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Pausing for More: An Exploratory Pedagogical Experience with Mindfulness and Productivity

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Abstract: As college students adapt to new workloads and freedom while facing significant stressors and time management struggles, they need tools to assist their transition. Mindfulness practices have consistently been found to be beneficial to college students’ mental health. Twenty-six students took the Brown & Ryan (2003) Mindfulness Attention Awareness Scale (MAAS) in class, participated in a classroom presentation on mindfulness, purposeful pausing to destress/re-center, and typical personal productivity methods such as time management tools and commonly adopted systems. Then, they selected a way to practice mindfulness and a productivity tool from an in-class presentation and tried implementing them both for three to five weeks depending on when they were able to report progress during the semester again. At this second reporting juncture, students re-took the MAAS, and completed a Qualtrics survey about their practice experience. Students self-reported slightly increased mindfulness via the MAAS, the Qualtrics survey, and anecdotally. Via qualitative feedback, students described their experience of learning the mindfulness and productivity tools in the classroom as understanding, welcoming and comfortable, and of feeling “seen and heard.” Briefly inserting mindfulness and productivity tool instruction into courses, periodically mentioning or having student-initiated conversations about these topics, and setting a faculty expectation that students practice these “best practice” tools, may prove beneficial to students regardless of academic major.

Keywords: pedagogy, mindfulness, student productivity, tools, COVID-19, planning, personal mission statement, breathing, meditation, contemplation, journaling

Student transition and development programs focus on acclimating students to college life’s freedom, workload, pressures, and, in some instances, spiritual development. Student programming such as campus ministry, counseling services, first-year seminar or orientation, student success programs, alerts programs, and support for at-risk students, vary widely within higher education - see for example, center-based programs like Belmont University’s Be Well BU, University of Tennessee, Knoxville’s Center for Health Education & Wellness, and Vanderbilt University’s Center for Student Wellbeing or full-term courses on mindfulness - see for example Gray (2021) and Larson (2020). These activities are firmly established on college campuses, and yet students self-reported mental health struggles and burnout increase, especially with the added stress of the COVID-19 pandemic (Rava & Hotez, 2021; Haomiao et al., 2021; Copeland, et. al., 2021).

Almost a decade ago, over 95% of college counseling center directors reported the volume of students with psychological problems increasing (American Psychological Association, 2013). The pandemic exacerbated this trend (Haomiao et al., 2021; Rava & Hotez, 2021). Burnout, overwhelm, time management issues, student stress, and mental health concerns were compounded as a result of shifts necessitated by COVID-19. The Centers for Disease Control (CDC) “reported significant increases in symptoms of anxiety and depressive disorders among adults aged ≥18 years during August
19, 2020–February 1, 2021, with the largest increases among adults aged 18–29 years and among those with less than a high school education,” (Haomiao at al., 2021, p. 1). The CDC (2021) recommends taking breaks from media, breathing, and meditation as healthy ways of dealing with stress, burnout, and anxiety.

Anecdotally and as documented by campus counseling services, before (Mistler, et. al., 2012; Knopf, 2018) and since the pandemic (Anderson, 2020; Redden, 2020; Salimi, et. al. 2021, Scofield and Locke, 2022), more faculty find themselves referring students to mental health programs and coaching students on methods for managing stress, anxiety, overwhelm, and time management, in efforts to support student focus and productivity (Riberio, et. Al., 2018). Additionally, mindfulness has been recognized and practiced for some time in education, for example, the Mindfulness in Schools Project (2020) has worked for more than a decade to expand mindfulness by educating teachers and certifying schools to engage in mindfulness practices that lead to these perceived benefits: wellbeing and mental health, concentration and cognition, social and emotional learning as well as self-regulating behavior.

### Mindfulness Definitions

Mindfulness may be understood as an attitude that focuses “on the present moment in a non-judgmental and acquiescent way” (Akyol & Demir, 2019, p. 256), and mindlessness is its absence. Yeganeh and Kolb (2009) draw upon the work of Brown and Ryan (2003), as well as Langer (1989, 2000), and others to describe socio-cognitive mindlessness as sensitivity to context, and openness to new information and multiple perspectives. In contrast, socio-cognitive mindlessness involves autopilot, as well as following predetermined rules, engaging in routinized behaviors or rigid perspectives, and lacking the capacity for variation. Yeganeh and Kolb (2009) describe meditative mindfulness as present-centered, nonjudgmental, and purposeful, whereas meditative mindlessness is embodied by habitual rejection, living in the past or future, judgment, and autopilot. Rava and Hotez (2021) describe mindfulness as living in the present, purposefully and without judgment. As Taylor et al. explain, “mindfulness is a practice to cultivate purposeful awareness of the present moment through the careful observation of one’s experiences and sensations as they emerge moment-to-moment without applying judgment,” (2021, p. 1). Understanding and practicing mindfulness may be beneficial to college students as they navigate college life.

A mindfulness practitioner works on becoming conscious and aware through earnest effort to observe self-talk, reactions, actions, thoughts, feelings, bodily sensations, breath, etc. (Tolle, 2004). Mindfulness practitioners deliberately pause, contemplate, and notice, which can lead those who practice it to fuller lives. When a mindfulness practitioner retains a competent mindful outlook, an emotional balance may be achieved, which in turn leads to other positive cognitive, interpersonal and professional benefits ranging from anger management to acceptance (Kabat-Zinn, 1994; Nortje 2020; Cullen & Pons, 2015) and even to inducing functional and structural changes in the brain (Gotink et al., 2016).

### Benefits of Mindfulness

As Richard Rohr writes:

[Buddhist teacher/Nun] Pema Chödrön teaches three graces of mindfulness practice: precision, gentleness, and letting go. Once we can honestly acknowledge whatever is going on in the moment with clarity and acceptance, we can let our unmet expectations go. This allows us to live more freely and vibrantly, fully awake to Presence (2015).
It is from this “awakened” emotional state (mindfulness) that college students, as well as any other type of person, can experience an improvement in quality of life. Previous research has indicated that mindfulness is beneficial in the classroom environment. Leupol, et. al. (2020) found that mindfulness classroom interventions outside of wellness courses also increased perceived organizational support in student populations, which negatively correlated with burnout, with the instructor initiating the intervention acting as a simulacrum for the institution. Leupol, et. al. (2020) also found statistical significance at the $p < .05$ level between perceived organizational support and core self-evaluation, which is defined by Judge, Bono, and Thoreson (2003) as self-esteem, self-realized self-efficacy, emotional stability, and internal locus of control, which are all achievable through mindfulness.

Mindfulness practices were demonstrated to be beneficial to mental health during the COVID-19 pandemic. Rava and Hotez (2021) incorporated journaling into coursework during the pandemic and identified four major themes in the entries of 55 undergraduate student participants: COVID-19, assessments of mindfulness and wellbeing (positive, negative), emergent concerns, and coping strategies. Rava and Hotez found students verbalized shifts toward mindfulness and exhibited centering activities such as focusing on what they could hear, see and feel at the moment of journaling.

Although mindfulness is often anecdotally thought of as part of self-care, good health, and even relaxation, Aykol and Demir (2019) explain that mindfulness supports professional achievement. The stressors of students are comparable to any occupational burnout, in that the work of students is the educational setting and its responsibilities (Akyol & Demir, 2019). On top of demands for grade achievement, students are undergoing both physical and cognitive development as part of their maturation process. This transitional period can yield emotional or psychological problems (Larson, 2020) unless it is carefully navigated and mindfulness can serve as a solution for various negative emotions, (Akyol & Demir, 2019, Gray, 2021). Using the Mindfulness Attention Awareness Scale and the Maslach Burnout Inventory Student Scale, Akyol and Demir found a negative correlation between mindfulness and burnout scores (2019), and they encourage incorporating mindfulness into schools to prevent student burnout. Stress is often a precursor to poor mental health and stressors originate from new environments, workload, relationships, and many other sources. Coping skills are crucial to managing negative outcomes (psychological disorders, suicidal ideation, and attrition) in student populations, including mindfulness and time management practices (Akyol & Demir, 2019).

**Mindfulness In Action**

Yusufov et al. (2018) conducted a retrospective review of 43 mindfulness training studies with undergraduate and graduate students varying in intervention lengths from one day up to twelve weeks. The authors found interventions with the Mindfulness-Based Stress Reduction (MBSR) techniques were able to reduce medically measured anxiety but not perceived stress. Participants receiving intervention were shown to have a statistically reduced amount of anxiety compared to a control group at $p < .001$ (Yusufov et. al. 2018). The authors also note brief interventions that can easily be incorporated into an academic term may be effective with students, (Yusofov et al., 2018). Similarly, Taylor et al. (2021) found mindfulness indicators increased among individuals who had longer durations of using a mindfulness video streaming service.

Kolb’s Learning Styles are widely used in training and development and are often incorporated into group project coursework, (Chiu, 2019; Halstead & Martin, 2002; Ofaz & Turunc, 2012). Blending concepts of learning styles and mindfulness, Yeganeh and Kolb (2009) found mindfulness can be cultivated using strategies particular to each of Kolb’s four distinct learning styles, defining mindfulness as “a state in which an individual 1) focuses on present and direct experience, 2) is intentionally aware and attentive and 3) accepts life as an emergent process of change,” (2009 p. 14).
Building on Kolb’s (1984) work that explains people learn by both grasping (Concrete Experience; Abstract Conceptualization) and by transforming (Active Experimentation; Reflective Observation) the experience, Yeganeh and Kolb examined participants who participated in both Kolb’s Learning Styles Inventory (2007) and Brown and Ryan’s (2003) MAAS to determine whether mindfulness increased learning from experience. Yeganeh and Kolb found that participants benefited from different mindfulness practices according to learning style. Yeganeh and Kolb concluded that “simply presenting techniques for mindfulness practices...generate[s] interest resulting in self-driven exploration of mindful experiential learning,” (p. 18) and the authors encourage learning style-based mindfulness practices and interventions be incorporated into coursework. Yeganeh and Kolb suggest different types of mindfulness practices resonate with each of the four learning styles.

One way of practicing mindfulness is outlined by Chadsey and Jackson who explain the history and educational benefits of the Circle of Trust® method created by Parker Palmer. The authors describe how Palmer recognized that the communal inquiry model used within Quaker Clearance Committee Meetings could have valuable applications outside that faith community. Like in Rava and Hotez' (2021) explanation of mindfulness as a way of living in the present, the Quaker practice of communal silence that is implemented in the Circle of Trust® method asks practitioners to focus on the here and now as they wait for wisdom to emerge, ready to be shared in fellowship. This is a mindfulness practice. Palmer identified that a similar method he devised could function specifically to improve secular teaching capabilities: “The more closely a pedagogy can emulate this communal process, cultivating these habits of heart and mind as it goes along, the deeper the learning will go,” (Chadsey & Jackson, 2012, p. 1). They explain that the group experiences facilitated by the Circle of Trust® method have transformed the teaching abilities of educators in K-12 and higher education. Educators learn and reflect together in a communal setting, and their experiencing the Circle of Trust® prepares them to create improved learning environments. Chadsey and Jackson (2012) recommend adopting the Circle of Trust® method to the classroom itself so that educators may help their students find inner wisdom too. When practicing the Circle of Trust® approach, purposeful pausing is used to cultivate an attentive state of mind.

Purposeful pausing is more than simply stopping an activity, it involves intentionally settling the mind, focusing, noticing, listening, becoming more open to the experience and channeling attention into the present moment and its experiences (McIntyre, 2018; Marturano, 2019; Golding, 2020). Purposeful pausing and mindfulness seem to make a difference for professionals. Goodman and Schorling (2012) determined that after undergoing mindfulness and stress-reduction training, medical providers’ mental health increased and their burnout decreased as measured by the MBI-SS, a questionnaire that measures Emotional Exhaustion (inability to experience emotion at work), Depersonalization (providers’ emotional distancing from their patients), and Personal Accomplishment (“feeling of achievement related to working with people”) (p. 122). Four types of mindfulness activities were taught to participants, who were asked to practice one of the techniques for 45 minutes per day, six days a week, and had audio recordings to guide them in their at-home work. Session topics included an overview of mindfulness, how to apply mindfulness to daily life, mindful movement, using mindfulness in challenging situations, mindful communication, practicing appreciation, compassion meditation, and a final review of all topics.

The medical professionals were asked to pay special attention “particularly at work, to their physical, emotional, and cognitive responses,” (Goodman & Schorling, 2012, p. 122), and their reflections were discussed the following week at the class meeting. Goodman and Schorling determined that after undergoing mindfulness and stress-reduction training, medical providers’ mental health increased and their burnout decreased. Lessons learned in long-form interventions in stressful environments should have applicability to other situations.

Fast-paced industries like public relations and publishing, where multi-tasking and hard
deadlines are the norm, are adopting mindfulness-based practices that encourage pausing and reflection, with regular publications focusing on the benefits of pausing or decompressing. For example, Jacques (2020), writing in a monthly publication for public relations practitioners, extols the benefits of disengaging from distractions, sticking to a schedule, making time for quiet, refueling and exercising, and checking in with oneself. Similarly, Swanson (2014) provides examples of mindfulness and mindlessness in public relations practice and stresses the benefits of engaging in mindfulness strategies within public relations, and offers strategies for a more mindful workplace, including understanding the mind, collaborative, non-linear approaches, embracing complexity, expect ambiguity, work for a more mindful media – e.g., provide substantive content, and balance work and life.

Swanson’s later study (2020) expressed the value of mindfulness interventions in public relations education. He specifically examined mindfulness among public relations practitioners and students using Brown and Ryan’s (2003) MAAS and found both groups answered similarly. He suggests mindfulness intervention strategies in both educational and workplace settings, from asking probing questions to online presentations on mindfulness to in-class activities. He found that public relations professionals and students were familiar with the term and concept of mindfulness. Half of the public relations professionals and 24% of students said that mindfulness was relevant to public relations work. “Most respondents reported that mindfulness is related to presence in the moment and that it has links to productivity and meditation,” (Swanson, 2020, p. 44).

Introducing Mindfulness and Productivity to College Students

To introduce students to the benefits of practicing mindfulness and purposeful pausing as well as to expose students to popular concepts related to productivity, the authors prepared an in-class presentation on common mindfulness and productivity practices. It was necessary for practical purposes (a single intervention which had just one class period’s amount of time to complete) to narrow down the plethora of options for both portions of the presentation. Faculty engaged with this study presented multiple suggestions to help students tame their deadline-driven workloads, although students did not all apply every method. These tools were determined through a combination of literature review, as indicated below, and author experience. Each author had various personal successful methods of professional productivity, as well as mindfulness-cultivating habits, and drew on these to spark a literature review which eventually informed the presentation.

Mindfulness Tips and Tools Considered for the In-class Presentation

Ways of being mindful include purposeful pausing, reflective writing, and meaningful contemplation of both experiences and texts, as indicated by Chadsey & Jackson (2012), Goodman & Schorling (2012), Brown & Ryan (2003), Gray (2021), McIntyre (2018), and Yeganeh & Kolb (2009). The in-class intervention incorporated mindfulness practice instruction derived from the following.

Reflection at the level of contemplation is much more than knowing, Rohr (2021) describes it as “the practice of being fully present—in heart, mind, and body—to what is in a way that allows you to creatively respond and work toward what could be,” (Center for Action and Contemplation, 2021, ¶ 1). This references a deeper level of being and learning, summarized in Ignatian Pedagogy mantra of Experience – Reflection – Action, these proven, common practices assist the human learning and growing process (Jesuit Institute, University of Edinburgh) and are aided by purposeful activities such as those described below.

Julia Cameron developed and popularized the concept of Morning Pages in the book *The Artist’s Way*. Practicing Morning Pages means that right after waking each day, a person free-writes
three pages about whatever flows through the mind at that moment. It is a brain-clearing exercise that helps one see what is occupying space in the mind, what may need attention, what is important to focus on, etc. She recommends that once the act of writing these pages is complete, they are put away and not looked at again (2016). She explains that there is no wrong way to do morning pages, because just the act of doing them helps “provoke, clarify, comfort, cajole, prioritize and synchronize the day at hand,” (Cameron, 2021, ¶ 1).

Journaling is not the same as Morning Pages. Journaling is more purposeful and is generally based on prompts, that can be anything – e.g., What makes me happy? What am I proud of today? Where do I see myself in five years? What are my career goals? If I were to say anything to my teenage self, what would it be? Etc. Some people journal their prayer life, others journal their hopes and dreams, etc. Many people use journaling as a daily examen or examination, through which these types of questions are answered: For what am I grateful? What do I really want for myself? How have I demonstrated love? How can I be better tomorrow? (Ignatian Colleagues, personal communication, 2020). Several planners, like Passion Planner®, Panda Planner®, Erin Condren®, Phoenix Journal®, and religious-based journaling planners build journaling prompts into organizational systems, so commonly available tools can help incorporate journaling into daily life.

A key concept of mindfulness practice is—being present and experiencing the now—focuses on elevating awareness, both (1) internal— of thoughts, feelings, etc., and (2) external— of surroundings, happenings, etc. Eliminating distractions, focusing on the moment at hand, and lessening the amount of psychological time invested in the past (e.g., I should have done X differently), or future (e.g., once Y happens, I’ll be happy), all help a person to create contentment now. Now and presence are crucial to mindfulness practices.

Tolle (2004) espouses the benefits of living in the now, rather than in the past or future, and stresses the additional importance of consciously experiencing the moment. He also emphasizes noticing thoughts, quelling internal chatter, offering oneself positive affirmations rather than listening to negative self-talk and focusing on handling situations rather than investing psychological time in turning those situations into problems (Tolle, 2004). One way to heighten awareness is via the proven mindfulness practice of meditation. Pencock & Alberts (2019) explain that meditation should be timed, begins with a quiet place and centering breath, then progresses to awareness of physical sensations, and then to awareness of mental activity, then purposeful attempts to calm mental activity, while breathing slowly and deeply, then close the session with positive thoughts. College students with heightened test anxiety or general stress benefit from any nervous system relaxation, which meditation has been proven to provide.

Sometimes contemplation of a purposefully selected text can yield a deeper understanding or clarity of thought. For example, the Circle of Trust® approach includes a poem or other brief text, read silently, then reflected upon, then read aloud, then discussed. This brief pause can help with grounding and focus. Another example of this type of purposeful pausing is Rohr’s daily meditation emails, to which he adds these reflection questions to spur contemplation: “What word or phrase resonates with or challenges me? What sensations do I notice in my body? What is mine to do?” (R. Rohr, personal communication, Dec. 31, 2020). This type of contemplation and reflection, practiced on occasion, can yield clarity of thought, deeper appreciation and gratitude, a welcome respite from busyness, and much more. In the Circle of Trust® approach explained previously as well as in other non-trademarked mindfulness practices, it is common for participants to read, reflect, and discuss a reading of some sort.

Establishing dedicated time to practice smart work patterns, practicing mindfulness, setting goals, prioritizing activities, proactively scheduling time to work on these activities, evaluating progress, minimizing distractions, clarifying thought through freewriting or journaling, focusing on being present/experiencing the now, meditating, and contemplating selected texts may assist in
lessening overwhelm or burnout (Gray, 2021, Chadsey & Jackson, 2012; Rava & Hotez, 2021, Yeganeh & Kolb, 2009, Haomiao, et. al., 2021). While it may seem contrary to productivity inclinations, regular pausing is beneficial. Whether that pause is to organize work, self-center, or purposefully consider something other than a To Do list, pausing may lead to more wellness (Marurano, 2019).

