is (the control group), then using a survey and a behavioral measurement tool like the BRIEF-A (Behavior Rating Inventory of Executive Function for Adults) (PAR, n.d.) to determine if there are changes in student behavior as a result of using proactive design to support EFs in an undergraduate setting.

Some higher education instructors worry that providing too much support might reduce academic rigor (Tobin & Behling, 2018). A study (like the undergraduate grade level study mentioned above) that examined which supports might be helpful for students at each undergraduate grade level could help instructors find a more appropriate balance of supports and academic rigor if they were able to curate the supports based on recommendations specific to undergraduate grade levels. For example, a senior may no longer need as much support for things like study skills and memory retention (like a freshman might need), but they may need additional support in terms of engagement and relevance as they near the end of their undergraduate degree. A study like the experimental intervention study mentioned above could help to provide evidence that proactively designing instruction and materials to support students' EFs is beneficial in reducing the cognitive energy required to learn under stressful circumstances.

Appendix A

Universal Design for Learning (UDL) Framework

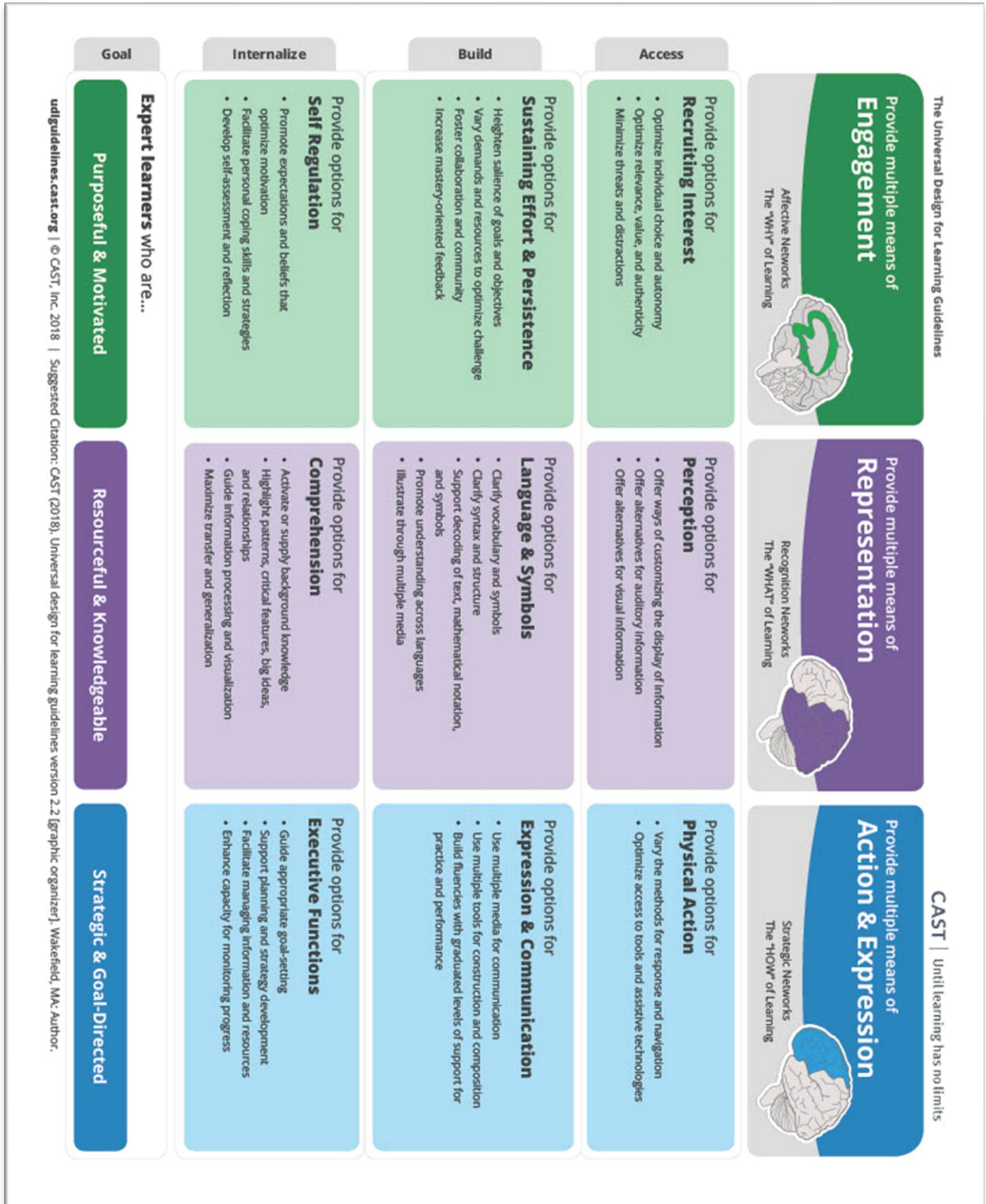


Figure A1. Graphic organizer depicting the CAST (2018) UDL Framework

Appendix B

Six Code Themes, Categories, and Original Codes- Enlarged

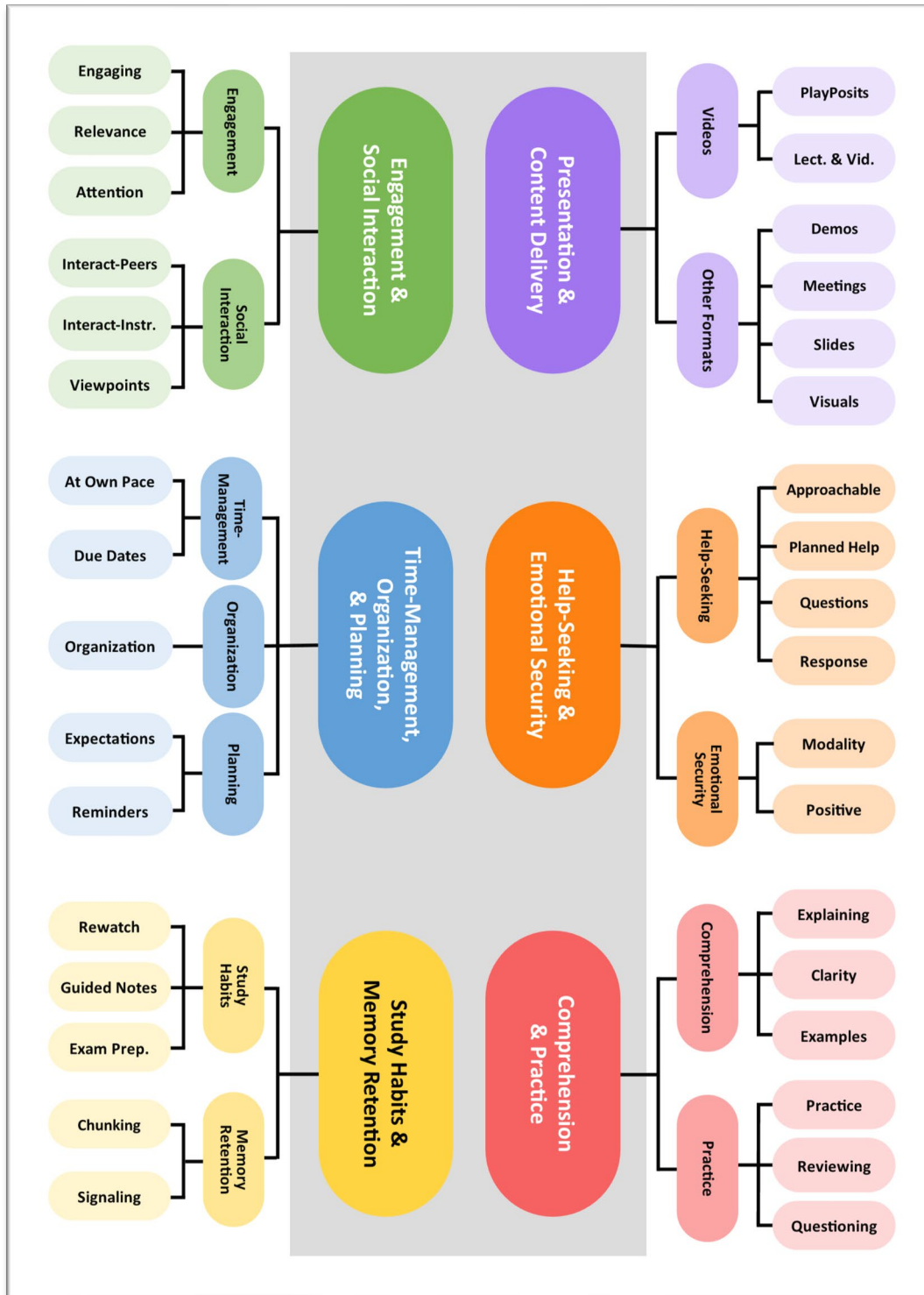


Figure B1. Diagram showing six code themes, categories, and original codes which were derived from survey responses by the COVID Freshmen in fall 2020.