Productivity Tips and Tools Considered for the In-class Presentation

Productivity tips for desktop organization can help users work more quickly and logically (Schubert, 2017). Since most work is done in the digital realm, keeping computer desktops organized boosts productivity (Dachis, 2011). Busy students can be easily distracted, and creating environments for work that is as focused as possible is vital. Dachis (2011) notes that cluttered worktops lead to cluttered minds, and Schubert (2017) suggests that limiting icons and shortcuts on a desktop to less than half of the space can assist with mental clarity. Using a neutral background image can also assist in a clean desktop appearance (Dachis, 2011; Schubert, 2017).

Users should regularly delete or reorganize desktop icons (Alton, 2018). Using the “ABCD method” of prioritizing document importance can help determine what icons should be on the desktop, what should be organized elsewhere, etc. (Schubert, 2017). Only the things used daily qualify as “A” in importance and should remain accessible on the desktop; other applications and folders should be tucked out of sight with varying degrees of fast accessibility. There are even programs that can automatically determine a user’s frequency of use for programs and sweep them from the desktop on their behalf.

Utilizing folder and subfolder organization for files and applications is a best practice (Alton, 2018). Shortcuts to various folders may be created (these are called an alias) and dropped onto the desktop for fast access. This allows older computers to run faster and may save time. The alias shortcuts can be organized on a desktop in several ways: alphabetization, by type (apps and files in separate halves or quadrants), or by theme (e.g., finance, work, and family files in separate halves or quadrants).

The “visual overwhelm” email users experience by working daily out of full inboxes is unhelpful to productivity. Implementing “Inbox Zero” strategies brings email inboxes closer to containing zero messages, which helps professionals’ organization and work speed, and may alleviate frustration (Raphael, 2018).

Rubinstein et al. (2001) demonstrate that general multitasking creates cognitive delay as workers switch between task focuses, thus making each goal task take longer. Johnson (2016) applies this methodology to inbox management by recommending that users check email at designated times throughout the day to increase overall productivity. By not keeping email open all day, users can prevent frequent interruptions from incoming messages (Raphael, 2018). This decreases the overall time major tasks may take by providing uninterrupted work time.

Raphael explains that email response triage is a tool for organizations (2018). To quickly lighten inbox load, an email user can archive messages that need no response, and immediately answer messages that can be dealt with in under a minute. Raphael suggests viewing email as a messaging service. By keeping responses to under five sentences whenever possible, users write responses so that brevity is helpful to their contacts. A final strategy for new email messages is to snooze them until they can be handled. Both Raphael and Johnson exhort decreasing email traffic overall by unsubscribing from marketing emails so that time is not wasted deleting emails daily. Finally, taking time to create email templates for common responses saves time in the long run (Raphael, 2018).

Schedulers and visualizing time management tools (Success Center, n.d.) can improve a person’s ability to do the things necessary to satisfy commitments. These tools can help increase the discipline, quality, and amount of time dedicated to specific tasks. One easy way to effectively manage
time is to define and dedicate blocks of time within the 168-hour week. Student success personnel have been recommending time-blocking grids for decades (see for example Success Center, n.d.). Time blocking begins with a grid (or spreadsheet) that contains columns for seven days and rows for non-sleeping hours of the day, which provides a visual of the roughly 110 weekly hours with which to build a full and productive life. Next, obligated time is blocked out on the grid – e.g., class time, work time, regular meal times, commute, or preparation time. Then, free time is identified and assigned – e.g., studying, having fun, or working toward goals. Time blocking helps visualize what should or can be done and when. It can also help harness time wasters. Setting aside time each day for checking/responding to/acting on email or social media, helps lessen the likelihood that hours per day are mindlessly lost to such activities.

Schedulers like Erin Condren®, FranklinCovey®, and PlannerPad® work similarly. These tools encourage goal setting and scheduling, and also the periodic examination of progress toward goals and external roles. A weekly planning pause helps gather thoughts in the context of roles and goals (Covey 2020; Leonhardt, 2017). Once obligated time is blocked out on the scheduler, then free time can be dedicated to making progress. The PlannerPad system refers to this as a scheduling funnel that encourages users to identify what needs doing, pick a day to do it, then schedule a time to get it done. Establishing a reasonable schedule, adhering to it, setting parameters for the how and when of working and even rewarding oneself for good time management should increase both discipline and productivity.

One way to get the most out of scheduled activity is to commit to high-intensity focus on one task at a time, for a limited time. The word pomodoro is tomato in Italian, and Francesco Cirillo quite literally named the Pomodoro® Technique after the common tomato-shaped kitchen timers. Benefits of this work method include cutting down on interruptions, improving the content and quality of work products, helping meet deadlines, and decreasing estimation errors for how long tasks will take (Cirillo, 2020). Explanations vary, but contain these common steps: 1) choose a task or project; 2) set a timer for 20 to 30 minutes; 3) work diligently for that entire period on that one thing; 4) when the buzzer sounds, take a break of just a few minutes; 5) repeat for the duration of the block of time dedicated to working on that project; 6) record each session in your planner or notebook with an X or a tick mark and 7) after several sessions, take a longer break (Cirillo, 2020; ToDoist, n.d., Collins, 2017). Larson (2020) similarly recommends focused working.

Covey originally published his seminal work The 7 Habits of Highly Effective People in 1989 after spending most of his career studying successful leaders and leadership. He found several truisms that have helped millions of people achieve both private and public victories yielding greater personal performance and productivity; those are as true today as they were then. All seven habits are important, but some are more applicable to college students. The first of his seven habits is to be proactive. According to Oxford Dictionaries, proactivity refers to “creating or controlling a situation by causing something to happen rather than responding to it after it has happened,” (2021). Once time and energy are channeled into proactivity, there are fewer crisis-type situations. For example, students who do a little project work, regularly, from the moment something is assigned until it is due, are more controlled and less frantic than students for whom everything is a surprise or tackled only on deadline. Simply planning out work by considering tasks and order to achieve desired results, then breaking the work into manageable chunks spread out over time will benefit performance and productivity. Covey’s second habit to begin with the end in mind, urges the development of a personal mission statement that defines and directs the person, sets clear boundaries, and helps him or her be principle-directed, as well. It should be brief, at most, and provide a framework upon which to make principled, purposeful decisions related to activity, participation, and major life choices. Covey (2020) explains the concept in great detail, but Andrews offers five questions a person can reflect upon to help a person set a personal mission statement: 1) What is important?, 2) Where do I want to go? 3) What does “the best”
look like for me? 4) How do I want to act? 5) What kind of legacy do I want to leave behind? (2021, ¶ 20). Covey's third habit is to *put first things first*. He encourages classifying tasks along four quadrants: Urgent | Not urgent + Important | Not important (see Figure 1) (p. 173).

![Figure 1. Covey Time Management Matrix.](image)

He advocates the least amount of time be spent in Quadrant 4 and the important tasks in Quadrant 2 be given priority. Covey recommends coding tasks by their quadrant in a planner so that more time is given to what's important than to distractions. His seventh habit, *sharpen the saw*, encourages investing time in continuous self-improvement and development of the physical, mental, and spiritual capability to avoid burnout, effectively extolling the benefits of practices like mindfulness. Covey (2020) urges incorporating some or all of these principles to yield greater productivity.

Undergraduates may not have the organizational or mindfulness skills that administrators, faculty, and internship sites presume the population to have developed before college enrollment, (Balduf, 2009; Dikmen, 2022). Student trial-and-error learning about how to be productive occurs in the high-stress incubator of the busy semester filled with worries about academic performance, pressure to succeed, and post-graduation plans (Beiter, 2015). Exposure to and practice of methods to work efficiently and healthfully should be beneficial to students before internships, real-world employment, and within the educational framework as well (Larson, 2020).

The literature reviewed before the development of the classroom intervention most frequently related to full-term courses or programs (Gray, 2021; Larson, 2020; Rava & Hotez, 2021, Goodman & Schorling, 2012), therefore, the contribution of this study is to demonstrate that a brief in-class introduction to the concepts of productivity and mindfulness with encouragement to test and begin incorporating tools, should prove beneficial to students and their work as this study explores these research questions:

**RQ1:** In what ways will students who have been introduced in the classroom to concepts of personal productivity and mindfulness report behavioral adaptation?

**RQ2:** How can faculty incorporate mindfulness and productivity-enhancing strategies into regular curricular offerings, regardless of academic discipline, to assist student well-being?


Classroom Intervention

Method

After approval from the Institutional Review Board, the in-class intervention of a dedicated class session and presentation was conducted during the fall semester of 2021 in two classes of traditional undergraduate students at a 64% female, mid-sized, High Research Activity (R2) institution. Both undergraduate literary publishing classes for this exploratory study were taught by an author of this study: 1) an introductory course (The Publishing Process), and 2) an advanced course (Media Relations & Branding). In both instances, the courses are designed for students who desire to work in a fast-paced entertainment industry. As the presentation was done in class, all students in both courses participated, though only one male student was enrolled in either class. The majority of students studying in this major skews female and only one male student was enrolled in either class.

After an informed consent brief, students were asked to complete a Mindfulness Attention Awareness Scale. Next, the instructor gave an approximately hour-long presentation: 30 minutes on productivity tools and 30 minutes on mindfulness. The in-class presentation included 25 slides that covered productivity and productivity enhancement techniques (Seven Habits, goal-setting, Pomodoro, Inbox Zero strategy and desktop management), mindfulness and mindfulness enhancement techniques (definitions, examples, how-to information on breathing, meditation, contemplation, Morning Pages, journaling) and incorporated practicing a purposeful pause that allowed students to contemplate and reflect on a selected poem. “The Guesthouse” by the 13th-century Persian poet Rumi was selected for the in-class text upon which to purposefully pause and contemplate. The poem describes the difficulty of human existence in its transitions between competing and even conflicting emotions, which the authors deemed an appropriate selection at that point of the COVID-19 pandemic:

This being human is a guest house.  
Every morning a new arrival.  
A joy, a depression, a meanness,  
some momentary awareness comes  
as an unexpected visitor.  
Welcome and entertain them all!  
Even if they’re a crowd of sorrows,  
who violently sweep your house  
empty of its furniture,  
still, treat each guest honorably.  
He may be clearing you out  
for some new delight.  
The dark thought, the shame, the malice,  
meet them at the door laughing,  
and invite them in.  
Be grateful for whoever comes,  
because each has been sent  
as a guide from beyond. (The Guest House by Rumi)

The speaker in the poem lauds accepting present moments as a path to personal growth—the ultimate lesson in mindfulness. The poem was included in the presentation followed by moments of silent contemplation and then brief discussion. At the end of the presentation, they were asked to select one
mindfulness tool and one productivity tool to implement into their routines in the coming weeks. Additionally, students engaged in class discussion and asked questions of the instructor.

Three weeks later, Brown & Ryan’s 2003 Mindfulness Attention Awareness Scale was readministered in class, followed by a classroom discussion of their selected productivity and mindfulness practices. Because of a Hyflex classroom environment (a COVID-19 attendance practice with some students in-person and some online), some students took the MAAS upon return to the class after remote learning, meaning they may have had up to an additional two weeks before taking it, depending on the student. The MAAS contains 22 items that measure openness to experience (fantasy, aesthetics, feelings, actions, ideas, values), trait meta-mood (clarity, attention, repair), mindfulness/mindlessness (flexibility, novelty seeking, novelty producing, engagement), self-consciousness (private: self-reflectiveness, internal state awareness), public self-consciousness, social anxiety, reflection, rumination, self-monitoring, need for cognition and absorption, but it is a self-scored tool similar to Kolb’s Learning Styles Inventory. To link pre- and postMAAS responses and to ensure anonymity, students were asked to select a pseudonym and use it to label both in-class MAAS administrations. At the first administration, each student sealed his/her envelope containing the selected pseudonym. These envelopes were collected by the faculty member, held between test administrations, and returned to the student before the second MAAS exercise. After both administrations of the MAAS exercise, a brief 8-question Qualtrics survey developed for this study about the mindfulness tool/productivity tool trial was sent to all students in the class. Students were asked to anonymously report which productivity and mindfulness concepts were put into practice, to rate the helpfulness of what was attempted, and to reflect briefly on the experience. Additionally, in participating classes, the instructor or students occasionally informally referenced materials covered in the presentation related to productivity and mindfulness.

Results

Each student’s aggregate score was compared from the first to the second administration, with the overall MAAS pre-intervention mean of $M=3.29$ and the MAAS post-intervention mean of $M=3.55$, the sample was too small for robust statistical analysis but indicates a small, mostly positive increase after the intervention. Of the 26 students who completed both administrations, only six students had a lower MAAS score on the second administration.

Table 1. Students’ Aggregate MAAS Scores with difference.

<table>
<thead>
<tr>
<th>Student</th>
<th>Reported MAAS 1</th>
<th>M Reported MAAS 2</th>
<th>M Difference: MAAS Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.4</td>
<td>4.26</td>
<td>1.86</td>
</tr>
<tr>
<td>2</td>
<td>2.06</td>
<td>3.73</td>
<td>1.67</td>
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<tr>
<td>3</td>
<td>3.2</td>
<td>4.6</td>
<td>1.4</td>
</tr>
<tr>
<td>4</td>
<td>2.6</td>
<td>3.4</td>
<td>0.8</td>
</tr>
<tr>
<td>5</td>
<td>4.2</td>
<td>4.87</td>
<td>0.67</td>
</tr>
<tr>
<td>6</td>
<td>3.53</td>
<td>4.13</td>
<td>0.6</td>
</tr>
<tr>
<td>7</td>
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<td>3.2</td>
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</tr>
<tr>
<td>9</td>
<td>3.33</td>
<td>3.73</td>
<td>0.4</td>
</tr>
</tbody>
</table>
In the brief follow-up Qualtrics survey \((n=16)\), 31\% of the students reported sharing the information they learned with others. Students reported which mindfulness tools they incorporated after the intervention: deep breathing (56\%), Morning Pages/journaling (25\%), meditation (13\%), or contemplation of a text (.06\%). The closed-ended ratings and the open-ended responses were aligned and indicated a positive experience. Of the 16 students who rated their experiences with the selected mindfulness tools on a seven-point scale, \((M=5, SD = 1)\), 50\% rated the selected tool as somewhat helpful and 25\% rated it helpful. No students rated their selected tool as unhelpful, 12\% selected neutral and .06\% selected either somewhat unhelpful or extremely helpful.

![Figure 2. Student-rated helpfulness of the selected mindfulness tool (n=16).](image-url)
Students then reported which productivity tools they incorporated after the intervention \((M=6, SD=1)\) — inbox management (38%), time/schedule management (31%), priority management (19%), or desktop management (13%). They rated their experiences with the selected tools: 50% indicated helpful, 19% said their tool was extremely helpful, 19% selected neutral and .06% said somewhat helpful. No students said the selected productivity tool was either unhelpful or somewhat unhelpful.

![Productivity Tool Helpfulness (n=16)](image)

**Figure 3. Student-rated helpfulness of the selected productivity tool.**

The qualitative responses were positive, without fail, regarding the benefits of the classroom intervention and the students’ trial of mindfulness and productivity tools. The *prima facie* themes were *change*, *control*, and *interest* as indicated by these exemplary statements to the question of their “one big takeaway:”

- “It really changed my perspective on how unsustainable my practices were, especially in work.”
- “By planning my day correctly and having a set schedule, I feel much more relaxed and confident about my assignments and throughout my day.”
- “I was blown away by how much there was in this idea of living in mindfulness. I really hope to slowly incorporate it more in my life and to learn more about it because I find it so interesting.”
- “The comparison between mindfulness (being in the present) and mindlessness (ruminating in the past or future) was a really important distinction for me to make as I realized I’d been spending quite a bit of time in mindlessness.”

The *prima facie* themes of how students benefited were *growth*, *agency*, and *awareness*, as indicated by these exemplary responses:

- “I have learned to connect more with my current reality instead of focusing either on the past or the future. This has helped me take bites out of what I need to accomplish instead of panicking at everything that needs to be done and not accomplishing any of it.”
- “The Pomodoro method helped me retain more information when studying, as well as make me feel more productive. I will definitely continue to use this method when studying or getting tasks done.”

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“Being aware of my own mindfulness has made me begin to look at life day-by-day as a way to manage my stress, schedule, and worries.”

“I feel more present in my life.”

“I feel I am better at managing my time and being more efficient within the time I have set aside to do work.”

Because the MAAS was administered as part of a classroom activity, in one course an additional reflective assignment was incorporated into the curriculum. 11 qualitative reflections were gathered as part of the course, which included valuable feedback about incorporating the presentation and tool trial into the course; the following are exemplary:

- I feel thankful that there is an open and honest dialogue about mindfulness in our classroom, and I can't wait to continue putting these tips to good use.

- Overall, I got a lot of value out of both taking the MAAS and further discussing mindfulness and burnout in class and am very grateful for being able to openly learn about and discuss these prevalent topics in an academic environment.

- This presentation being given in a classroom has made me feel a bit more understood. I feel more valued and seen as a person, rather than one of many students in a classroom. It is comforting to know that I am not the only one who experiences overwork and that professors are open to discussing this problem with us students.

**Additional Indications of Subject Matter Relevance**

An important bit of informal, anecdotal feedback gleaned in subsequent classroom interactions was that by receiving this intervention in a classroom specifically, students felt “seen and heard” by their instructor. Additionally, the informal manner with which the topics of mindfulness and productivity subsequently seamlessly entered multiple classroom discussions in the participating classes as initiated by students also indicates impact. These topics even manifested in unrelated assignments, e.g., in a group project for one of the courses where the intervention was presented, students were assigned to create their own magazine and one group decided a wellness-based publication would be their theme. Interior to the content of the magazine were articles about mindfulness that indicated students’ further exploration and sharing of some tips presented in the intervention, including a quiz they created entitled “What Unique Mindfulness Practice Should You Try?” At the conclusion of their presentation, another student in the course asked the group if the intervention presentation earlier in the year had influenced their decision to use this topic for their project; the group response was that they shared an interest in wellness, but learning about mindfulness in the classroom helped them crystallize this theme when the project was assigned, and provided them additional concepts and material to incorporate and expand on within the assignment. The group verbalized that without the intervention, they probably would not have considered the topic for in-depth exploration through the project.

The intervention has observable “sticking power” for this group of students. Spring semester 2023, nearly two years after this presentation, students continue to, anecdotally and without prompting, comment upon things they learned in the presentation, for example, bringing up in advising appointments the power of implementing “Inbox Zero” strategies or how mindful breathing has become a part of daily routines.
Discussion

Literature indicates the successful incorporation of mindfulness into full courses and campus programming. This exploratory study found that students expressed growth in productivity and mindfulness through both their MAAS scores and through the brief questionnaire as well as informally through subsequent assignment material. Mindfulness and productivity can be informally incorporated into courses briefly through a one-class meeting presentation and limited-time tool adoption trial; the shared experience lends itself to subsequent conversations and informal interactions that include both practices. Dedicating a class period rather than multi-week programming, as previously indicated in the literature, to these topics seemed to improve the courses for their duration, and individual activities or incorporating mindfulness and productivity discussion into regular classroom activities may have a similar impact.