Appendix C

Sub-Codes That Relate to EF- Enlarged

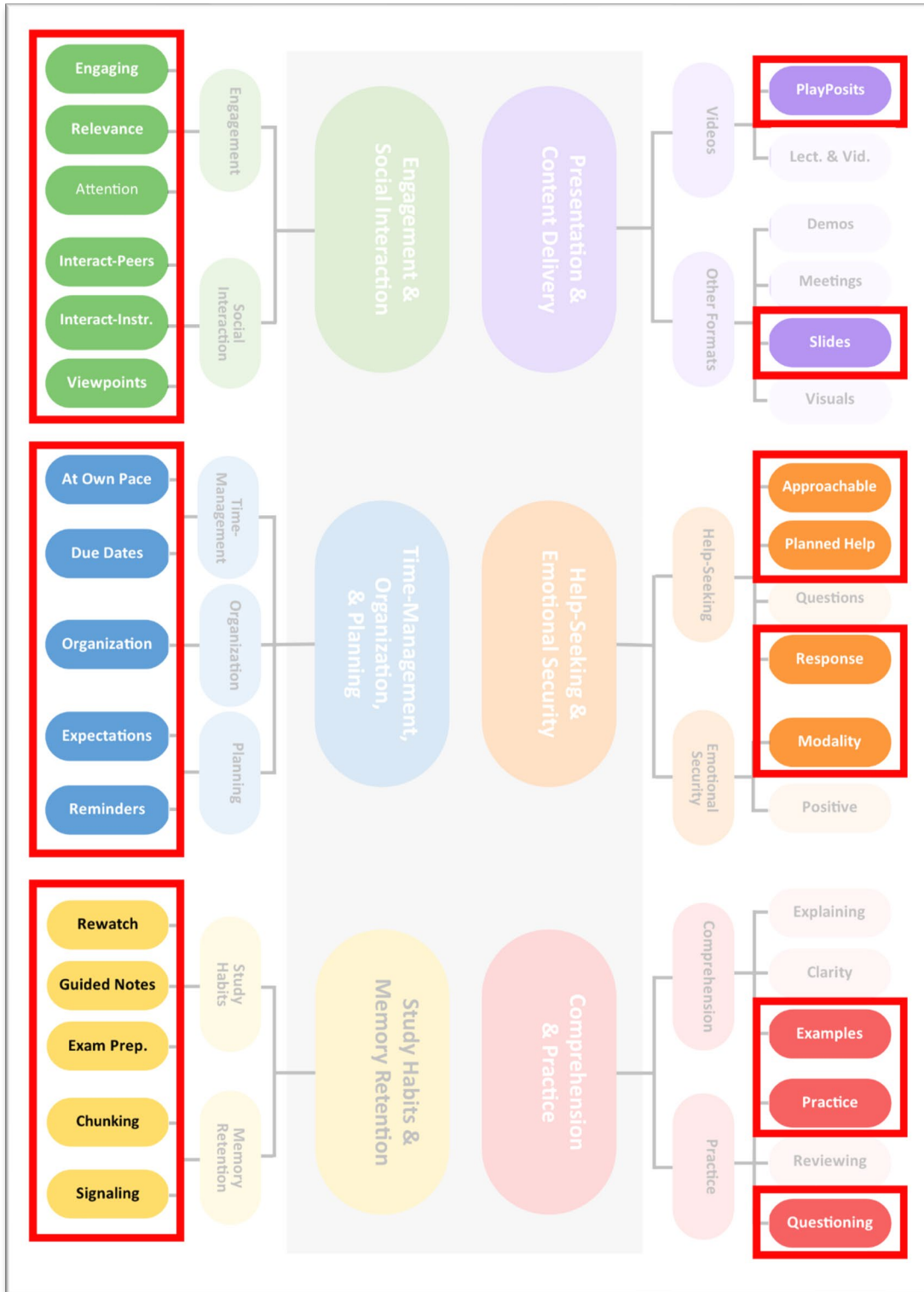


Figure C1. Diagram showing the sub-codes that relate to EF

References

- Almendingen, K., Morseth, M.S., Gjolstad, E., Brevik, A., & Torris, C. (2021). Students' experiences with online teaching following COVID-19 lockdown: A mixed methods explorative study. *PLoS ONE*, *16*(8), 1-16.
- Amirkhan, J.H., Bowers, G.K., & Logan, C. (2020). Applying stress theory to higher education: Lessons from a study of first-year students. *Studies in Higher Education*, *45*(11), 2231-2244.
- Applehans, B.M., Thomas, A.S., Roisman, G.I., Booth-LaForce, C., & Bleil, M.E. (2021). Preexisting executive function deficits and change in health behaviors during the COVID-19 pandemic. *International Journal of Behavioral Medicine*, *28*, 813-819.
- Arnett, J.J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*(5), 469-480.
- Arnett, J.J. (2004). *Emerging adulthood: The winding road from the late teens through the twenties* (2nd ed.). Oxford University Press.
- Arnett, J.J. (2007). Emerging adulthood: What is it and what is it good for?, *Child Development Perspectives*, *1*(2), 68-73.
- Aspegren, E. & Zwickel, S. (2020, June 22). In person, online classes or a mix: Colleges' fall 2020 coronavirus reopening plans, detailed. *USA Today*.
<https://www.usatoday.com/story/news/education/2020/06/22/coronavirus-reopening-college-fall-2020/3210719001/>
- Bacon, K. (2014). All along. *Harvard Ed. Magazine*.
<https://www.gse.harvard.edu/news/ed/14/01/all-along>

- Bangasser, D.A. & Shors, T.J. (2011). Critical brain circuits at the intersection between stress and learning. *Neuroscience and Behavioral Reviews*, 34(8), 1223-1233.
- Bartik, A.W, Bertrand, M., Cullen, Z., Glaeser, E.L., Luca, M. & Stanton, C. (2020). The impact of COVID-19 on small business outcomes and expectations. *PNAS*, 117(30), 17656–17666.
- Bettis, A.H., Coiro, M.J., England, J., Murphy, L.K., Zelkowitz, R.L., Dehardins, L., Eskridge, R., Adery, L.H., Yarboi, J., Pardo, D., & Compas, B.E. (2017). Comparison of two approaches to prevention of mental health problems in college students: Enhancing coping and executive function skills. *Journal of American College Health*, 65(5), 313-322.
- Brown, P.C., Roediger, H.L., McDaniel, M.A. (2014). *Make it stick: The science of successful learning*. The Belknap Press of Harvard University Press.
- Brown, T.E. (2005). *Attention deficit disorder: The unfocused mind in children and adults*. Yale University Press.
- Bureau of Transportation Statistics. (2021, June 1). *March 2021 airline passenger volume shows signs of aviation recovery*. <https://www.bts.gov/data-spotlight/march-2021-airline-passenger-volume-shows-signs-aviation-recovery>
- Camacho-Zuniga, C, Pego, L., Escamilla, J., & Hosseini, S. (2021). The impact of the COVID-19 pandemic on students’ feelings at high school, undergraduate, and postgraduate levels. *Heliyon*, 7, 1-11.
- Cao et al., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, 287, 1-5.

CAST (2018). *UDL and the learning brain*. Wakefield, MA: Author. Retrieved from <https://www.cast.org/products-services/resources/2018/udl-learning-brain-neuroscience>

ChilcoteBacco, L. (2022, December 6). College professor sees students who are struggling, post COVID. *Grown & Flown*.
<https://grownandflown.com/professorsees-students-struggling-post-covid/>

Conley, C.S., Kirsch, A.C., Dickson, D.A., & Bryant, F.B. (2014). Negotiating the transition to college: Developmental trajectories and gender differences in psychological functioning, cognitive-affective strategies, and social well-being. *Emerging Adulthood*, 2(3), 195-210.