No information shared within the intervention was discipline-specific, and any course with an instructor willing to dedicate a class period to the classroom intervention could support this content. In student programming (e.g. campus ministry, counseling services, freshman seminar or orientation, student success programs) and in general education wellness health courses, students may be exposed to productivity or mindfulness instruction, but integrating these into a regular major or minor course, with adaptation trial expected, seemed to underscore the importance of such activities.

Likely impacts to this exploratory study include the following. The second MAAS was administered closer to mid-semester and the curve of typical mid-semester stress, compounded by the COVID-19 pandemic, could have overwhelmed possible benefits of students’ mindfulness practice and could explain the drop in some MAAS scores between the intervention and the final data acquisition. Additionally, students were not required to implement their tools (either mindfulness or productivity) as part of an assignment, so not all students likely applied their selected methods after the presentation and this could have factored in the second MAAS administration. The Hyflex classroom model, adopted for the COVID-19 pandemic, made anonymous participation difficult for fully online students, who were encouraged to participate in the MAAS administrations, but their data were not gathered.

Limitations

Though the institution is majority female, a sample size of 26 participants in two classes, with only one male student enrolled, is exploratory, and more studies with higher numbers of students are recommended, with more diversity in students’ areas of study and demographics. Class size could either increase or take away from the impact of future findings if various class sizes were explored, rather than the small sizes within this exploratory group. Aggregate means collected via an in-class activity do not allow robust statistical analysis. The number of questionnaire variables can be increased to allow for more robust data collection and analysis.

For Further Study

More confirmation of the self-report would be interesting to implement in a future iteration of this study. A required mindfulness practice in a course could lead to higher student performance, as indicated by Gray’s (2021) study featuring daily practice and Rava and Hotez’s (2021) study featuring journaling.

It would be helpful for future productivity and mindfulness in-class activities to include a one-page handout listing the mindfulness and productivity tips so students have an easy reference tool rather than relying on memory, notes, or a multi-slide presentation when implementing their chosen
tips for practice at home.

Although one version of a short intervention was used for this exploratory study, other models of short interventions with varying mindfulness and productivity tool variations could be utilized to broaden future studies, as ways of practicing mindfulness and working productively are more numerous that what this study presented to students.

Another study might shorten the full-class intervention to just a portion of one class. It would also be interesting to progress from a single-session intervention combining productivity and mindfulness to a full-term study examining the impact of multiple in-class interventions during the term, perhaps three: the introductory presentation, a check-in/reminder presentation, and a wrap-up presentation, as an alternative to the multi-week or semester-long studies found in the literature. This latter suggested model for future research maintains the shorter intervention ethos while also offering more check in points for educator and student to reinforce learning and positive experiences with the tools of the intervention.

**Conclusion**

The results of this exploratory study were consistent with prior published research indicating positive correlations between mindfulness and quality of life for students (Gray, 2021; Rava & Hotez, 2021). A single class insertion of mindfulness and productivity tool instruction into courses, having regular conversations about these topics, and setting a faculty expectation that students put these tools into practice, may prove beneficial to students regardless of academic major.

Indications related to this single classroom intervention are that students exposed to productivity and mindfulness information and practices seem to have been positively impacted. Students reported trying both productivity and mindfulness practices and finding these helpful. Educators implementing a similar program should benefit undergraduate students’ mindfulness and productivity practices, which have been shown to reduce stress and lead to healthier emotional wellness (Leupold, et. al., 2020). Although implementing these types of interventions could seem more practical in a general education or workshop setting, this study seems to indicate the importance of individual professors, across the academic enterprise, addressing the topics of mindfulness and productivity within their classrooms. Though exploratory, this study indicates it is possible to affect productivity and mindfulness through increased familiarity and heightened exposure via a single brief program exposing students to concepts and tools. The advantage to this style of single intervention classroom mindfulness training is in its simplicity and ease for the educator, who need not be a mindfulness expert to implement it (as proven by this study conducted by educators who are hobbyist mindfulness practitioners). It would not be difficult to train educators of any discipline to facilitate this simple classroom tool, which may help college educators facing an ever-increasing population of stressed students to support student wellness and academic success.

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**References**


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Silos to Synergy: Experiences of an Interdisciplinary Trainee Network

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Abstract: With global increases in older adult populations, there is a critical need for interdisciplinary research to address the complexities of aging. Graduate and post-graduate scholars, within academic institutions, are ideally situated to develop interdisciplinary research skills. Academia provides many opportunities for building relationships, developing interdisciplinary skills and knowledge, and initiating collaborative projects and networks. This quality improvement (QI) project sought to explore how the experiences of graduate students’ and post-doctoral fellows’ participation in an interdisciplinary trainee network for research on aging informed the development of interdisciplinary research competencies. The QI approach was informed by principles of reflexivity whereby participants reflected on their development as interdisciplinary researchers through their engagement in the network. Key findings included: the contribution of institutions and structures, transcendence of boundaries, and development at the level of the individual and community. Findings highlight the value of investing in trainee development in interdisciplinary collaboration, within and beyond aging research, and can also inform the development of interdisciplinary trainee initiatives in other areas of research, policy, and practice.
Introduction

Interdisciplinarity has been lauded as an innovative approach to educating the next generation of researchers to address the wicked issues faced by society, including those within the field of aging (Finlay et al., 2019; Kawa et al., 2021; Krohn, 2017). Widespread increases in aging populations across the globe are predicted to have extensive economic, social and health implications (World Health Organization, 2022). Concerns about the immediate and long-term impacts of this demographic shift have led to calls for immediate and collaborative approaches to inform strategies and to anticipate challenges arising from aging populations (Cherbuin et al., 2021). Historically, interdisciplinarity has been variably defined depending on the context of application and the disciplines involved (Frodeman, 2017). Within research, interdisciplinarity can be broadly defined as academic activities by researchers from at least two separate disciplines who draw upon a range of theories, methods, data, and concepts from different disciplines to advance knowledge to benefit society (Aboelela et al., 2007; Bridle et al., 2013; Frodeman, 2017; Klein, 2021).

Given the complexity of the aging process, research in this realm can benefit from drawing upon interdisciplinary principles. Across Canada, a country expected to have more than 30% of its population over the age of 60 by 2035, aging-related government priorities echo the need for interdisciplinary collaboration in their research mandates (CIHR, 2020; Government of Canada, 2014). For example, the Canadian Institute for Health Research’s Institute of Aging is addressing priorities in aging research through collaborations and multidisciplinary initiatives with research groups such as the Canadian Longitudinal Study on Aging (CLSA), the Dementia Research Strategy, Healthy and Productive Work, and eHealth Innovations (CIHR, 2020). Increasing recognition of the benefits associated with interdisciplinary approaches to address widespread population aging has also led to an increase of interdisciplinary and student-focused funding calls (Cherbuin et al., 2021). For example, the Canadian Frailty Network’s Interdisciplinary Frailty Fellowship requires participation in cross-disciplinary collaborative projects with program peers (i.e., graduate students) (Canadian Frailty Network, n.d.).

Beyond the domain of aging, there is growing recognition that introducing interdisciplinarity early in graduate education can better prepare academics to address complex problems going forwards (Berasategi et al., 2020; Brown et al., 2021; Clark, 2020; Sweeney et al., 2015). For example, integrated approaches to graduate education, while not without challenges, have enabled students from diverse disciplines such as life sciences, engineering, and math/physical sciences to benefit from peer education, foster their communication skills, and enhance career preparation (McKee et al., 2021). Furthermore, a European interdisciplinary doctoral program bringing together practitioners and academic scientists resulted in graduates with high employability and who produced predominantly interdisciplinary scientific publications (Serlet et al., 2020). Other documented interdisciplinary approaches within academia include introducing cross-disciplinary courses, providing opportunities for networking across multiple disciplines and formalized reflection within academic training (Fuller et al., 2012; Liu et al., 2017; Siebert et al., 2020). However, within the field of aging, the majority of research on interdisciplinary collaboration has focused on the clinical setting rather than the academic settling. While this interdisciplinary clinical focus is necessary to optimize the design, implementation, and sustainability of health services for older adults, there is also a need to increase interdisciplinarity within academia, particularly with regard to age-related research (Morano & Damiani, 2019).

Research collaborations are not new, for example, the Cochrane Collaboration successfully brings together many disciplines. However, collaborative research approaches can be challenging.
particularly when small and large disciplines must cooperate, or the research involves junior researchers. Early-career researchers face pressures to obtain competitive funding which may make them hesitant to share research ideas, their resources are often limited, and the individual performance-based tenure process can discourage engagement in interdisciplinary research (Green & Johnson, 2015; Hall et al., 2006). Moreover, engagement in interdisciplinarity can mean using multiple methodologies, having conflicting approaches to authorship and, as such, researchers may struggle to find a “shared language,” all of which can serve to discourage collaborative research (Cooke et al., 2020). Therefore, there continues to be the need for research on the education, development, and fostering of interdisciplinary research, particularly by junior researchers.

**Interdisciplinary Research Competencies**

Recognizing a need to better prepare graduates and post-graduates to manage societal and scientific issues, the National Science Foundation (NSF), an independent agency of the United States government that supports research and education, developed formal criteria to guide interdisciplinary training (Turner, 2017; Gamse et al., 2013). These competencies were informed by the findings of an in-depth literature review in conjunction with consulting academic experts in the NSF and an advisory committee. The resultant key competencies identified are the ability to: (a) use theories and methodologies associated with multiple disciplines; (b) engage in scholarship and communication across disciplines; (c) explore interdisciplinary research hypotheses; (d) work as a community comprised of individuals with different disciplinary training; (e) appreciate differences and strengths of different disciplines; (f) communicate interdisciplinary research to a range of academic and non-academic audiences; and (e) seek feedback on interdisciplinary group functioning (Gamse et al., 2013; Hesse-Biber, 2016; Klein, 2008; Larson et al., 2011; Lorenzetti et al., 2022). The historical basis for these competencies came from a report authored in 1995 by the National Academy of Sciences’ Committee on Science, Engineering, and Public Policy highlighting the need to prepare graduates to work well in team environments and work across a range of fields and communicate complex ideas to laypersons (Gamse et al., 2013; National Academy of Sciences, National Academy of Engineering, Institute of Medicine, 1995). While graduate students engage in in-depth focal learning, their academic training also presents opportunities for development of broader constructs associated with interdisciplinarity such as communication and collaboration (Thompson, 2014). Participation in informal information sharing and at conferences presents ideal opportunities for students to communicate to a variety of audiences and build collaborations (Kuzhabekova & Temerbayeva, 2018). Crucial elements of collaboration include communication, self-reflection, and respect for cultural variation in disciplines. Mentorship can assist trainees to advance their thinking and share research approaches, and peer-to-peer mentorship can enhance productivity and provide informal practice opportunities in interdisciplinarity (Bansal et al., 2019; Eise et al., 2019).

**Interdisciplinarity within the Context of a Research Institute – An Exemplar**

One Canadian university has brought together multiple disciplines across all its faculties to form an institute for aging research. Impetus was provided by both the university leadership and donor interests with a shared objective to leverage existing strength in aging research to build interdisciplinary research partnerships, using a solution-focused design thinking framework (McLaughlin et al., 2019). The institute’s governance consists of experts located in academia and within the private sector who, together, established a mission to promote the health and life
expectancy of older adults through interdisciplinary research, education, and collaboration with a diverse group of stakeholders (McMaster Institute for Research on Aging, 2023).

In accord with the institute’s goal of fostering interdisciplinary research and education, an informal interdisciplinary trainee network was established for undergraduate and graduate trainees. Guided by an initial structure administered by the institute, the network’s growth and direction were student driven allowing for flexible growth and development in response to trainees’ identified interests and needs. Meetings occurred monthly and featured activities such as informal research presentations, informal peer mentorship, interdisciplinary conference participation, and collaboration to develop new interdisciplinary research. Much of the interdisciplinary exposure for the Institute’s trainees happens within an informal trainee network, a strategy that has been identified as a successful way of promoting student engagement and learning (Ainsworth & Eaton, 2010; Harvey et al., 2022; O’Shea & Vincent, 2011; Stone et al., 2013). To date, the literature primarily documents the impacts and outcomes associated with formalized interdisciplinary trainee programs that have structure and oversight from an institutional body (Liu et al., 2017; McKee et al., 2021; Serlet et al., 2020; Siebert et al., 2020). Yet there remains a gap in knowledge and understanding of how informal trainee networks can influence graduate trainees’ development of interdisciplinary competencies specific to aging-related research. Therefore, the purpose of this inquiry was to examine: How can trainee experiences, as members of an informal interdisciplinary trainee network on aging research, inform the development of interdisciplinary research competencies?

**Methods**

**Project Design**

A quality improvement (QI) approach was used to guide this inquiry because the intent was to both gather information on the network functioning but also to ensure there was a continuous process of growth and development within the network (Berman et al., 2018; Faiman, 2021). Specific aims of the inquiry were to increase understanding of how trainees’ experiences helped them to develop interdisciplinary research competencies and to explore whether the trainee network provided a suitable venue for the development of the competencies.

This process of inquiry incorporated principles of reflexivity, a process of critical reflection concerning both the self and others (Lincoln & Guba, 1985; Taylor & White, 2000). The reflexive process aims to help an individual achieve a level of understanding and self-awareness as it relates to an experience. It also encourages the individual to become aware of potential underlying assumptions regarding their experiences. Reflexivity is a formal construct within qualitative research but can also be inherent to interpersonal engagement within social settings and as such it is impossible to be “unreflexive” (Lynch, 2016). Increasingly, reflexivity has been used within QI projects in order to be more responsive to the needs of participants and the goals of the organization or institution (Nielsen et al., 2022; van Loon & Zuiderent-Jerak, 2012). In order to practice reflexivity a researcher must engage in an ongoing process of evaluation to assess how their own subjectivity and the current circumstances exert influence on the evaluation process they are engaged in (Olmos-Vega et al., 2022). For the purposes of this project, trainees practiced reflexivity as they explored and described their experiences of being an active member of an interdisciplinary trainee group in aging. In consultation with the university research ethics board, it was determined that this process of evaluation was in alignment with a QI initiative rather than a formal research study and therefore received full exemption from the research ethics board.
The Interdisciplinary Trainee Group

The interdisciplinary trainee group was formed to fulfill one of the McMaster Institute for Research on Aging (MIRA) strategic priorities to support training and capacity building among trainees (graduate students and postdoctoral fellows) in aging research (McMaster Institute for Research on Aging, 2017). After direct consultation with trainees regarding their requirements for training-related support, the Institute initiated its trainee network in 2017 with the goal of supporting trainees in four ways: (a) communication support and information sharing (e.g., aging related events, calls for abstracts, and external funding opportunities in aging, and supporting an Institute trainee blog); (b) encouraging trainee-driven structured events (e.g., community knowledge translation opportunities, speed-mentoring sessions with affiliated researchers, research fairs, competitions and showcases); (c) funding opportunities targeting trainees engaged in interdisciplinary research on aging, and; (d) supporting regular, informal networking among trainees (e.g., monthly meetings of the trainee network).

The Institute brought together academic advisors across faculties, provided funding for regular meetings, organized formal activities such as research events, and provided personnel support. For example, the institute research coordinator and administrative support team were instrumental in facilitating inter-member communication and fostering the growth of the trainee network membership. Regular meetings were part of the core fabric of the network; each meeting showcased a trainee presentation of their own planned, ongoing or completed research, followed by peer discussion among attendees. Initially administered by Institute staff, these meetings were subsequently chaired and managed by the Institute’s trainee network executive committee. Attendance was voluntary, allowing for self-directed exposure to new colleagues and research approaches. Discussions during meetings were organic but contributed to trainees’ development as collaborative researchers. For example, conversations ranged between exchanging funding and conference resources, to problem-solving shared challenges in research design (e.g., participant recruitment, methodological issues), and organizing networking and educational events. The QI project was initiated by the network members as the first formalized assessment of the network with an expressed goal of understanding how the group was performing and identify areas for ongoing growth and development.

Data Collection

The Institute’s trainee network executive committee included an item in the group’s monthly newsletter inviting members who were interested in sharing their experiences with the trainee network to participate. Six doctoral students and two post-doctoral fellows responded to the call and formed an interdisciplinary reflection and writing team (See Table 1 for a summary of team member characteristics). The team, including the Institute’s research coordinator, met as a group on two occasions to refine the project’s objectives and research question. All student participants were asked to write about their experiences of being part of an interdisciplinary trainee group.1 Specifically, team members were provided with instructions to describe, using a reflexive approach, their experiences of being active members of the Institute’s trainee network. There were no word count limits or specific questions provided. Participants were encouraged to reflexively write about anything they perceived to be relevant.

1 Although a team member, the Institute’s research coordinator did not provide a reflection on engagement in the network from a student perspective. They participated in all meetings and discussions.
Table 1. Team Member Characteristics.

<table>
<thead>
<tr>
<th>Faculty Affiliation</th>
<th>Level of Study</th>
<th>Number of Participants</th>
</tr>
</thead>
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<td>Science</td>
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</tr>
<tr>
<td>Health Sciences</td>
<td>PhD Nursing</td>
<td>1</td>
</tr>
<tr>
<td>Social Sciences</td>
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<tr>
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<td>2</td>
</tr>
<tr>
<td>Institute</td>
<td>Research Coordinator</td>
<td>1</td>
</tr>
</tbody>
</table>

Analysis

Once team members had written about their experiences, all 8 response narratives were anonymized then compiled into a master document/list. The master list was uploaded into a shared online folder that was accessible to all members. The analysis of this QI project was guided by thematic analysis, a flexible analytical approach that can be adjusted to meet different types of projects but, it also allows for a fulsome description of the data (Braun & Clarke, 2006). As per this approach, including direct quotes from project participants is key to illustrate the information contained in the data informing the project (Braun & Clarke, 2006).

At this stage, the team met as a group to begin preliminary data analysis drawing on the principles of thematic analysis whereby units of information are first organized into codes and then thematically similar codes are organized under broader groupings called themes (Braun & Clarke, 2006). Participants split into two groups (i.e., group A and group B), and each group examined the four reflections to identify key concepts and emerging ideas. Members of each group sorted these concepts and emerging ideas into codes, individually at first, and then discussed the potential codes with their group in an iterative process. Once complete, groups A and B reconvened as a large group to create a preliminary list of codes which were classified as major and minor codes. The major codes became the resultant overarching themes that answered the research question, and the minor codes informed these themes. The codes and developing themes were refined at a subsequent face-to-face meeting. The two teams then worked together to ensure that all members agreed with the application of the codes and emergent themes. Once a consensus was reached, key quotations for each theme were identified.

Results

Four main themes emerged from the thematic analysis, including: 1) Institutions and Structures; 2) Transcending Boundaries; 3) Sense of Community; and 4) Personal Development/Enrichment.