Daley, S.G. & Rose, D.H. (2018) In Metzler, L. (Ed.). *Executive function in education: From theory to practice* (2nd Ed., pp. 357-379). Guilford.

Das, B.M., Walker, C., Hodge, E., Christensen, T., & Darkenwald, T. (2021). Understanding the impact of the COVID-19 pandemic on honors college students: A qualitative content analysis. *Journal of the National Collegiate Honors Council*, 22(1), 169-181.

Denckla, M.B. (2019). *Understanding learning and related disabilities: Inconvenient brains*. Routledge.

Denckla, M.B. & Mahone, E.M. (2018). Executive function: Binding together the definitions of attention-deficit/hyperactivity disorder and learning disabilities. In Metzler, L. (Ed.). *Executive function in education: From theory to practice* (2nd Ed., pp. 5-24). Guilford.

Education Week. (2020, July 1). *The Coronavirus Spring: The Historic Closing of U.S.*

Schools (A Timeline). <https://www.edweek.org/leadership/the-coronavirus-spring-the-historic-closing-of-u-s-schools-a-timeline/2020/07>

Erikson, E.H. (1950). *Childhood and society*. Norton.

Etikan, I., Musa, S.A., & Alkassim, R.S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4.

Fawcett, E. (2022, November 1). The pandemic generation goes to college: It has not been easy. *The New York Times*. <https://www.nytimes.com/2022/11/01/us/covid-college-students.html>

Gibbons, C. (2015). Stress, eustress, and the national student survey. *Psychology Teaching Review*, 21(2), 86-92.

Harel-Gadassi, A. (2022). For whom is distance learning suitable?: The relationship between distance learning, executive functions, and academic achievements. *Universal Journal of Educational Research*, 10(2), 129-136. DOI: 10.13189/ujer.2022.100202.

Henderson, M., Selwyn, N. & Aston, R. (2017). What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. *Studies in Higher Education*, 42(8), 1567-1579.

Hofmann, W., Schmeichel, B.J., & Baddeley, A.D. (2012). Executive functions and self regulation. *Trends in Cognitive Sciences*, 16(3).

Ives, B. (2021). University students experience the COVID-19 induced shift to remote instruction. *International Journal of Educational Technology in Higher Education*, 18(59), 1-16.

- Johnson, N., Veletsianos, G., & Seaman, J. (2020). U.S. faculty and administrators' experiences and approaches in the early weeks of the COVID-19 pandemic. *Online Learning, 24*(2), 6-21. <https://doi.org/10.24059/olj.v24i2.2285>
- Johnson, R.B. & Christensen, L. (2017). *Educational research: Quantitative, qualitative, and mixed approaches* (6th ed.). Sage.
- Kira, I.A., Alpay, E.H., Ayna, Y.E., Shuwiekh, H.A.M., Ashby, J.S., & Turkeli, A. (2021). The effects of COVID-19 continuous traumatic stressors on mental health and cognitive functioning: A case sample from Turkey. *Current Psychology, 1*-12.
- Knapp, A.K. & D'Avanzo, C. (2010). Teaching with principles: Toward more effective pedagogy in ecology. *Ecosphere, 1*(6), 1-10.
- Kroshus, E., Hawrilenko, M., & Browning, A. (2021). Stress, self-compassion, and well being during the transition to college. *Social Science & Medicine, 269*, 1-10.
- Leary, K.A. & DeRosier, M.E. (2012). Factors promoting positive adaptation and resilience during the transition to college. *Psychology, 3*(12), 1215-1222.
- Lee, J., Jeong, H.J., & Kim, S. (2021). Stress, anxiety, and depression among undergraduate students during the COVID-19 pandemic and their use of mental health services. *Innovative Higher Education, 46*, 519-538.
- Lumpkin, A., Achen, R.M., & Dodd, R.K. (2015). Student perceptions of active learning. *College Student Journal, 49*(1), 121-133.
- Masha'al, D., Rababa, M., & Shahrour, G. (2020). Distance learning-related stress among undergraduate nursing students during the COVID-19 pandemic. *Journal of Nursing Education, 59*(12), 666-677.