Institutions and Structures

The McMaster Institute for Research on Aging, as a structured and institutionally sanctioned organization, was the catalyst for the trainee group to form and cohere. Without the power and structure provided by the Institution, the trainees would not have been presented with multiple opportunities to develop competencies necessary for becoming interdisciplinary researchers (such as having the opportunity for networking, as will be outlined in the theme Sense of Community). The recognition of the benefit gained through structure can be seen in the following quotes:
Albeit still in the first year, the structured nature of the trainee network within an established institute played a strategic role in capacity building and I believe provided us with the momentum needed to build a successful trainee group. (Respondent 8)

…each meeting presentation is relatively unformatted which also provides interesting and different presentation styles and allows creative information dissemination. (Respondent 1)

The current academic structure ties students to a home department, discipline, and advisor, thus encouraging siloed disciplinary specialization. Trainees expressed that the network was successful in its aim to promote interdisciplinary conversations. This approach included semi-structured meetings; the focus of which was on fostering a collaborative learning environment for the trainees. However, the unstructured format was not without some criticism. The highly formalized and institutional structure of the trainee network replicated some of the pitfalls faced by interdisciplinary researchers in both academia and health care/community service. For example, one respondent said:

I came into academia with assumptions that multidisciplinary collaboration would not be much different. This was not always the case. Indeed, the balance of power and the institutional and disciplinary constraints were much more apparent, and at times problematic, in academia…. My experience with the trainee network is that there was a much stronger influence ‘from above’ with regards to oversight when the network first formed. However, this shifted to where, by the end of the year, the trainee network was much more equitable, in that students were taking on more leadership. (Respondent 4)

Transcending Boundaries

Initially, some trainees felt tension and unease navigating the unknown territory of interdisciplinary collaboration, “…it wasn’t an easy start – none of us were part of any similar group.” (Respondent 7)

The trainee network played a vital role in challenging some trainees’ preconceived ideas of the problems with interdisciplinarity by creating a space that was open to explore disciplinary boundaries and challenge their perspectives. Some students felt such comfort with the trainee network that they described it as a forum where disciplinary boundaries were completely removed or diminished. Trainees described this process as one in which their contributions to scholarship were contextualized as part of a larger, more holistic part of understanding aging:

As a PhD student and early graduate researcher in the social sciences, I largely remain mono-disciplinary and that ultimately contests my capacity to understand the holistic nature of the aging process. Over the course of this past year, being integrated into a multidisciplinary trainee network has provided me with the opportunity to contextualize approaches of various disciplines. (Respondent 8)

The ability to transcend disciplinary boundaries was also attributed to the fact that trainees all came together with a common research interest on aging:

These meetings have provided me with a space to meet and interact with other trainees from all academic levels and faculties, most of whom are also researching a component of aging. As aging is a multifaceted condition, exposure to other forms of data collections, analysis and subject recruitment is paramount. (Respondent 1)
Not only were trainees able to learn about the contributions by other disciplines toward aging scholarship, but also about how other disciplines conduct research. For example, one respondent noted, “Where there are parallels in topic, there may be differences in methods, and where there are similarities in methods, there are new applications in aging-related challenges.” (Respondent 2)

These opportunities were not only a benefit to the trainees’ personal development, but also skill development as knowledge mobilizers as the trainee network provided an avenue for communicating about aging research and receiving feedback. For example, students beyond the trainee network also benefited from learning about what unfamiliar disciplines contribute to working with older adults:

[I] delivered [a] lecture to undergraduates participating in a program aimed at designing tech “solutions” to problems with aging. [The] Lecture/presentation [was] aimed at preventing ageism. This led to great conversations and discussions with new connections…This was an opportunity that certainly would not have arisen had I not been a part of the trainee network. …

I was able to provide important social science research with students from engineering and business backgrounds, many of whom had not previously considered how to go about their work in a way that was not ageist. Indeed, many of these students learned about the concept of ageism for the first time that day. As such, I found this opportunity very valuable and was happy to be able to share social science research in this way. (Respondent 6)

By the end of the first year, trainees met several scholars and peers outside of their discipline and were able to establish interdisciplinary relationships. Trainees’ abilities to transcend their disciplinary boundaries resulted in career development opportunities, such as speaking invitations and post-doctoral fellowships, that may not have been available to them had they remained within their disciplinary silos. For example:

…the development of relationships with academic leaders in the field of aging resulting from my involvement with the institute have enabled me to secure a post-doctoral supervisor outside of my discipline and to develop a research project including the submission of multiple applications for post-doctoral fellowships.” (Respondent 5)

“…viewing my PhD through the transdisciplinary lens would help bring different professionals to contribute to developing a model that any of the health care professionals can use. (Respondent 3)

Trainees felt that their contributions to their own disciplines were stronger as a result of their participation in the interdisciplinary trainee network initiatives. Not only did trainees express that their personal perspectives were enhanced, but their increased knowledge base would inform the future research within their own disciplines and help them to translate their research more widely.

**Sense of Community**

Opportunities for interaction and the development of healthy social ties only develop where people have the chance to meet and ‘feel the warmth’ of a ‘neighborhood.’ If an interdisciplinary ‘neighborhood’ feels insecure and unsafe, people will not leave their ‘homes’ to enjoy them. The social nature of the trainee network’s meetings and events provided the trainees with the opportunity to build a support system and develop a sense of community. One respondent noted,
“The trainee network provides the venue for relationships to form and be maintained in a way that is ‘fun.’” (Respondent 6)

While this sense of community extends beyond the trainee network meetings and events, more work is needed, as the social connections outside of network activities were not compelling for some trainees. For example, one respondent noted, “Many Institute trainees outside of my department remain as acquaintances, only working together/ sharing tips/ references/ resources with extra effort.” (Respondent 7)

Patterns of trust between trainees and across the structure of the institute facilitated a shared sense of cohesion in a non-judgmental space. Trainees felt comfortable communicating with one another, providing one another with feedback, exploring subject matter and methods outside of their disciplines, and fostering truly interdisciplinary relationships. For example, Respondent 6 noted, “These meetings have also created a space to ask for advice and feedback on current projects from various perspectives.”

Meeting formats allowed for trainees to practice public speaking or discuss challenges in their research projects in a safe environment. Even though each meeting may have hosted a different set of trainees, the “social venue” (Respondent 7) created an atmosphere where trainees could push the boundaries of their comfort zones without repercussion. This sense of community, specifically, engendered collaboration among trainees with the common aim of helping each individual develop professionally and academically, as well as enhancing the group as a whole.

**Personal Development/Enrichment**

Trainees expressed a myriad of benefits with regards to their own personal enrichment and professional development as early graduate researchers. These opportunities in which some trainees engaged included: presentations, community engagement, mentoring, networking across disciplines, career advancement, leadership development, development of interdisciplinary collaborative skills, feedback on work-in-progress, continuing education (webinars, conferences, etc.), mentoring, and, of course, free breakfast on meeting days. For example:

Becoming a member … has been instrumental in enhancing my PhD career, fostering the growth of my professional networks both within and beyond the network and developing my curriculum vitae as a junior researcher in the field of aging research…. Direct benefits to my career include the opportunity to work with other members of the network to facilitate an ongoing program of monthly meetings with presentations by trainee researchers, which has provided a valuable leadership experience. (Respondent 5)

Of these benefits, networking was expressed frequently across trainee reflections. The frequency by which fostering new professional relationships not only underscores the importance placed on networking, as both a skill and as a vital component of personal development, but points to the important role the institute trainee network played in fostering interdisciplinary connections between trainees and mentors alike. This growth in interdisciplinary connections can be seen in the following quote:

When the [International Scientific Advisory Committee] visit[ed], we (trainees) had a morning session with the international scientific directors. Meeting and having a chat with [academic], from the [University name], expose[d] me to [the] concepts of social and health inequality. This has shaped my reflection on how these concepts relate to two components of my PhD project—financial and cultural gradients as a determinant of mobility for older adults. (Respondent 3)
One vital and reciprocal benefit was the ability to engage in knowledge translation activities, both as presenter (to the trainee group, to other students, and to the greater community) and as receiver of the knowledge disseminated. For example:

These events were great and really hit home the concept of knowledge translation, which is a key skill many researchers fail at. The opportunity to present a poster and demo some carotid ultrasound imaging at the MIRA event was a unique experience, and really underscored how discussing research with members of the general public is so very different than speaking with other researchers…. and allowed me to grasp how important our research really is. (Respondent 1)

These opportunities for personal development lead directly to tangible benefits for some trainees, such as applications for funding and/or the next stage of one's career. Others were able to take on more involved roles with the trainee network in order to engage in activities to build non-traditional skills that can be overlooked in traditional graduate programs, such as creating an online blog. For example:

Through this opportunity I have been involved in creating the trainee network blog where we highlight the research of individual trainees. While it is still in its infancy, this has been a valuable learning opportunity which I would not have had during my postdoc fellowship. (Respondent 1)

Some trainees even expressed that the networking and opportunities for collaboration went so far as to extend to faculty relationships, thus transcending beyond the level of the trainee:

Through the trainee network, my supervisor and I have initiated a collaboration with a new Professor in the Department of Engineering…we can provide…our ultrasound images collected from older adults with and without chronic diseases, coupled with extensive patient characteristics. We have also been assisting… on understanding basic cardiovascular physiology, while they have been teaching us about basic mechanical engineering. We hope to have a collaborative publication(s) soon. (Respondent 1)

Many positions within and outside of academia now expect graduates to understand and to adapt to meet contemporary challenges and potential changes in the research environment (Beausaert et al., 2013). Actively seeking out information, training, and attending events keep students’ skills and knowledge up to date. Time devoted to understanding what influences personal perspectives and the benefits or pitfalls of one’s personal ontological and epistemological positions is well spent. It is also important to be aware of how one’s lens affects other people and their research. Knowing how to collaborate whilst simultaneously creating individual opportunities is an invaluable skill in the workplace and beyond. The Institute’s trainee network therefore created a unique space and place for learning and growth that fostered and encouraged experimentation with opportunities to develop participants’ professional and personal academic skills.

Discussion

The current QI project sought to explore how graduate students’ and post-doctoral fellows’ participation in an informal interdisciplinary trainee network on aging informed their development of interdisciplinary research competencies. Participants described the influences of institutional and informal structures on their personal and professional development, as well as on the development
of their disciplinary and interdisciplinary competencies. Although trainees developed a range of interdisciplinary skills, findings suggest that trainees experienced the most development across the following interdisciplinary competencies: engaging in scholarship and communication across disciplines; appreciating the differences and strengths of different disciplines; communicating interdisciplinary research to a range of audiences; seeking feedback on interdisciplinary functioning.

An overarching contributor to trainee development was the benefit of a structured and institutionally recognized framework for research on aging to guide the trainee network in its earliest stages of development. While the Institute trainee network was driven from the top down early in its administration, the network has developed its own governance and process for facilitating trainees’ capacity building and professional growth. In order to promote effective learning, an environment must promote motivation and a sense of continuous evolution, while allowing the learner to maintain control of personal development (Englehardt & Simmons, 2002). The organizational space, thus, avoids control and predetermined process, but can be understood as a distinct influential layer, facilitating learning and growth (Englehardt & Simmons, 2002). Within an aging environment, interdisciplinary students are removed from the traditional, mono-disciplinary, experience of education, as Clark (1994) found that gerontology students are enculturated into dominant academic norms and principles wherein disciplinary contributions, individualism, and competition are paramount. As a result, students with interdisciplinary training experiences can better value teamwork, collaboration, and contributions from a variety of disciplines.

In the case of the current QI project, the Institute’s mandate included structured programming related to evidence dissemination within academic and community-based venues. Creating spaces for trainee involvement at such events allowed participants to develop key interdisciplinary competencies such as communication across disciplines, collaboration across disciplines, and knowledge translation with academic peers and non-academic audiences. Members of the institute trainee network could self-select which events they wish to participate in as well as their level of engagement in each (e.g., organizational, attendance, presenting research). For example, participants discussed the benefits of self-directed engagement towards developing their attributes and skills as researchers engaged within the communities they study. Unstructured or non-formal approaches to interdisciplinary education in aging may be ideal for fostering the use of adult learning principles such as an emphasis on self-direction, engagement in active learning and drawing upon prior experience (Knowles, 1968; Palis & Quiros, 2014). A more loosely structured approach to interdisciplinary education allows for evolution of the learning process as participants work together to define individual and shared learning needs in an efficient manner with limited oversight at the level of faculty and administration. Non-formal programs have taken a grass-roots approach to developing collaborative researchers in aging. Using a semi-structured context, and fostering trainee-led programming driven by adult-learning principles, has enabled the trainees in the context of this QI to develop specific competencies of inquiry, collaboration, and communication that meet their respective needs as developing interdisciplinary aging researchers.

Project findings supporting the importance of transcending disciplinary boundaries, a crucial interdisciplinary competency, are also consistent with literature that suggests that individuals must undergo a process of moving beyond disciplinary constraints before their competencies as researchers and educators in the complex field of gerontology can be maximized (Bass, 2013; Finlay et al., 2019). The Institute trainee network in this QI project sought to bring together trainees from multiple faculties and disciplines, creating an environment that encouraged them to explore their own disciplinary constraints while concurrently gaining a better understanding of other disciplines and research programs in the field of gerontology. Participants readily identified that the exposure to different disciplines within the trainee network encouraged them to recognize, and even breakdown, disciplinary boundaries.
Within literature, the value of interdisciplinary approaches to address complexities of aging is well recognized, but implementation of these approaches in education has seen challenges. Pedagogical challenges include the need to overcome siloed educational approaches, disciplinary specific language, and discordant attitudes regarding methodological approaches, and at the conceptual level, students’ disciplinary world views (Carr et al., 2018). To optimize interdisciplinary education, research suggests integrating structured didactic experiential learning opportunities with those that are more informal or loosely structured (Allen et al., 2006). Without imposing disciplinary constraints on interdisciplinary collaboration, trainees can focus on their shared interests, such as a better understanding of social or physical well-being across the aging trajectory. Optimizing a teaching approach in interdisciplinary education can foster collegial, respectful interactions across faculty, staff, and students to learn from each discipline with common goals in mind (Allen et al., 2006). Accordingly, participants in the current project found that the non-formal group structure readily facilitated engagement with other trainees and faculty members within the group and beyond to the greater Institute membership. For example, findings from this project highlighted the positive experiences of the learning opportunities offered by the monthly presentations made by trainees or guest lecturers from a variety of departments and faculties. Moreover, these informal gatherings provided opportunities for network members to practice soliciting feedback from their interdisciplinary peers, an important interdisciplinary competency. Indeed, the fluid and non-formal nature of the presentations created a space for trainees to examine, challenge, and transcend disciplinary boundaries.

The third theme identified in the QI project, Sense of Community, suggests that, for interdisciplinary collaborations to continue beyond the semi-structured margins of a group like the Institute’s trainee network, ongoing efforts to maintain engagement would be necessary. While participants spoke to the value of the group in facilitating interdisciplinary relationships to form and coalesce, others perceived that incentive to engage in academically fruitful collaborations required undue effort. Actualization of interdisciplinary engagement occurred in instances of participating in knowledge dissemination or case-based problem-solving activities, for example. These findings echo those of Bridle and colleagues (2013) who emphasize that providing opportunities for interdisciplinary engagement is important for optimizing education. As such, intentional calls for projects that bring together trainees from multiple disciplines serve to catalyze the development of learners’ collaborative networks. Specifically, encounters that articulate concrete products or outcomes of collaboration can spur training in aging research to co-create novel ideas and sow the seeds for future research partnerships. The institute has developed terms of reference that enable institute trainees to remain involved with the network as they move forward with the next steps of their career development. Being able to maintain relationships created during their training will allow new researchers to further build on the collaborative partnerships they developed through the trainee network.

Outcomes of personal development and enrichment resonated across participant reflections on their experiences as members of the institute trainee network. Of note, was the emphasis that trainees placed on the value of networking across disciplines, both among the trainees and via other institute-led initiatives such as funding calls for graduate students and participation in community-based knowledge translation events. Outcomes of these encounters included successfully obtaining interdisciplinary doctoral or post-doctoral fellowships, manuscripts, and engagement with leaders in aging research at international conferences. These venues provided tacit learning experiences for trainees to draw upon knowledge gained in peer presentations. For example, one participant described benefits of hearing interdisciplinary peers’ approaches to participant recruitment to designing their own thesis studies. Receiving successful funding to conduct interdisciplinary research as a graduate student or post-doctoral fellow can be a catalyst for budding researchers to seek out
such projects in their future programs of research. Increasing the availability of funding calls tailored to interdisciplinary research is also important to sustain long-term advances in the field of interdisciplinary aging research (Garg et al., 2018). Given the growth in government mandates of interdisciplinary research in aging (Hennessy & Walker, 2011), ensuring future scholars have the foundational competencies to successfully respond to these calls for funding should be a priority for academic institutions. Additionally, there is increasing recognition that programs directed to graduate students and those in continuing education should incorporate curricula that foster direct interdisciplinary engagement at the levels of practice, policy, and management (Morano & Damiani, 2019). These multi-level programs are well-placed to help the next generation of researchers and professionals dissociate the disciplinary silos inherent at the departmental and administrative level of many research and health organizations (Morano & Damiani, 2019). Researchers and clinicians who are able work within an interdisciplinary framework are better positioned to address the aging-related knowledge gaps and clinical issues widely predicted to increase globally over the coming years (World Health Organization, 2015).

**Limitations**

This QI project had some limitations. The current cross-sectional reflection represents a self-selected subset of the greater Institute trainee network. Therefore, those who participated may have been predisposed to present a particularly engaged perspective on the value of an interdisciplinary trainee network. Importantly, the results of this QI project must be understood within the context in which the project was conducted and as such the findings should be contextualized by the parameters that influenced the trainees’ experiences, such as the educational model (e.g., publicly funded university), geography (e.g., availability and type funding models for interdisciplinary research), and health system (e.g., publicly funded).

Of note, trainees from the Faculties of Engineering, Business, and the Humanities were not represented in this analysis. The lack of representation from these disciplines presents an opportunity for further exploration. From the perspectives of research, important findings are coming from partnerships that consider the ecological aspects of aging moving beyond the traditional medical model aging and drawing on the skills of disciplines in the social sciences such as sociology and geography (Ferraro, 2007). The early under-representation may also reflect the readiness of some disciplines to engage in interdisciplinary research. For examples, health-related disciplines such as occupational therapy, medicine and nursing frequently collaborate within clinical settings so research collaborations may be more organic than other more traditionally siloed disciplines. Since the conduct of this inaugural QI project, the trainee network has substantially grown and diversified, in part due to targeted outreach strategies by the Institute to engage underrepresented disciplines such as engineering and business. Going forward it will be important to continue engaging in QI types of initiatives to ensure trainee network members have opportunities to optimize their interdisciplinary skill development.

**Implications**

Interdisciplinary trainee networks have potential to enhance the positive benefits of interdisciplinary research as early as during post-secondary training. Albeit focused on aging-related research, the institutional strategies employed to establish a trainee network fostered professional growth and self-governance among future researchers. As society experiences a growing number of complex or wicked problems, the need increases for researchers who have the interdisciplinary skills to respond. Yet, resistance to instituting interdisciplinary programs persists across academic institutions (Kawa et
al., 2021). The experiences of this trainee network highlight its benefits in helping trainees develop skills in communication and collaboration across a range of disciplines, and engagement with a range of audiences. Areas for targeted growth include strategies to increase knowledge and application of a variety of methodologies and theoretical constructs and supporting trainees to develop and implement research projects directed by interdisciplinary research hypotheses. Overall, the Institute’s oversight to help initiate the informal trainee network was well received. Other Institute initiatives such as graduate and post-doctoral funding geared towards interdisciplinary researchers may well provide the aforementioned skill development but were beyond the scope of this project to evaluate. The Institute may also be well-placed to offer methodological training and workshops to trainees, thereby supporting an identified need for their interdisciplinary competency development.

Conclusion

The current QI project aimed to understand how graduate and post-graduate trainees’ experiences with an interdisciplinary trainee network in aging informed their development of interdisciplinary research competencies. Positive experiences of building collaborative networks and individual competency development in scholarship activities were emphasized by project participants. Facilitators and barriers to engaging in interdisciplinary collaborations were also highlighted by project participants, with some participants finding that the initial emphasis on institutional structure in this non-formal educational approach hindered their development of interdisciplinary competencies. Outcomes of this QI project suggest that structured and non-formal approaches can be successfully used to training the future generation of interdisciplinary aging researchers.

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References


Exploring Achievement Behaviors in Non-Major Statistics Course: An Expectancy-Value Perspective and Thoughts for Practice

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Abstract: Statistics education is increasingly important to our society with enrolment increases of 16% in introductory statistics courses and 85% in upper-level statistics courses. Research has demonstrated many factors related to students’ behaviors and outcomes in statistics courses such as past achievement, attitudes, and effort. We sought to model these factors together to better understand how introductory statistics students’ attitudes were related to students’ achievement behaviors and what student characteristics mediated such relationships. Structural equation modeling with data from N=301 students in an introductory statistics course for psychology majors revealed that majors with higher GPAs had more interest, enjoyment as well as utility value for statistics, and these variables were in turn related to expectations for success or achievement behaviors. Females had lower interest in statistics, and this was related to lower expectations of success. The findings highlight the need to increase interest and enjoyment and utility value for non-majors studying statistics. Recommendations for how to adapt the statistics classroom to that end are discussed.

Keywords: statistics education, expectancy-value theory, achievement behaviors, college students

Introduction

Attitudes towards statistics have been demonstrated to have an important relationship to students’ achievement behaviors in a statistics course and course outcomes (Emmiögu & Capa-Aydin, 2012; Nguyen et al., 2016). In the field of statistics education, “attitudes” refer to constructs such as perceived cognitive competence with statistics, interest in statistics, affect when learning statistics, value of statistics and perceived difficulty in learning statistics. Reviews of the research on statistics attitudes show that attitudes correlate with achievement behaviors and higher statistics course outcomes (Emmiögu & Capa-Aydin, 2012; Ramirez et al., 2012). Studies have demonstrated that negative attitudes towards statistics, such as lower levels of interest or value, are related to lower course grades (Cashin & Elmore, 2005) and lower test and quiz scores (Tempelaar et al., 2007).

There is a strong social need for students to learn statistics. The National Science Foundation (NSF; 2018) highlights the need for developing a “21st century data-capable workforce.” The ability to run statistical analysis and the ability to interpret, communicate, and use statistics are critical skills for building such a workforce. Most current estimates suggest that more than 500,000 students take an introductory statistics course at the college level per semester and this number is growing rapidly (American Statistical Association, 2012). However, many students have difficulty when taking such courses (Murtonen & Lehtinen, 2003) and further research demonstrates that many of these students have negative attitudes towards the subject and this will inhibit their ability to learn the statistics thereby reducing the ability to achieve the levels of literacy needed in our society. This makes attention
to statistics attitudes and the factors that play a role in students’ attitudes imperative if we are to address, and, hopefully, improve students’ attitudes (Shau, 2003).

While instructors may be aware of students’ negative attitudes towards statistics, and a great deal of literature exists on strategies for improving students’ attitudes towards statistics, there is little published on the frameworks that inform how these attitudes manifest and function. Rather, studies commonly focus on what attitudes students hold at a particular point in time, or perhaps before and after an intervention. What is missing, however, is a broader understanding of how various factors not only directly but indirectly influence students’ attitudes towards statistics to begin with. By understanding the more nuanced details we can develop classroom activities that better fit the needs of our students. Without this understanding, efforts to improve attitudes may be futile. Therefore, the purpose of this study is to examine a model of how attitudes play a role in students’ attitudes toward learning statistics, how the attitudes interact with other student characteristics, and ultimately how attitudes manifest in students’ learning behaviors. We used the expectancy-value model (Eccles et al., 1983) as a guiding framework for understanding students’ attitudes towards statistics and achievement behaviors. Recent research has suggested a connection between expectancy value theory and statistics learning (Corwyn & MaGarry, 2020); however, unlike these studies we utilized data of direct measurement of students’ attitudes towards statistics. Findings have invaluable implications for practices in statistics classrooms and for designing intervention measures for attitude improvement.

Applying the Expectancy-Value Model to Statistics Attitudes

The expectancy-value model (Eccles et al., 1983) includes two broad constructs, expectancies and value that are broken down into several factors that make up each. Expectancies encompass the factors that lead to a student estimating their likelihood, or expectation, of success if they engage in achievement related behaviors. The students’ expectations of success are determined by their self-concept; however, self-concept is developed through a series of experiences and interpretations of those experiences. Students’ interpretation and memory of past achievement related experiences as well as their perceptions of others’ expectancies including interpretations of their stable characteristics through social belief structures (e.g., gender stereotypes of math ability) lead to the development of a self-concept of ability. Their previous achievement related experiences include the grades they earn for assignments, tests or courses, as well as evaluations received when interacting with others (e.g., teachers, parents, peers). Importantly, the interpretations of these experiences are argued to be stronger predictors than the experiences alone, and this is a key feature of the expectancy-value theory. The theory was designed to explain achievement behavior with psychological and developmental factors beyond innate ability. As such, factors such as past achievement related experiences are not by themselves determinant of self-ability and expectancies but mediated by the students’ interpretation of those experiences. This is also true of others’ expectations of a student and stable characteristics. The students’ interpretation of others’ expectation and social belief systems mediate the effect of such variables.

In the expectancy-value model, whether a student will engage in achievement related behavior, and the amount of effort they put forward if they do engage, is determined not only by their expectation of success but also the subjective value they place on the various achievement related tasks (Perez et al., 2019). Task value is broken down into four components: 1) interest and enjoyment value; 2) attainment value; 3) utility value; and, 4) relative cost. The first three components have the potential to increase the value of the task while the last, cost, can decrease the value of the task. Cost refers to the invested resources and potential negative consequences of failing. Interest and enjoyment refer to the amount of pleasure engaging in the task will bring to the individual. Attainment value refers to how important success is to the student’s self-schema that is their goals and personal values. Utility
value, however, is a measure of the importance of the task in reaching a long-term goal. For example, a student who believes they are a good math student may have high attainment value stemming from this self-schema. They believe they are a good math student and therefore will seek to do well in math courses. They may also have high utility value as this would aid them in achieving success in math course. They would therefore invest the time and effort to perform the tasks needed to succeed.

![Figure 1. Conceptual Model of Student Effort for a Statistics Course Developed Based on Expectancy-Value Theory.](image)

Attainment value can be challenged if a student feels that the math or statistics course they are taking is not necessarily important for their long-term goal of earning a degree. The overall value that the student has for the task would therefore depend on (1) the students’ evaluation of attainment and utility value and (2) whether they believe the task will bring them enjoyment. This would be offset by the students’ perception of the potential resources that will be lost by completing the task and the possible negative consequences of failure.

Understanding the mediation of relationships between these factors can allow instructors to better tailor their efforts in the classroom. For example, in the expectancy-value model, the effect of prior achievement related experiences on affective memories and reactions is mediated by a separate construct, the student’s interpretations of the experience. Students' interpretation of their previous experiences—particularly in mathematics based courses such as statistics—could play a critical role in shaping their attitudes towards statistics. One interpretation of particular concern would be whether a student believes their past experience is indicative of their innate ability to do well in mathematics and related domains. This type of belief, referred to as a fixed-mindset, has been documented as being related to poor academic outcomes (Dai & Cromly, 2014; Paunesku et al., 2015; Yeager, Romero et al., 2016; Yeager, Walton et al., 2016; Yeager et al., 2019).
Educators would be able to provide better classroom experiences for students if we understand the mediating role of a student’s perceptions about their prior experience, and if we can constructively use these perceptions to influence their future performance. For example, one way of addressing the relationship between past performance and achievement in statistics is to provide students with curriculum or assignments that review prerequisite math material. However, if the students’ perception of their past performance is important, then efforts should be made to allow students to explore this as well. Otherwise, students’ perceptions may be a barrier to their success not only in statistics but also with review assignments. Instructors might consider discussing with students that past performance is not an automatic determinant of future outcomes. For example, Smith and Capuzzi (2019) showed that after a mindset intervention with statistics students, which explored the idea of ability being developed and malleable rather than innate and fixed, having a growth mindset was related to higher course grades.

This is one example of how the relationships posited in the expectancy-value model (Eccles et al., 1983; Wigfield & Eccles, 2000; Figure 1) provide a more comprehensive framework for understanding the relationship between constructs that influence student attitudes and achievement behaviors, and therefore has a greater potential of explaining students’ statistics achievement. This may make the expectancy-value model more helpful to guiding practices in statistics classrooms and intervention development.

Another theoretical model that explains statistics attitudes is the Model of Student Attitudes Towards Statistics (SATS-M; Ramirez et al., 2012). This model is an adaptation of the expectancy-value model (Eccles et al., 1983; Wigfield & Eccles, 2000) and focuses on six major constructs: student characteristics, previous achievement related experiences, attitudes towards statistics (affect, value, interest, perceived cognitive competence, and difficulty), effort, and statistics course outcomes. The SATS-M posits that attitudes constructs are simultaneously influenced by past educational experiences and student characteristics, which all directly influence effort, and have no impact on each other or direct relationship with outcomes. We chose to use expectancy-value theory in the present study, as it provides a more comprehensive model that encompasses the various direct and indirect relationships between these factors, and thereby potentially depicts a more accurate framework of statistics attitudes and achievement.

**Current Study**

The goal of this study was to identify a model that explains the relationship between factors that influence students’ attitudes towards statistics and to use this to inform practice in the statistics classroom, particularly with students who are not majoring in statistics. We examined the attitudes of students using data from the most current 36-item Survey of Attitudes Towards Statistics (SATS; Hilton et al., 2004; Schau et al., 1995) to draw insights from the expectancy-value model to better understand the relationship between students’ attitudes and their achievement behaviors in a statistics course. One study (Hood et al., 2012) used data from the SATS-28, an earlier version of the instrument, to model the relationship between students’ attitudes and statistics achievement using the expectancy-value model as a guide. Our study differs from this work by using an expanded version of the SATS and including additional variables known to influence statistics outcomes such as interest and GPA. Further, to better understand ways that we can increase students engagement in the classroom, we focused on the achievement behaviors as the outcome so as to inform ways that we can develop experiences for students that will increase student engage.
Materials and Methods

Participants and Procedure

The sample included undergraduate psychology majors (N = 310) from a small liberal arts school in Southeastern Pennsylvania and a large public school in central Pennsylvania. To participate, students had to have completed or be currently enrolled in a statistics course offered by their psychology department. The course was required for all psychology majors and comprised a yearlong curriculum. Topics included probability and central limit theorem, descriptive analysis, and inferential statistical tests such as t-tests, ANOVAs, and correlation and regression. In addition to traditional multiple-choice-question exams, students were also graded on a comprehensive portfolio that required them to conduct analyses using statistical software to answer predetermined research questions and provide written summaries of the results.

The majority of students were female (79.30%) with a mean age of 21.66 (SD = 3.99). GPA was coded on a scale of 1-9 with 1 corresponding to a F and a 9 corresponding to an A. Students reported a mean college GPA of 8 (SD = 1), equivalent to a letter grade of B and an average rating of 5 (out of 7, SD = 1.4) for past math achievement. The mean number of credits completed was 65.47 (SD = 30.82) indicating that many students were in their sophomore or junior years. Students reported having completed an average of 3.94 (SD = 1.20) mathematics and statistics courses in high school and 2.60 (SD = 1.34) mathematics and statistics courses in college.

Students participated in the study during the last two weeks of the semester. They were given time in class to complete a paper-and-pencil questionnaire including demographic questions, items about achievement, and the SATS-36 measure. No incentives were provided. The research was reviewed and approved by the Institutional Review Board at the University where the data were collected. All procedures met the ethical standards outlined by the American Psychological Association (2020).

Measures

The Survey of Attitudes Towards Statistics (SATS-36; Hilton et al., 2004; Shau et al., 1995) was developed to provide both instructors and researchers with a tool that could measure the most important dimensions of students’ attitudes towards statistics and would be applicable to students in introductory courses. The original instrument measured was designed using the expectancy-value framework and resulted in subsections that measure four attitude constructs: affect, cognitive competence, difficulty, and value. The SATS was later expanded to include the two additional constructs of interest and effort comprising a total of 36 items.

The SATS-36 was used here to measure the various constructs included in the expectancy-value framework. The measure also included personal characteristic variables such as gender, age and GPA. Past educational experiences was operationalized using one item on student-perceived past math achievement (“How well did you do in mathematics courses you have taken in the past?”) on a 7-point Likert scale anchored at 1=very poorly and 7=very well. Thirty-six items measure six subscales: affect, perceived cognitive competence, interest, value, perceived difficulty and effort. Items are positively and negatively worded statements that are rated on a 7-point Likert scale anchored at each end (strongly disagree/agree) and in the middle (neither disagree nor agree). The posttest version of the survey was used. This version uses past tense for several items on the SATS (e.g., I worked hard in my statistics test) so that students’ responses would reflect their experiences and behaviors during their statistics course. Other questions retain the current tense (e.g., I can learn statistics).
Several studies have demonstrated evidence for reliability and validity for both the original version of the survey, the SATS-28, as well as the newer version, the SATS-36 (Cashin & Elmor, 2005; Hilton et al., 2004; Schau et al., 1995; Tempelaar et al., 2007). In the current study, we sought further evidence for the factor structure of the 36 SATS items as administered to our study participants with an exploratory structural equation approach (ESEM; Marsh et al., 2009). Briefly, the ESEM results indicate 5 latent factors underlying a reduced number of items, with some items being excluded from the model due to low factor loadings. The internal consistency is high for the overall measure ($\alpha = .829$) as well as within the 5 subscales ($\alpha$'s = .701 ~ .920). We present detailed ESEM results in the Results section.

**Analytic Approach**

We conducted exploratory structural equation modelling of the participants’ responses to the SATS-36 questions. ESEM integrates both confirmatory and exploratory factor analyses, thus it examines the theoretical dimensionality of a measure and is flexible in the sense of estimating item cross-loadings (Marsh et al., 2009). ESEM, a more flexible psychometric framework compared to exploratory or confirmatory factor analysis (Cano et al., 2021), is gaining increasing popularity in higher education research and other social science research areas, due to its methodological appropriateness and quantitative rigor (Green, 2016). The choice of ESEM as our approach to measurement validation was based on two considerations specific to the interested measure in the present study. First, although the six-factor structure has been previously tested (Ramirez et al., 2012), a confirmatory factor analysis approach where each item is specified to load on one factor only may lead to poor model fit. Second, it was not clear to us a priori whether the expanded version of the SATS-36 would manifest the 6-dimensional model proposed by Ramirez et al. (2012) as most research conducted using a version of the SATS has used the original 28 item measure (Ramirez et al., 2012). In this study, we use the full 36-item measures. As such, the model would better represent the item-factor relations if we could estimate item cross-loadings, as we were able to do with our ESEM models.

We examined all items with a new ESEM model hypothesizing five factors based on the expectancy-value model—utility value, cost, interest and enjoyment, expectancies and achievement behaviors. With a cutoff of .35 for standardized item-factor loadings, we eliminated the low-loading items from the designated subscales, and, hence, excluded them from further analyses. We then calculated the average item scores within each of the 5 subscales, entered them in a path model to examine the structural relations based on the expectancy-value theory (Wigfield & Eccles, 2002; Figure 1). We decided to use a path model with composite scores instead of using a full SEM approach with both the measurement and the structural parts mainly due to the restrictions posed by our sample size. With our sample of 310 participants, we had just enough statistical power to estimate the current path model. This sample would have been underpowered for estimating a full SEM.

We used Mplus 6 (Muthén & Muthé, 1998-2010) to test the ESEM and path models. We evaluated the model-to-data fit with cutoffs for fit indices suggested by Hu and Bentler (1999). Missing data on all variables in the path model were 0.3~1.0%, except GPA (missing 7.4%). The Little’s MCAR test showed that the missing data mechanism was not MCAR ($\chi^2[275] = 326.176, p = .018$), however,

---

1 Also, we hypothesized six factors consistent with the Model of Student Attitudes Towards Statistics model, however, the ESEM model showed inadequate factor loadings ESEM of responses to the SATS items based on a six-factor model. Further, there was inadequate model-to-data fit (CFI < .96, see Table 1 for ESEM-6; Hu & Bentler, 1999). Three of the six factors had items cross-loaded on multiple other factors, and many items loaded on their hypothesized factor with a standardized loading lower than .35. Overall, the results indicated that the factor structure of the original SATS-36 (Hilton et al., 2004) does not hold. In particular, the constructs affect, cognitive competence, and difficulty were not recovered in our ESEM analysis.
the missingness is believed to be MAR due to its small percentage and partly being accounted for by variables in the model. We used Full Information Maximum Likelihood as the estimation method for all analyses to handle missing data. For ESEM, we used Oblique Geomin rotation—a nonorthogonal-dimension rotation approach—as recommended for ESEM analyses of continuous item-level variables similar to ours.

Results

Factor Structure Shown by ESEM Results

The five-factor model showed an adequate fit to the data with 21 retained items (Table 1 for ESEM-5) and none were highly cross-loaded on multiple factors. The 5-factor solution holds; the standardized item-factor loadings ranged from .473 to .893 (Table 2). We retained the 5-factor model, which provides evidence for construct validity for the reduced SATS measure with 21 items. The factors represented five constructs in expectancy-value theory. Five of the items represented utility value (i.e., “statistics is worthless” and “…have no application…in my profession”). The four items that represented cost were based on the definition of Eccles et al. (1983) to include perceived effort, loss of valued alternatives, or psychological cost associated with tasks. The four cost items included students’ perceived effort (i.e., “Statistics requires massive calculations” and “…a new way of thinking”) as well as psychological cost (i.e., “I was under stress during statistics class.”) Four items represented interest and enjoyment and three items represented students’ expectancies for success (i.e., “I can learn statistics”). Finally, four items reflected students’ achievement related behaviors in statistics (i.e., completing all assignments, working hard, studying hard and attending every class).
Table 1. ESEM and Path Models Fit Statistics.