- Mesghina, A., Wong, J.T., Davis, E.L., Lerner, B.S., Jackson-Green, B.J., & Richland, L.E. (2021). Distressed to distracted: Examining undergraduate learning and stress regulation during the COVID-19 pandemic. *AERA Open*, 7(1), 1-20.
- Metzler, L. (2010). *Promoting executive function in the classroom*. Guilford.
- Metzler, L. (Ed.). (2018). *Executive function in education: From theory to practice* (2nd ed.). Guilford.
- Miyake, A., Friedman, N.P., Emerson, M.J., Witzki, A.H., & Howerter, A. (2000). The unity and diversity of executive functions and their contributions to complex “frontal lobe” tasks: A latent variable analysis. *Cognitive Psychology*, 41, 49-100.
- Mohammadi, M.K., Mohibbi, A.A., & Hedayati, M.H. (2021). Investigating the challenges and factors influencing the use of the learning management system during the COVID-19 pandemic in Afghanistan. *Education and Information Technologies*, 26, 5165-5198.
- Nardi, P.M. (2018). *Doing survey research: A guide to quantitative methods* (4th Ed.). Routledge.
- Nelson, L.J. (2021). The theory of emerging adulthood 20 years later: A look at where it has taken us, what we know now, and where we need to go. *Emerging Adulthood*, 9(3), 179-188.
- Neubeck, M., Johann, V.E., Karbach, J., & Konen, T. (2022). Age-differences in network models of self-regulation and executive control functions. *Developmental Science*, e13276.
- Novak, K. (2022). *UDL now!: A teacher’s guide to applying universal design for*

- learning* (3rd ed.). CAST Publishing.
- O'Connor, C. & Joffe, H. (2020). Intercoder reliability in qualitative research: Debates and practical guidelines. *International Journal of Qualitative Methods*, 19, 1-13.
- Paivio, A (1986). *Mental representations: A dual coding approach*. Oxford. England: Oxford University Press.
- PAR. *BRIEF-A: Behavior rating inventory or executive function- adult version*. (n.d.). Retrieved February 12, 2023 from <https://www.parinc.com/Products/Pkey/25>
- Patel, S. (2015, July 15). *The research paradigm- methodology, epistemology and ontology- explained in simple language*. Dr. Salma Patel.
<http://salmapatel.co.uk/academia/the-research-paradigm-methodology-epistemology-and-ontology-explained-in-simple-language/>
- Piazza. *Piazza: Ask. answer. explore. whenever*. (n.d.). Retrieved December 28, 2022, from <https://piazza.com/account/login>
- MAXQDA. *Why MAXQDA?*. (n.d.). Retrieved April 15, 2023, from <https://www.maxqda.com/>
- PlayPosit. *PlayPosit: Interactive Video. Unleashed Learning*. (n.d.). Retrieved December 28, 2022, from <https://go.playposit.com/>
- Pusateri, J.L. (2019, March). Elevating student voice in higher education: Mid-semester feedback & UDL. In *2019 UDL-IRN International Summit Proceedings, Orlando, FL*. Retrieved from <https://www.learningdesigned.org/resource/mid-semester-feedback-udl>
- Pusateri, J.L. (2022). *Transform your teaching with Universal Design for Learning: Six steps to jumpstart your practice*. CAST Publishing.