<table>
<thead>
<tr>
<th>Model</th>
<th># of Para.</th>
<th>AIC</th>
<th>BIC</th>
<th>$\chi^2$ [df]</th>
<th>$p$</th>
<th>RMSEA [90% CI]</th>
<th>CFI</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESEM-6</td>
<td>209</td>
<td>27929.491</td>
<td>28710.435</td>
<td>425.558 [225]</td>
<td>&lt;.001</td>
<td>.056 [.046, .061]</td>
<td>.949</td>
<td>.035</td>
</tr>
<tr>
<td>ESEM-5</td>
<td>137</td>
<td>20992.469</td>
<td>21504.380</td>
<td>223.2 [115]</td>
<td>&lt;.001</td>
<td>.055 [.044, .066]</td>
<td>.966</td>
<td>.022</td>
</tr>
<tr>
<td>Path Model</td>
<td>39</td>
<td>4397.346</td>
<td>4539.793</td>
<td>2.496 [1]</td>
<td>.114</td>
<td>.072 [.001, .191]</td>
<td>.992</td>
<td>.014</td>
</tr>
</tbody>
</table>

*Note.* Para. = Parameters

Table 2. Items Factor Loadings from the ESEM-5 Model, and Subscale Internal Consistency

<table>
<thead>
<tr>
<th>Item</th>
<th>Standardised Factor Loadings</th>
<th>Cronbach’s $z$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expectancy</td>
<td>Utility Value</td>
</tr>
<tr>
<td>06. Statistics formulas are easy to understand.</td>
<td>.693</td>
<td>-.023</td>
</tr>
<tr>
<td>31. I can learn statistics.</td>
<td>.700</td>
<td>.000</td>
</tr>
<tr>
<td>32. I will understand statistics equations.</td>
<td>.885</td>
<td>.086</td>
</tr>
<tr>
<td>07. Statistics is worthless.</td>
<td>.022</td>
<td>.772</td>
</tr>
<tr>
<td>13. Statistics is not useful to the typical professional.</td>
<td>-.014</td>
<td>.717</td>
</tr>
<tr>
<td>21. Statistics conclusions are rarely presented in everyday life.</td>
<td>.025</td>
<td>.665</td>
</tr>
<tr>
<td>25. I will have no application for statistics in my profession.</td>
<td>-.052</td>
<td>.796</td>
</tr>
<tr>
<td>33. Statistics is irrelevant in my life.</td>
<td>.024</td>
<td>.826</td>
</tr>
<tr>
<td>19. I will enjoy taking statistics courses.</td>
<td>.293</td>
<td>-.054</td>
</tr>
<tr>
<td>12. I am interested in being able to communicate statistical information to others.</td>
<td>-.001</td>
<td>.045</td>
</tr>
<tr>
<td>20. I am interested in using statistics.</td>
<td>.078</td>
<td>.015</td>
</tr>
<tr>
<td>23. I am interested in understanding statistical information.</td>
<td>-.069</td>
<td>.022</td>
</tr>
<tr>
<td>29. I am interested in learning statistics.</td>
<td>.035</td>
<td>-.011</td>
</tr>
<tr>
<td>18. I will be under stress during statistics class.</td>
<td>.257</td>
<td>.158</td>
</tr>
<tr>
<td>30. Statistics involves massive computations.</td>
<td>.010</td>
<td>-.064</td>
</tr>
<tr>
<td>34. Statistics is highly technical.</td>
<td>-.031</td>
<td>-.083</td>
</tr>
</tbody>
</table>
36. † Most people have to learn a new way of thinking to do statistics.

<table>
<thead>
<tr>
<th>Item</th>
<th>Min.</th>
<th>Max.</th>
<th>M</th>
<th>Var.</th>
<th>Skew.</th>
<th>Kurt.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>01. I completed all of my statistics assignments.</td>
<td>.238</td>
<td>-.071</td>
<td>-.054</td>
<td>-0.023</td>
<td>.703</td>
<td>.775</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02. I worked hard in my statistics course.</td>
<td>.075</td>
<td>-.006</td>
<td>.019</td>
<td>-.103</td>
<td>.840</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I studied hard for every statistics test.</td>
<td>-.079</td>
<td>.138</td>
<td>.018</td>
<td>.043</td>
<td>.660</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. I attended every statistics class session.</td>
<td>-.100</td>
<td>.073</td>
<td>.089</td>
<td>.088</td>
<td>.526</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. All item loadings are significant at $p < .001$. † Item responses coded reversely.

Table 3. Inter-Factor Correlations from the ESEM Model, and Descriptive Statistics of Corresponding Subscale Scores

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Min.</th>
<th>Max.</th>
<th>M</th>
<th>Var.</th>
<th>Skew.</th>
<th>Kurt.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectancy</td>
<td>1</td>
<td>7</td>
<td>3.523</td>
<td>1.147</td>
<td>0.322</td>
<td>0.438</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utility Value</td>
<td>1</td>
<td>7</td>
<td>4.628</td>
<td>1.940</td>
<td>-0.512</td>
<td>-0.296</td>
<td>.093**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest and Enjoyment</td>
<td>1</td>
<td>7</td>
<td>3.808</td>
<td>2.147</td>
<td>-0.482</td>
<td>-0.093</td>
<td>.477***</td>
<td>.204***</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>1</td>
<td>7</td>
<td>3.523</td>
<td>1.147</td>
<td>0.322</td>
<td>0.438</td>
<td>.173**</td>
<td>-.007***</td>
<td>.190**</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Achievement</td>
<td>1</td>
<td>7</td>
<td>6.038</td>
<td>0.872</td>
<td>-1.596</td>
<td>3.698</td>
<td>.114***</td>
<td>.168**</td>
<td>.174**</td>
<td>-.078***</td>
<td>--</td>
</tr>
</tbody>
</table>

Note. *$p < .05$; **$p < .01$; ***$p < .001$. 
As presented in Table 3, we found mostly significant positive correlations between these five factors, except one significant negative correlation between cost and value, and four non-significant correlations—between achievement behaviors and expectancies, achievement behaviors and cost, value and expectancies, and value and cost. All inter-factor correlations estimated in the ESEM model were consistent with the expectancy-value theory, which suggests further evidence for the construct validity (see Table 4 for a corresponding variance-covariance matrix).

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>1.125</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utility Value</td>
<td>-0.114</td>
<td>1.874</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectancy</td>
<td>0.367</td>
<td>0.143</td>
<td>1.845</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest and</td>
<td></td>
<td>0.345</td>
<td>0.346</td>
<td>1.073</td>
<td>2.136</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enjoyment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achievement Behaviors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.237</td>
<td>-0.18</td>
<td>-0.095</td>
<td>0.663</td>
<td>0.601</td>
<td>15.327</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>0.058</td>
<td>0.407</td>
<td>0.109</td>
<td>0.334</td>
<td>0.182</td>
<td>0.357</td>
<td>1.623</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Assessed Math</td>
<td>0.019</td>
<td>0.087</td>
<td>0.396</td>
<td>0.087</td>
<td>0.205</td>
<td>-0.061</td>
<td>0.112</td>
<td>1.957</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>-0.041</td>
<td>0.031</td>
<td>-0.042</td>
<td>-0.079</td>
<td>0.023</td>
<td>-0.182</td>
<td>0.107</td>
<td>0.007</td>
<td>0.160</td>
</tr>
</tbody>
</table>

A Path Model Based on Expectancy-Value Theory

**Effects on Achievement Behaviors**

The path model with the five variables (i.e., composite scores on each subscale) based on expectancy-value theory fit the data excellently (see Table 1 for fit indices). As Figure 3 shows, a considerable portion of variance (13% ~ 35%) in the endogenous variables was accounted for by the expectancy-value model. The model parameter estimates showed that motivation variables (i.e., interest and enjoyment and utility value) served as important mediators of the effect of prior achievement on current achievement behaviors in statistics (see Table 5 for direct, indirect, and total effects of student characteristics and self-assessed past math achievement on achievement behaviors).
Table 5. Standardized Direct, Indirect, and Total Effects of Self-Assessed High School Math Achievement, and Individual Characteristics on Student Achievement Behaviors and Expectancy for a Statistics Course Based on the Expectancy-value Model

<table>
<thead>
<tr>
<th>Path</th>
<th>Total Effect</th>
<th>Direct Effect</th>
<th>Indirect Effect (and Breakdowns)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Direct</td>
<td>Indirect</td>
</tr>
<tr>
<td>Effects on Achievement Behaviors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Assessed Math Achievement</td>
<td>.135**</td>
<td>.135*</td>
<td>.019**</td>
</tr>
<tr>
<td>Female</td>
<td>.054*</td>
<td>.07*</td>
<td>-.016*</td>
</tr>
<tr>
<td>Age</td>
<td>.166**</td>
<td>.152**</td>
<td>.015**</td>
</tr>
<tr>
<td>GPA</td>
<td>.122*</td>
<td>.070*</td>
<td>.052*</td>
</tr>
<tr>
<td>→ Interest and Enjoyment → Achieve Behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ Utility Value → Achieve Behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects on Expectancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Assessed Math Achievement</td>
<td>.204***</td>
<td>.187***</td>
<td>.018**</td>
</tr>
<tr>
<td>Female</td>
<td>-.098*</td>
<td>.006*</td>
<td>-.104**</td>
</tr>
<tr>
<td>→ Interest → Expectancy</td>
<td></td>
<td></td>
<td>-.08**</td>
</tr>
<tr>
<td>Age</td>
<td>-.032*</td>
<td>-.064*</td>
<td>.032*</td>
</tr>
<tr>
<td>GPA</td>
<td>.073*</td>
<td>-.044*</td>
<td>.117***</td>
</tr>
<tr>
<td>→ Interest → Expectancy</td>
<td></td>
<td></td>
<td>.107**</td>
</tr>
</tbody>
</table>

Note. *Only significant breakdowns of the significant indirect effects are presented in this table.
~p < .10; *p < .05; **p < .01; ***p < .001.

First, college GPA, although not directly associated with achievement behaviors, was found to have marginally significant indirect effects on achievement behaviors through interest and enjoyment (β = .035, p = .06), and utility value (β = .03, p = .08). Even though each indirect relation was only marginally significant, additively they had a significant total indirect effect on achievement behaviors (β_{indirect} = .052, p < .05), highlighting the fact that interest and enjoyment, and utility value play an indirect but crucial role in influencing achievement behavior in statistics. In other words, the effect of prior GPA on current statistics achievement behaviors was fully mediated by interest and enjoyment as well as utility value: Higher GPA was related to higher interest and enjoyment and higher utility value, and both interest and enjoyment, and utility value were related to more achievement behaviors.

Regarding direct effects on achievement behaviors, self-assessed prior math achievement (β_{total} = .153, p < .01) had a significant positive direct effect on achievement behaviors, which indicates the importance of students’ perception of their prior performance and achievement for their current statistics learning. Age also had a significant positive effect on achievement behaviors (β_{total} = .166, p < .01), suggesting better achievement behaviors in statistics by older students.
Figure 2. Path Model of Achievement Behaviors for a Statistics Course Based on the Expectancy-Value Theory with Standardized Path Coefficients and Percentages of Variance Explained. Note. Nonsignificant paths are in grey. Exogenous variable residual variances and covariances, and endogenous variable disturbances and covariances are omitted from this path diagram.

Effects on Expectancy

Similar to its role in achievement behaviors, college GPA did not have a direct impact on expectancy beliefs, but it showed a significant positive indirect effect through interest and enjoyment, indicating that higher GPA was associated with higher interest and enjoyment, and therefore higher expectancy beliefs ($\beta = .107, p < .01$; Table 5).

Prior research has shown differences in male and females students’ attitudes towards math (Watt, 2006). In this study we found that female students had lower expectancy than males, and this difference by gender was also mediated by interest and enjoyment ($\beta = -.088, p < .01$). This finding shows that females tended to find less interest and enjoyment in statistics than males, and interest and enjoyment was positively associated with expectancy, and, therefore, indirectly females had lower expectancy beliefs about their achievement in statistics. The direct association between female and expectancy was nonsignificant. Taking both indirect and direct relations into account, we found that interest and enjoyment fully mediated the association between gender and expectancy beliefs about statistics achievement.

Regarding the direct effects on expectancy beliefs, self-assessed prior math achievement was the only significant variable that had a significant direct effect on expectancy beliefs ($\beta = .187, p < .001$). Again, this suggests the imperative role of students’ perception of their prior math achievement in their current expectancy beliefs about statistics achievement.
Discussion

We sought to identify factors that influence student attitudes’ towards statistics and its relationships with achievement behaviors among non-statistics majors in a college statistics class. Our findings showed that students had different levels of interest and enjoyment, utility value, expectancy, and perceived cost for statistics learning, and that these variables had significant direct and indirect influences on students’ achievement behaviors as hypothesized in the Expectancy-Value framework (Eccles et al., 1983).

Firstly, perceived utility value, and interest and enjoyment mediated the effects of prior achievement (college GPA) on achievement behaviors and expectancy beliefs. Second, perceived cost and interest and enjoyment mediated the effects of gender (being female) on achievement behaviors and expectancy beliefs. Self-assessed prior math achievement was directly positively associated with both achievement behaviors and expectancy beliefs, and age was directly positively associated with achievement behaviors. Among the attitudes and behavior variables, we did not find a direct relationship between expectancy beliefs and achievement behaviors, or one between perceived utility value and expectancy beliefs.

Our findings are to a large extent consistent with the expectancy-value model and prior research that shows interest and enjoyment, utility value, self-assessed prior math achievement and expectancy beliefs are related to achievement and other student outcomes in statistics courses. Interest and enjoyment have been found to be correlated with quiz grades, test grades, (Tempelaar et al., 2007) and course grades (Cashin & Elmore, 2005) in statistics courses. Utility value also has demonstrated a relationship with course engagement and course grades in statistics (Sutter et al., 2022). Students’ beliefs about their ability to do well in statistics has also been related to their achievement in statistics (Emmioglu & Capa-Aydin, 2012). Research shows a direct relationship between past performance both in math courses (Sorge & Schau, 2002; Chiesi & Primi, 2010) and statistics courses (Hood et al., 2012) to be related to statistics achievement as well as achievement behaviors in statistics courses (Hood et al., 2012; Tremblay et al., 2002). Our study adds to this literature by examining some of the more complex relationships between these variables with prior GPA, self-assessed math achievement, and gender in a sample of statistics students who are not majoring in statistics.

Key Findings and Recommendations for Instructional Practices

Research has shown that students’ expectations for success are related to their outcomes in statistics (Emmioglu & Capa-Aydin, 2012); however, we did not find a direct relationship between expectancy beliefs and achievement behaviors. This is in contrast to the expectancy-value theory that posits stronger expectations of success will lead to engaging in more achievement related behavior. Many studies have confirmed a direct relationship between expectancy beliefs and achievement behaviors. The lack of a direct relationship in this study may be in part due to the limitations of the SATS-36 to measure these constructs. For example, achievement behaviors rely on student self-report.

Another possible explanation for the lack of a direct relationship may be the wording/phrasing of the expectancy-beliefs items and the achievement-behavior items. The former are written in the present or future tense, e.g., I can learn statistics, and I will understand statistics questions. The latter is written in the past tense, e.g., I worked hard in my statistics test. Note that the measurement occurred in the last two weeks of the semester, and, therefore, the students were very likely referring to their achievement behaviors specifically in the semester, whereas they referred to a general expectancy of their statistics learning when answering the expectancy-beliefs questions. There seemed to be a mismatch in references led by the writing of the items, which is a limitation of the SATS-36 scale.

We found several indirect effects that have implications for practice. Our findings showed that
students with lower prior GPAs, who may be at an increased risk for poor course outcomes, are more likely to believe they are able to succeed in statistics and to have more positive achievement behaviors when they find the statistics course interesting and enjoyable and value the course as more useful. This has direct implications for instruction in statistics. Instructors can consider using pedagogical approaches that have been demonstrated to improve engagement, interest and even attitudes towards statistics overall. For example, instructors can adapt activities that engage their statistics students with real life simulations (Lawson et al., 2003; Schoenfelder et al., 2007; Wiberg, 2009). Carlson and Winquest’s (2011) workbook is designed to teach students statistics using guided activities outlined in the workbook. Carlson and Winquest (2001) found that among non-majors taking statistics, students’ were more confident about their ability to achieve in the course and liked statistics more after engaging with the workbook. A gamified curriculum that improves students’ attitudes such as perceived ability to do well in the course, interest in statistics, and value for the course while simultaneously instructing on statistics is also available (Smith, 2017).

Our findings also suggest that instructors be thoughtful about helping not only students with lower GPAs but also students with negative perceptions of their past math achievement. Self-assessed past math achievement had a direct effect on students’ expectations for success and their achievement behaviors in their statistics course. If perceptions of their past performance lead to lower expectations for success and less achievement behaviors, then we need to ensure that we are engaging with these students in a way to communicate clearly to them that their past experiences do not have to limit them from achieving in the course. This communication can also benefit students with lower GPAs who are having difficulty finding value and enjoyment in their statistics course. By emphasizing that their general academic standing does not have to stand in the way of their enjoyment in the course, we may be able to remove this barrier of their engaging in achievement behavior and subsequent success.

One way to accomplish this is through explicit conversations designed to help students change their thinking about their past experiences and achievement. Such conversations may be a direct route to helping students understand that their performance in the course is not predetermined and empowering them with strategies for success. Further, instructors can communicate with students’ about their own utility value for statistics as this has been shown to be related to students’ perception of how useful statistics is to them (Han et al., 2019).

Instructors can consult the literature for guidance on different ways to incorporate explicit conversations about the role of past experiences and achievement in statistics course outcomes (Acee & Weinstein, 2010; Lai et al., 2018; Smith & Capuzzi, 2019). For example, Acee and Weinstein (2010) incorporated messages into a statistics course about the importance and value of statistics and found improvement in students’ attitudes which was in turn related to higher academic achievement. Smith and Capuzzi (2019) developed a mindset intervention specifically for non-major statistics courses. The intervention includes a presentation on the way in which students’ beliefs about their mathematical ability is influenced by culture and debunks the myth that only some students are capable of high achievement in math using current neuroscience findings. Students receiving the intervention were more likely to hold a growth mindset and in turn had lower anxiety and higher course grades. There is also preliminary data to suggest that this approach can work well with non-major graduate students taking statistics (Lai et al., 2018).

The approaches we have listed here have been demonstrated to help students with lower academic achievement levels perform more strongly making them an appropriate choice for students with lower prior achievement. However, when implementing these approaches, instructors should be cautious of their own beliefs regarding their students as instructors’ judgements about students’ past achievement has been demonstrated to be related to students’ achievement, expectations of success and aspirations (Zhu, 2018).
Research on ways to adapt the classroom to improve statistics outcomes is not new (e.g., Goldfinch, 1996). Several pedagogies that have been shown to increase interest and enjoyment in a course include problem-based, student centered, and gamified curriculums. A plethora of resources exist to provide guidance on implementing these pedagogies in the statistics classroom including peer reviewed articles, journals and edited books dedicated to the teaching of statistics (see Beyer & Peters 2020; Dunn et al., 2007; Smith, 2017). Based on the results of this study, these approaches may be beneficial for statistics instructors to use in courses with non-majors as they may improve the students’ interest and enjoyment and lead to positive achievement behaviors. These approaches are also in line with recommendations from Guidelines for Assessment and Instruction in Statistics (GAISE, 2016) to teach statistics in a way that uses real data, context and active learning.

The findings of this research also show that particular attention should be paid to female students taking statistics courses. Many majors that require a statistics course have large numbers of female students including psychology, nursing and education. Female students have been shown to have low expectations for math outcomes (Kyttala & Bjorn, 2010) and in this study also had lower expectations for success. Together, the lower expectations for success, higher perceptions of difficulty and lack of confidence make female statistics students vulnerable to performing poorly in statistics. As such, the achievement behaviors of female students who struggle with math and find statistics difficult will be critical in helping them be successful in statistics. Further, students’ perceptions of their past performance (Bornholt, 2001) and having lower value for math (Yumusak et al., 2007) can guide their decision around continued study with math. This could make introductory statistics a barrier for female students to persist in programs that require additional statistics coursework. The strategies described above can be used to help female students redefine their expected abilities. Female statistics students can learn from their instructor that ability in statistics is not based on static innate traits but rooted in trial and error and seeking helpful feedback to guide such practice.

Limitations and Future Research

The data collected in this study relied on self-reported GPA and past math achievement. Using objective assessments for GPA and assessments of achievement could strengthen results. Achievement behaviors could also be more objectively assessed for example by recording class attendance and assignment completion. Our analyses were restricted by the sample size of 310 participants. The use of path models of observed composite scores could to some extent result in attenuation of path values given the inclusion of measurement error in the manifest variables. Future research should consider enhancing statistical power with a larger sample to estimate a full SEM with both measurement and structural parts.

Future research could focus on the expansion of the SATS-36 to capture other expectancy-value factors not examined in this study. Several individual items on the SATS-36 may be able to be improved in terms of their mapping onto specific expectancy-value constructs. For example, rather than items focusing on efficacy (i.e., “I can learn statistics”) it may be better for additional items that address expectations for success to do well in the course (i.e., “I will understand statistics”). Such revisions to the SATS-36 may allow for better modelling of the expectancy-value constructs and subsequently the relationship between the constructs. We did not find a direct relationship between expectancies and achievement related behaviors, which is contrary to the larger expectancy-value literature. This could be a manifestation of the way in which the SATS-36 operationalizes expectancies.

Future research could also expand our model by including the potential change in constructs over time. Research has shown that several constructs in the expectancy-value model are not static (Johnson et al., 2014; Perez et al., 2019).
We suggest implementing pedagogy and curriculum that can directly impact the achievement behaviors, but we also recommend integrating instructional practices and pedagogy that enhance interest, enjoyment, perceived utility value and expectancy beliefs as indirect ways to promote positive achievement behaviors. Examining these outcomes using a randomized design would allow for a better understanding of the extent to which psychology students’ interest, enjoyment, and utility value, particularly for low GPA and female students, can be positively influenced. Further, the findings could shed light on the effect these potential increases could have not only achievement behaviors but also course outcomes.

Conclusion

Overall, the numerous indirect effects we observed in this study highlight that the factors impacting the achievement behaviors of non-major statistics students is complex and a holistic model is needed to understand their relationships. Our data support the idea that the expectancy-value model can provide that holistic framework. The SATS-36 is a useful tool for collecting data from statistics students to model expectancy-value theory, but room for improvement does exist. Finally, the role of interest and enjoyment, and utility value should not be underestimated in terms of its relationship with psychology students’ achievement behaviors in statistics. Pedagogy and curriculum should take this into consideration and work to address the low levels of interest and/or value psychology students have for statistics, and this is particularly important for students with lower GPAs or poor past achievement.

References


Inclusive Access Course Materials: An Analysis of Waukesha County Technical College’s Inclusive Access Program

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Abstract: The rising costs of course materials have higher education stakeholders seeking alternative models to the traditional course materials acquisition model. One model of interest is Inclusive Access. Inclusive Access has had a sudden rise in adoption across the country which has left gaps in the literature as to the effectiveness of such programs. A review of the literature on the effectiveness of Inclusive Access course materials models returned only four published studies. The purpose of this study was to examine the use of an Inclusive Access course materials model and its effects on student success rates at a Waukesha County Technical College (WCTC). WCTC provided student outcome data for 7,110 students across six courses. The analysis documented significant differences between the before and after Inclusive Access samples for five of the nine categories examined. Black students (+12.80%), Female students (+3.93%), and Students ≥ Age 25 (+3.40%) had the largest increase in success rates when comparing the before and after Inclusive Access implementation populations.

Keywords: Inclusive Access, equitable access, course materials, textbooks, student outcomes

The traditional higher education course materials acquisitions model requires students to acquire their own course materials through their campus bookstore or other sources. Which course materials to use are decisions made by individual faculty members, department chairs, or committees with or without regard for cost or ease of access, a process that has remained largely unchanged for decades (Jensen & Nackerud, 2018; U.S. Government Accountability Office, 2005). This traditional model can create confusion about which course materials to buy, where to buy them, or force students to decide if they can afford the assigned materials (David et al., 2015). Despite a slight downward trend in the last three to four years in costs and student spending, the associated costs of course materials can still lead to students not purchasing their required course materials (Buczynski, 2007; Florida Virtual Campus, 2016; 2018; Vitez, 2018). Furthermore, the cost of course materials can impact student decision-making regarding their educational program or selection of particular courses (Buczynski, 2007; Florida Virtual Campus, 2016; 2018; Martin, et al., 2017; Senack, 2014a; Senack, 2014b; Sikorski et al., 2002). Having access to and obtaining required course materials is important for in-class success because they are still being relied on and are an important component of learning (Buczynski, 2006; Florida Virtual Campus, 2018; Hilton III, 2016; OnCampus Research, 2012).

Through legislation or efforts of institutions, bookstore lease operators, publishers, or interested parties, the cost of and access to course materials is front of mind (Affordable College Textbook Act, 2017; H.B. 2919, 2021; Hurley, 2020). To address these issues, higher education course materials stakeholders have explored course materials models that impact access to and affordability of course materials which include the use of Inclusive Access (Hilton, 2016; Hurley, 2020; Moore, 2021; Spica, 2021; Vitez, 2020).
Inclusive Access is a ‘by course’ course materials acquisitions model through which students enrolled in a particular course have their required course materials provided to them on or before the first day of class (Anderson, 2019). Inclusive Access course materials models use an automatic billing process that charges a student’s Bursar account and generally deliver the course materials digitally through the learning management system so that students have their materials on or before the first day of class (Conole et al., 2020; Anaya & Yankelewitz, 2020; Cuillier, 2018). Laws vary by state, but most states require a student to have the ability to opt out of these programs and source their own course materials as well as receive a refund for the course materials charge or tuition fee (Budnik & Schneider, 2022; Cuillier, 2018). The reduced cost of course materials in an Inclusive Access course materials model can be up to 80% off the retail price of a physical new book price (RedShelf, 2021). Inclusive Access course materials models largely use publisher driven content like that of traditional textbooks (McKenzie, 2017).

In evaluating any course materials intervention, it is important to consider how the model used impacts student course performance/outcomes not just the overall cost savings for a student. This study sought to fill a gap in the literature on the use of Inclusive Access course materials models and their impact on student outcomes. This paper focuses on the student outcome metric of success rate which this WCTC defines as a student receiving a letter grade C or better in a course.

**Review of Literature**

How and when students obtain their course materials may impact their course outcomes. Some research suggests that access to course materials on or before the first day of class may not be absolutely necessary (Spica, 2021) while others have demonstrated that better and sooner access to course materials may have a positive impact on student outcomes (Agnihotri et al., 2017; Colvard et al., 2018; Feldstein et al., 2012. Hurley & Fekrazad, 2020; Moore, 2021; Williams, et al., 2020). Apart from potential cost savings, the premise of Inclusive Access is to provide sooner/immediate access to course materials upon enrollment in a course which may impact student outcomes (Cuillier, 2018; McKenzie, 2017). This review of the literature covers existing research on the impact of Inclusive Access course materials models on student outcomes.

**Inclusive Access Impact on Student Outcomes**

A small public university in Texas launched an e-book program in 2010 that served 1,250 students over 100 courses. In 2018, the program had grown to nearly 12,000 students across 1,020 courses. Hurley & Fekrazad (2020) examined student outcome data from academic years 2016-2017, 2017-2018, and 2018-2019 for sections of a course using an Inclusive Access e-book and sections of the same course that did not use an Inclusive Access e-book. Students not using an e-book had a success rate of 80.30% while students using an e-book had a success rate of 84.96%. The study identified three race/ethnicity categories: Black (+3.79%), White (+3.35%), and Hispanic (+5.21%) and sex/gender categories of Male (+6.55%) and Female (+3.92%). All of these categories showed improvement in success rate. Hurley & Fekrazad (2020) stated that all groups reported had statistical significance at p<0.05 when comparing the before and after Inclusive Access implementation populations but did not identify the statistical analysis tool/method.

Chattanooga State Community College examined the impact of the Inclusive Access program within their math department (Williams, et al., 2020). The pre-Inclusive Access implementation population was 7,653 and their post-Inclusive Access population was 22,007. The study used significance testing where z-tests for proportion were used for each student subgroup to compare the pre and post Inclusive Access populations. The overall population had a 9.3% increase in success rates...
(letter grades A through C). The study provided three race/ethnicity categories (Black +8.5%, White +8.9%, Other 6.5%) as well as sex/gender of Male (+9.5%) and Female (+8.9%). Further student groups included financial aid (+4.79%), traditional students (+10.2%), and non-traditional students (+3.2%).

Moore (2021) conducted analysis of three courses at a community college in the northeastern United States using an Inclusive Access course materials model. The pre-Inclusive Access implementation population was 1,075 and their post-Inclusive Access population was 1,077. Rather than using the term 'success rate' this study used the terminology of letter grade ‘C’ or better. The total population of the study had a 3.88% increase in letter grade ‘C’ or better for students using an Inclusive Access model compared to students who had to source their own required course materials. This study provided four race/ethnicity categories (Black +13.15%, White +1.47%, Hispanic +1.22%, Other +1.59%) as well as sex/gender of Male (+2.31) and Female (+3.24%). Further student groups include traditional students (+2.67%) and non-traditional students (+5.86%). Moore (2021) used multiple 2x2 chi-square test for independence to test statistical significance at p=.05.

A study by Spica (2021) examined an Inclusive Access pilot at 13 Tennessee community colleges. The study compared the Fall 2017 and Fall 2018 pre-Inclusive Access semesters and the Fall 2019 Inclusive Access pilot semester. The pre-Inclusive Access population was 87,854 and the Inclusive Access pilot population was 47,462 across nearly 140 courses across multiple disciplines. This study references DFW rates as a measure (letter grade D and F and Withdraws). Spica (2021) used hierarchical linear regression to determine statistical significance between the three semesters analyzed. Overall, there were “no statistically significant improvements or declines in either overall or disaggregated DFW rates (p.10)” when comparing the pilot semester and two previous fall terms.

Three of the four studies in this literature review found increases in success rates in total population or in specific population segments. However, the use of Inclusive Access course materials models has only taken rise in the last half decade (McKenzie, 2017). Therefore, the quick adoption in the use of Inclusive Access course materials models has left a gap in the literature as to the effectiveness of these course materials acquisitions models. As of the date of publication of this study, these are the only four studies found on the impact Inclusive Access course materials models have on student outcomes. With the limited research on how Inclusive Access impacts student outcomes, this study was designed to increase understanding and contribute to the literature on the impact Inclusive Access course materials models has on student outcomes.

**Purpose and Research Questions**

The purpose of this study was to examine the use of an Inclusive Access course materials model and its impact on success rates at a WCTC. The success rate metric in this study means a student received a letter grade of A through C. This study did not analyze DFW rates because students who received a C- (1.67 on a 4.0 scale) in a class falls outside of the study’s success rate metric definition. This study seeks to help fill the gaps in the literature of how Inclusive Access course materials models impact student outcomes. As Spica (2021) suggested, evidence provided by these studies can help educational leaders and policymakers make important decisions regarding the implementation of such course materials initiatives. To achieve this insight, this study sought to answer the following research questions:

1. When comparing students enrolled in Inclusive Access courses and students who had to source their own course materials, is there a statistically significant difference in the number of students who pass a course with a letter grade C or better?
2. When comparing students enrolled in Inclusive Access course and students who had to source their own course materials, is there a statistically significant difference in the number of students who withdrew from a course?

3. When comparing students enrolled in Inclusive Access courses and students who had to source their own course materials, is there a statistically significant difference in mean final grades?

**Background**

Waukesha County Technical College (WCTC), located in the Midwest is a two-year college with a focus on occupational training. WCTC is a 100% commuter college serving 16,000 total students (3,500 FTEs) with an even split of male and female students. The average age of the student body is 26 years old and 23% of the students enrolled at WCTC identify as a member of a minority student population.

After continued frustration with students who were enrolled in accelerated programs not having access to the course materials, WCTC began exploring the use of an Inclusive Access course materials model to ensure students would have access to what they needed prior to the start of the course. The journey into Inclusive Access began in the Fall 2016 semester in one section of four unique courses. Upon the backs of a few Inclusive Access champions on the WCTC campus, including the bookstore manager, the adoption of Inclusive Access started to grow. By the Spring 2019 semester, WCTC was offering Inclusive Access in 150 sections across 80 courses. As of the Spring 2022 semester, Inclusive Access is used in 406 sections across 135 courses and impacting 5,928 students (duplicated). The Spring 2022 courses using Inclusive Access accounts for approximately 35% of the courses that require textbooks for the course.

The Inclusive Access course materials model at WCTC is a course-fee based model. This model places the cost of materials into tuition and fees for students. Therefore, students who receive financial aid do not need to wait for financial aid awards to post before having access to their course materials. More importantly, students do not need to go to campus to make purchases or search other sources for their materials because their materials are delivered digitally and immediately available in the learning management system. Originally, Inclusive Access at WCTC was started to address students having access to their course materials. Reduced cost for students was a byproduct of this effort, but what was not known was how this program would impact student outcomes. While cost is an important consideration, this study was conducted specifically to understand how WCTC’s publisher content driven, digitally delivered, Inclusive Access program impacted student success rates compared to the success rates of students in the same courses before Inclusive Access was implemented. For this study, success rate is defined as a student receiving a letter grade between A and C.

**Method**

**Participants**

Waukesha County Technical College responded to a direct email inquiry to participate in research on the impact of Inclusive Access course materials models on student outcomes. WCTC provided historical, de-identified student data for six classes that followed a traditional 16-week schedule and using an Inclusive Access course materials model that delivered the course materials digitally through the learning management system: College Mathematics, Fundamentals of Mathematics, Macroeconomics, Math with Business Applications, Medical Terminology, and Introduction to
Software Applications. These classes were selected because they started the use of an Inclusive Access course materials model between Fall 2017 and Fall 2018 which provided at least three semesters of pre-Inclusive Access implementation data and three semesters of post-Inclusive Access. This study examined WCTC data from Spring 2015 through Fall 2019. Having multiple semesters of before and after Inclusive Access course materials model implementation data has been suggested as an improvement to current research (Moore, 2021; Spica, 2021).

**Table 1. Participant Characteristics – Graded.**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Before IA n</th>
<th>Before IA Percentage</th>
<th>After IA n</th>
<th>After IA Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1221</td>
<td>40.90</td>
<td>1248</td>
<td>44.81</td>
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<tr>
<td>Female</td>
<td>1764</td>
<td>59.10</td>
<td>1537</td>
<td>55.19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2985</td>
<td>100.00</td>
<td>2785</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>2199</td>
<td>73.67</td>
<td>2078</td>
<td>74.61</td>
</tr>
<tr>
<td>Black</td>
<td>291</td>
<td>9.75</td>
<td>218</td>
<td>7.83</td>
</tr>
<tr>
<td>Hispanic</td>
<td>280</td>
<td>9.38</td>
<td>284</td>
<td>10.20</td>
</tr>
<tr>
<td>Other</td>
<td>215</td>
<td>7.20</td>
<td>205</td>
<td>7.36</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2985</td>
<td>100.00</td>
<td>2785</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Learner Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students ≤ Age 24</td>
<td>1663</td>
<td>55.71</td>
<td>1705</td>
<td>61.22</td>
</tr>
<tr>
<td>Students ≥ Age 25</td>
<td>1322</td>
<td>44.29</td>
<td>1080</td>
<td>38.78</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2985</td>
<td>100.00</td>
<td>2785</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Data Collection**

Data used for this study were historical and already collected and stored in Waukesha County Technical College’s student information system. Raw deidentified student data were transferred from WCTC to the researcher via a secure Box. The Box was accessible only to the researcher and designated WCTC representative. Researcher applied for and received IRB approval from Researcher’s Institution and WCTC to conduct this study. Researcher’s Institute and WCTC provided the researcher with an IRB exemption because the study did not involve human subjects.

**Data Analysis**

This study used multiple 2x2 chi-square tests of independence to determine if there was a statistically significant difference between students enrolled in an Inclusive Access course materials program or not and their success rate. In this instance, success rate includes students who had received a letter grade of A through C. Students who received letter grades of C-, D or F were not calculated in the success rate metric. Furthermore, students who withdrew from a course are counted separately from the success rate metric. A chi-square test for independence is a reasonable analysis tool to explore the two categorical variables (Pallant, 2016), and previous research examining the relationship between course materials and student outcomes have used a chi-square test of independence (Fischer et al., 2015; Moore 2021). An independent *t*-Test was then used to determine if there was statistically significant difference in mean grades between students enrolled in an Inclusive Access course materials program or not. Previous course materials intervention research has used independent *t*-tests to
analyze mean final grades (Moore, 2021; Ryan, 2019). This study utilized a standard p-value of .05. Thus, a chi-square test or independent t-test result of less than .05 will serve as evidence of a statistically significant relationship between the variables (McLeod, 2019; Moore, 2021; Rose, 2014).

**Results**

The purpose of this study was to examine the impact of an Inclusive Access course materials model on student success rates at WCTC. A total of 7110 students were included in the study. Of the 7110 students included in the analysis, only 5770 received a grade. These students were used in factoring statistical significance for chi-square and independent t-test analysis. The remaining 1340 students withdrew from a course and were only factored in the withdrawal analysis. This study did not analyze DFW rates because students who received a C in a class fell outside of the study’s success rate metric definition.

**Grade Distribution**

Grade distribution was not relevant to this study’s research questions, but previous Inclusive Access research has provided it (Moore, 2021; Spica, 2021). A total of 3723 students received a grade or withdrew from a course in the Before IA sample and 3387 students received a grade or withdrew from a course in the After IA sample. Table 2 displays grade distribution between the Before/After IA samples. When comparing the Before/After IA samples, there was a 5.23% increase in letter A grades and a decrease in letter grades B through F. Overall, there was a 2.05% decrease in withdrawals in the After IA sample compared to the Before IA sample.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Before IA</th>
<th>After IA</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1042</td>
<td>1125</td>
<td>+5.23</td>
</tr>
<tr>
<td>B</td>
<td>866</td>
<td>785</td>
<td>-0.08</td>
</tr>
<tr>
<td>C</td>
<td>593</td>
<td>493</td>
<td>-1.38</td>
</tr>
<tr>
<td>D</td>
<td>165</td>
<td>124</td>
<td>-0.95</td>
</tr>
<tr>
<td>F</td>
<td>319</td>
<td>258</td>
<td>-0.95</td>
</tr>
<tr>
<td>W</td>
<td>738</td>
<td>602</td>
<td>-2.05</td>
</tr>
</tbody>
</table>

**Research Questions 1 and 2**

To answer the question of statistically significant differences in success rates between Before IA and After IA populations, a 2x2 chi-square was performed on the categories of total population, gender, race/ethnicity, and learner age. The After IA population experienced a 2.75% increase success rate compared to the Before IA population. This was statistically significant ($\chi^2 (1, N=5770) = 7.80, p<.05$). Subsequent chi-square tests for Female students ($\chi^2 (1, N = 3301) = 9.38, p<.05$), Black students ($\chi^2 (1, N = 509) = 9.23, p<.05$), Students ≤ Age 24 ($\chi^2 (1, N = 3368) = 4.11, p<.05$), and Students ≥ Age 25 ($\chi^2 (1, N = 2402) = 5.62, p<.05$) showed statistical significance when comparing the Before and After IA populations. The categories of Male students ($\chi^2 (1, N = 2469) = 0.78, p>.05$), White students ($\chi^2 (1, N = 4277) = 2.31, p>.05$), Hispanic students ($\chi^2 (1, N = 564) = 0.052, p>.05$), and Other students ($\chi^2 (1, N = 420) = 0.59, p>.05$) showed no statistical significance when comparing the Before IA and After IA populations. The reduction in Withdrawals ($\chi^2 (1, N = 7110) = 4.87,$
\(p < .05\) when comparing Before IA and After IA populations showed statistical significance. Table 3 displays the results of the chi-square tests.