- Raver, S.A. & Maydosz, A.S. (2010). Impact of the provision and timing of instructor provided notes on university students' learning. *Active Learning in Higher Education, 11*(3), 189-200.
- Rosen, S.M., Boyle, J.R., Cariss, K., & Forchelli, G.A. (2014). Changing how we think, changing how we learn: Scaffolding executive function processes for students with disabilities. *Learning Disabilities: A Multidisciplinary Journal, 20*(4), 165-176.
- Roy, S. & Covelli, B. (2021). COVID-19 induced transition from classroom to online mid semester: Case study on faculty and students' preferences and opinions. *Higher Learning Research Communications, 11*, 10-32.
- Ruberman, L. (2014). Challenges in the transition to college: The perspective of the therapist back home. *American Journal of Psychology, 68*(1), 103-115.
- Rudland, J.R., Golding, C., & Wilkinson, T.J. (2018). The stress paradox: How stress can be good for learning. *Medical Education, 54*, 40-45.
- Saldaña, J. (2021). *The coding manual for qualitative researchers*. Sage.
- Salehinejad, M.A., Ghanavati, E., Rashid, M.H.A., & Nitsche, M.A. (2021). Hot and cold executive functions in the brain: A prefrontal-cingular network. *Brain and Neuroscience Advances, 5*, 1-19.
- Sandiford, P. J. (2015). Participant observation as ethnography or ethnography as participant observation in organizational research. In Strang K.D. (Ed.), *The Palgrave handbook of research design in business and management* (pp. 411-443). Palgrave Macmillan.
- Shields, G.S., Sazma, M.A., & Yonelinas, A.P. (2016). The effects of acute stress on core

- executive functions: A meta-analysis and comparison with cortisol. *Neuroscience and Behavioral Reviews*, 68, 651-668.
- Shoshan, H.N. & Wehrt, W. (2022). Understanding “Zoom fatigue”: A mixed-method approach. *Applied Psychology*, 71(3), 827-852
- Son, C., Hedge, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students’ mental health in the United States: Interview survey study. *Journal of Medical Internet Research*, 22(9), 1-21.
- Stebbins, R.A. (2001). *Exploratory research in the social sciences*. Sage.
- TIME. (2020, May 21). *Zoom Parties, Missed Proms, Uncertain Futures. High School Seniors Share What It’s Like to Come of Age During a Pandemic.*
<https://time.com/5839010/high-school-class-of-2020-coronavirus/>
- Tobin, T.J. & Behling, K.T. (2018). *Reach everyone, teach everyone: Universal design for learning in higher education*. West Virginia University Press.
- Fuchsia State University. (2020, June 16). [*FSU’s playbook for reinvented operations.*](#)
- World Health Organization. (n.d.). *Coronavirus disease (COVID-19).*
https://www.who.int/health-topics/coronavirus#tab=tab_1
- Xiong, J., Lipsitz, O., Nasri, F., Lui, L.M.W., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., & McIntyre, R.S. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of Affective Disorders*, 277, 55-64.
- Zelazo, P.D., Qu, L., & Kesek, A.C. (2010). Hot executive function: Emotion and the

development of cognitive control. In Calkins, S.D. & Bell, M.A. (Eds.), *Child Development at the Intersection of Emotion and Cognition* (pp. 97-111).

American Psychological Association.

Jennifer Lynn Pusateri

Vita

Educational Institutions Attended and Degrees Already Awarded

M.A.T.- University of the Cumberlands, Williamsburg, KY
Program: M.A.T. Elementary Education
Degree Awarded: 2015

B.S.O.F.- Indiana University, Bloomington, IN
Program: B.S. in Music and an Outside Field
Degree Awarded: August 2001

Professional Positions Held

Owner & Consultant, *Jennifer Pusateri Educational Consulting*, 2020 to present

Professional Development Consultant, *CAST National Faculty*, 2019 to present

Universal Design Consultant, *University of Kentucky*, CELT, 2018 to present

Co-Chair & Charter Member, *International UDLHE Network*, 2019-2021

Education Consultant, *Kentucky Department of Education*, 2015-2018

Accreditation Team Member, *Independent Schools Assoc. of the Central States*, 2015

Teacher: Arts & Humanities, *The dePaul School*, 2010-2015

Education Services Coordinator, *Louisville Science Center*, 2006-2007

Education Director, *Explorium of Lexington*, 2004-2006

Professional Publications

Pusateri, J.L. (2019, March). Elevating Student Voice in Higher Education: Mid-semester

Feedback & UDL. In *2019 UDL-IRN International Summit Proceedings*,
Orlando, FL. Retrieved from

<https://www.learningdesigned.org/resource/midsemester-feedback-udl>

Pusateri, J.L. (2022). *Transform your teaching with Universal Design for Learning: Six steps to jumpstart your practice*. CAST Publishing.

Jennifer L. Pusateri