Beyond chi-square analysis, this study reported the increase/decrease in percentage in success rate when comparing populations. The total After IA population had an increase in success rate of 2.75%. All categories analyzed had an increase in success rate in the After IA population except for the category of Hispanic students (-0.77%), which had a decrease when comparing the Before IA sample and After IA sample. The categories of Black students (+12.80%), Female students (+3.93%), and Students ≥ Age 25 (+3.40%) had the largest increase in success rate when comparing the Before/After IA populations.

### Table 3. Success Rates by Category.

<table>
<thead>
<tr>
<th>Category</th>
<th>Before IA Population</th>
<th>After IA Population</th>
<th>Before IA C or Better</th>
<th>After IA C or Better</th>
<th>Percent Change</th>
<th>Success Rate (\chi^2)</th>
<th>Significant at (p &lt; .05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>2985</td>
<td>2785</td>
<td>2443</td>
<td>2356</td>
<td>2.75</td>
<td>(p = .005)</td>
<td>Yes</td>
</tr>
<tr>
<td>Male</td>
<td>1221</td>
<td>1248</td>
<td>995</td>
<td>1034</td>
<td>1.36</td>
<td>(p = .377)</td>
<td>No</td>
</tr>
<tr>
<td>Female</td>
<td>1764</td>
<td>1537</td>
<td>1448</td>
<td>1322</td>
<td>3.93</td>
<td>(p = .002)</td>
<td>Yes</td>
</tr>
<tr>
<td>White Students</td>
<td>2199</td>
<td>2078</td>
<td>1868</td>
<td>1799</td>
<td>1.63</td>
<td>(p = .129)</td>
<td>No</td>
</tr>
<tr>
<td>Black Students</td>
<td>291</td>
<td>218</td>
<td>179</td>
<td>162</td>
<td>12.8</td>
<td>(p = .002)</td>
<td>Yes</td>
</tr>
<tr>
<td>Hispanic Students</td>
<td>280</td>
<td>284</td>
<td>224</td>
<td>225</td>
<td>-0.77</td>
<td>(p = .819)</td>
<td>No</td>
</tr>
<tr>
<td>Other Students</td>
<td>215</td>
<td>205</td>
<td>172</td>
<td>170</td>
<td>2.93</td>
<td>(p = .441)</td>
<td>No</td>
</tr>
<tr>
<td>Students ≤ Age 24</td>
<td>1663</td>
<td>1705</td>
<td>1330</td>
<td>1410</td>
<td>2.72</td>
<td>(p = .043)</td>
<td>Yes</td>
</tr>
<tr>
<td>Students ≥ Age 25</td>
<td>1322</td>
<td>1080</td>
<td>1113</td>
<td>946</td>
<td>3.4</td>
<td>(p = .018)</td>
<td>Yes</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>3723</td>
<td>3387</td>
<td>2985</td>
<td>2785</td>
<td>-2.05</td>
<td>(p = .027)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Research Question 3

To answer the question of statistically significant differences in mean final grades between Before IA and After IA samples, independent \(t\)-tests were conducted on the categories of total population, gender, race/ethnicity, and learner age. Students enrolled in courses using an Inclusive Access course materials model had higher mean final grades (\(M = 85.94, SD = 11.85\)) than students who were
responsible for sourcing their own required course materials ($M = 84.60$, $SD = 12.11$), ($t(5755) = 4.23$, $p = .00002$). Similarly, there were statistically significant higher mean final grade scores for Female students ($t(4270) = 2.59$, $p = .01$), White students ($t(463) = 4.05$, $p = .0001$), Students ≤ Age 24 ($t(3360) = 2.79$, $p = .043$), and Students ≥ Age 25 ($t(2339) = 4.01$, $p = .00006$) when comparing the After IA populations to the Before IA populations.

<table>
<thead>
<tr>
<th>Category</th>
<th>Before IA Mean Grade</th>
<th>After IA Mean Grade</th>
<th>Point Change</th>
<th>Effect Size</th>
<th>t Score p-value</th>
<th>Significant at p &lt; .05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>84.60</td>
<td>85.94</td>
<td>+1.34</td>
<td>0.1</td>
<td>$t = 4.23$</td>
<td>Yes</td>
</tr>
<tr>
<td>Male</td>
<td>83.94</td>
<td>84.73</td>
<td>+0.79</td>
<td>0.1</td>
<td>$t = 1.63$</td>
<td>No</td>
</tr>
<tr>
<td>Female</td>
<td>85.06</td>
<td>86.92</td>
<td>+1.86</td>
<td>0.2</td>
<td>$t = 4.47$</td>
<td>Yes</td>
</tr>
<tr>
<td>White Students</td>
<td>85.82</td>
<td>86.73</td>
<td>+0.91</td>
<td>0.1</td>
<td>$t = 2.59$</td>
<td>Yes</td>
</tr>
<tr>
<td>Black Students</td>
<td>76.45</td>
<td>81.03</td>
<td>+4.58</td>
<td>0.4</td>
<td>$t = 4.05$</td>
<td>Yes</td>
</tr>
<tr>
<td>Hispanic Students</td>
<td>83.50</td>
<td>84.54</td>
<td>+1.04</td>
<td>0.1</td>
<td>$t = 0.99$</td>
<td>No</td>
</tr>
<tr>
<td>Other Students</td>
<td>84.62</td>
<td>85.03</td>
<td>+0.41</td>
<td>&lt;0.1</td>
<td>$t = 0.34$</td>
<td>No</td>
</tr>
<tr>
<td>Students ≤ Age 24</td>
<td>83.62</td>
<td>87.78</td>
<td>+4.16</td>
<td>0.1</td>
<td>$t = 2.79$</td>
<td>Yes</td>
</tr>
<tr>
<td>Students ≥ Age 25</td>
<td>85.84</td>
<td>87.77</td>
<td>+1.93</td>
<td>0.2</td>
<td>$t = 4.01$</td>
<td>Yes</td>
</tr>
</tbody>
</table>

There were no significant differences in final mean grades for Male students ($t(2465) = 1.63$, $p = .102$), Hispanic students ($t(559) = 0.99$, $p = .323$), and Other students ($t(416) = 0.34$, $p = .736$) when comparing the After IA populations and the Before IA populations. Table 4 displays the results of the independent t-tests.

**Discussion and Implications**

This study examined how the use of an Inclusive Access course materials model impacted student outcomes. Results of the chi-square analysis indicated statistical significance in the After IA population compared to the Before IA population for six of the ten categories examined and results of the independent t-tests also indicated statistical significance in the After IA population compared to the Before IA population for six of nine categories.
Race/Ethnicity

The most notable impact in examining the results of the race/ethnicity categories of this study is the impact Inclusive Access may have on Black students and their outcomes. Black students experienced a +12.80% increase in success rate and a mean grade increase of +4.58 points when comparing the Before and After IA populations. These results mirror an Inclusive Access course materials model study conducted by Moore (2021), in which Black students saw a +13.15% increase in letter grade C or better and a mean grade increase of +3.41 points.

The similarities between the methodology and analysis of this study and Moore (2021) may point to a critical interaction for Black students enrolled in courses using an Inclusive Access course materials model. The increase in percent change and mean final grade between the two studies are comparable for race/ethnicity categories of White students, Hispanic students, and Other students. These categories pale in comparison to the impact Inclusive Access appears to have had for Black students. Given the disparity of results between Black students and other race categories, the impact of Inclusive Access course materials models appears to go beyond addressing some of the more traditional obstacles/challenges to higher education for Black students (Bartman, 2015; Kern, 2000; Wood, 2014; Wood & Harris, 2015; Zamani, 2003).

In her work on equity-minded scholarship, Bensimon (2005; 2012) implies that the traditional perspective of the challenges faced by or lack of performance of Black students (and other minorities) is a result of deficiencies with the student. However, she suggests that the real issue is deficiencies in the design structure of institutions of higher education. If one takes this perspective, the results of this study may speak more to the removal of intuitional structural barriers than the deficiencies or lack of performance in the Before IA sample compared to the After IA sample. Therefore, it is possible that the implementation of an Inclusive Access course materials model represents more than reduced cost or increased performance, but a demolition of structural barriers that hinder Black students from having an equitable opportunity to achieve the same success as their peers. This is a strong supposition based on two studies with comparable results and requires further exploration in future Inclusive Access research.

Gender

In this study, Female students (+3.93%) outperformed Male students (+1.36%) when comparing the Before IA and After IA samples. For Female students, these results are similar to other studies that examined the increase in success rates with the use of Inclusive Access course materials models (Hurley & Fekrazad, 2020; Moore, 2021). Male students experienced less of an increase in success rates than other studies that examined success rates with the use of an Inclusive Access course materials model (Hurley & Fekrazad, 2020; Williams et al., 2020). Furthermore, Female students had a mean grade increase of +1.86 points and Male students had a mean grade increase of +0.79 points. These results are similar to Moore (2021) who used an independent t-test to examine mean final grades for Female and Male students (+1.01/+0.36). These results indicate that both Female and Male students experience an increase in success rate and mean final grade with the use of an Inclusive Access course materials model compared to Female and Male students who had to source their own required course materials.

Learner Age

A part of the analysis for this study was to understand how the use of Inclusive Access course materials models impacted traditional (Students ≤ Age 24) and nontraditional students (Students ≥ Age 25). A
student aged 25 years or older is a line of demarcation between traditional and nontraditional students (Ellis, 2019; Fortin et al., 2016; Spica, 2021). In this study, both traditional (+2.72%) and nontraditional (+3.40%) students saw an increase in success rate in the After IA sample. The results for nontraditional students are in line with previous Inclusive Access studies (Moore, 2021; Williams et al., 2020).

Nontraditional students face several academic and completion challenges that their traditional peers may not experience (Bohl et al., 2017; McGraw, 2010; Taniguchi et al., 2005). The consistent results with respect to nontraditional students may indicate that the use of Inclusive Access course materials models helps reduce the challenge of obtaining or accessing their required course materials when coupled with family and work responsibilities.

**Practical v. Statistical Significance**

Certain categories examined in this study had small increases (<1-3%) in success rate or small increases (<1-2 point change) in mean final grade when comparing Before IA and After IA populations. This leads to questions as to whether the study results are practically significant despite their statistical significance. The only category with an effect size larger than 0.2 is Black students (see Table 4). It could be argued that given the small effect size, there is no practical significance for the results of the study (Bhandari, 2022; Madsen et al., 2016). Despite that argument, it is possible that for some students, these small differences may be enough to move them into a higher grade and further support their academic progress.

**Results in Practice**

Retention and degree attainment in the two-year college sector has been and continues to be a challenge (Bunce et al., 2019; Clement et al., 2016; Crosling et al., 2009; Tight, 2020; Lee & Choi, 2011). For practitioners in this space, it is incumbent upon them to not only identify but attempt to address those structural and institutional barriers that affect students. At WCTC, time was spent talking about immediate access to and the cost of course materials, in particular how these barriers can be removed.

As any two-year college practitioner will tell you, time is the enemy of completion in two-year colleges. In the Spring 2020 semester, after the time period of this study, WCTC transitioned to an 8-week academic calendar which provides the opportunity for WCTC students, of which 85% are part-time, to move through their programs more quickly. With the majority of course being offered in an 8-week format, it was essential that students have their materials before the class starts. Inclusive Access ensures that WCTC students have what they need when they need it – not having to play catch up.

Finally, for colleges that have embraced the Guided Pathways framework, and the four pillars within, there should be a focus on removing barriers for all students with a laser focus on underrepresented student populations (Jenkins et al., 2018; Jenkins et al., 2021). The results of this study should cause faculty, deans, and chief academic officers to pause and further explore how and why Inclusive Access has a positive impact on student outcomes and course completion for all student categories, but particularly black students.

**Other Models**

Inclusive Access course materials models are one of the ways in which higher education is attempting to tackle cost and access, however they are not the only effort. Textbook/e-text rental programs and
open educational resources are being used by college and universities across the country to address cost and access. (Hilton, 2016; Hurley & Carter, 2020; Medley-Rath, 2018; University Bookstore, 2022). This paper did not intend to compare different course materials interventions to each other, but to examine the impact of an Inclusive Access course materials model on success rate at Waukesha County Technical College.

Limitations

This study has some limitations that deserve mentioning outside the possibilities of data errors during extraction, formatting, and reporting. This study was conducted at a singular institution which limits the ability to correlate to other institutions and Inclusive Access course materials models. Furthermore, the study did not take into consideration course modality (online and in-person sections were used in the analysis), instructor changes, changes in assessment, or course assignment/quiz weight. The study neither explored how course materials were used by instructors nor measured student engagement in the course materials. Additionally, there was no attempt made to understand student perceptions of Inclusive Access. This study did not review or attempt to factor a student’s overall GPA in the analysis. With respect to external variables, there was no attempt made to collect or consider how external forces impact a student’s ability to complete assignments, study, or attend class. With respect to the cost of course materials, there was no attempt made to analyze cost savings or compare the cost of materials in the WCTC Inclusive Access program compared to the cost of materials students may have been able to obtain from other sources – the focus was strictly on student outcomes between the Before IA and After IA populations. An analysis of first-generation and a student’s economic status was not included in the study analysis because the information was not consistently available at the WCTC for this sample. This study utilized a 2x2 chi-square and independent t-test. The use of another analysis tool may provide another perspective or result on how Inclusive Access course materials models impact student outcomes.

Future Research

This study sought to contribute to the literature on how Inclusive Access course materials models impact student success. While there was statistical significance in chi-square results for six of ten categories and independent t-test results for six of the nine categories analyzed, it accomplished its objective. Results in the difference between Before IA and After IA samples for Female students, Black students, and nontraditional students align with previous research (Hurley & Fekrazad, 2020; Moore, 2021; Williams et al., 2020).

This study has suggested that the interaction between Inclusive Access use and performance of Black students could mean more than just reduced cost or improved access to course materials – two main tenants of Inclusive Access course materials models. This requires further investigation and research from a larger sample from a variety of campuses (2-year and 4-year) across the country and/or a mixed methods study that seeks to not only discover outcome changes, but how students perceive the impact Inclusive Access has made on their educational journey. Similarly, this effort would contribute to understanding the appearance of little to no benefit experienced by Hispanics students using an Inclusive Access course materials model. Future research in this area may consider focusing on cultural or perceived cultural norms/challenges that affect a student’s study habits and course materials engagement. This effort would also provide an opportunity to explore how instructors who utilize Inclusive Access course materials use and engage the material in class.

It is the opinion of the authors that more research is needed within the course materials initiative space, specifically how Inclusive Access course materials impact student outcomes. This
includes more analysis of DFW rates (letter grade D and F and Withdraws) and/or completion rates (letter grades A through D). Aside from study hypotheses or research questions, future research should consider expanding data samples through multi-campus studies. This effort would provide more data points from various parts of the country. The larger and more diverse sample may provide the ability to generalize the impact Inclusive Access course materials models have on student outcomes. This might provide stronger analysis of individual courses or impact on disaggregated categories, as in this study.

Acknowledgements

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References


In the internet age, students work around high textbook costs. Under federal law, these materials, opted out of such charges.


Re-envisioning Learning through a Trauma-informed Lens: Empowering Students in Their Personal and Academic Growth

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Abstract: We incorporated trauma-informed principles into the design of a synchronous, online Religion and Politics course and then evaluated impacts on student learning through qualitative methods. Using a novel approach, students self-evaluated their learning throughout the course in weekly reflections. Using content analysis and directed coding techniques, we analyzed students’ reflection assessments for themes of trauma-informed principles: safety, trustworthiness, choice, collaboration, and empowerment. We found that students co-developed a sense of safety by engaging in respectful peer dialogue; established trustworthiness through self-disclosure of personal beliefs; collaborated with peers to develop a deeper understanding of course content; and acquired transferable skills through choice in assessments. In addition, students experienced empowerment by recognizing their growth in four primary areas: (1) their personal beliefs and perspectives; (2) their understanding of the course material; (3) their learning; and (4) their ability to use academic tools. Our findings extend and support existing research on the efficacy of trauma-informed practices; furthermore, our research suggests that incorporating trauma-informed principles into course design can support students in their learning as well as bolster their capacity to succeed in other areas inside and outside of the classroom (e.g., engaging in difficult conversations, seeking out support, using transferable skills in other contexts, applying course content to their own lives). Finally, our case study presents innovative approaches for assessing how students engage with trauma-informed course design.

Keywords: trauma-informed, course design, collaborative learning, empowerment, religion

Introduction

Trauma is highly prevalent among undergraduates, whether instructors choose to acknowledge it or not (Stephens, 2020). A majority of students attending college experience a traumatic event in their lifetime (Frazier et al., 2009). Trauma poses an even higher risk to several marginalized and underrepresented groups of students, including veterans, current and former foster youth, American Indian/Alaska Native students, refugees, LGBTQ students, and nontraditional adult learners (Davidson, 2017). The prevalence of trauma means that mental health problems also persist among the undergraduate population (Hunt & Eisenberg, 2010). Furthermore, trauma among undergraduates is exacerbated by a series of intersecting social traumas, including the COVID-19 pandemic (Carello & Thompson, 2021), police brutality and the Black Lives Matter movement (Stephens, 2020), and food and housing insecurity (Marquart & Baez, 2021, pp. 68–69).
Important in the context of improving teaching and learning in higher education, traumatic experiences and/or content may negatively impact students’ learning as well as instructors’ teaching. Students are at risk of experiencing negative classroom experiences when learning about content that can be potentially traumatic (e.g., religion, criminal justice), including retraumatization (Carello & Butler, 2014, Carello & Butler, 2015, p. 263), vicarious traumatization in response to coursework (Carello & Butler, 2014, pp. 158–159; Zartner, 2019), and compassion fatigue and burnout (Zartner, 2019). Trauma is a strong predictor of poor academic achievement (Anders et al., 2012; Armwine, 2019, p. 77; DeBerard, Spielmans, & Julka, 2004), high attrition rates (DeBerard, Spielmans, & Julka, 2004; Duncan, 2000; Porche et al., 2011), and low student engagement (Balfanz & Byrnes, 2012; Craig, 2016; Craig, 2017). Instructors also face challenges when teaching potentially traumatizing material (Carello & Butler, 2014, p. 159; Nikischer, 2019; Walters & Anderson, 2021). Risks include retraumatization, compassion fatigue (Davidson, 2017; Stephens, 2020, p. 449), vicarious trauma (Carello & Butler, 2015, p. 263; Zartner, 2019), and teacher burnout (Pines, 2002; Zartner, 2019).

Research has shown that approaching teaching using a trauma-informed pedagogy can mitigate some of the risks associated with teaching potentially traumatic content, both for students (Brunzell, Stokes, & Waters, 2019; Carello & Butler, 2014; Carello & Butler, 2015; Cless & Nelson-Goff, 2017; Harper & Neubauer, 2021; Morgan, Pendergast, Brown, & Heck, 2015), including marginalized groups of students and those from underrepresented minorities (Tang & Kiang, 2011; Wilson & Nelson-Moody, 2019), and instructors (Walters & Anderson, 2021). Five core principles underlie a trauma-informed pedagogical approach: safety, trustworthiness, choice, collaboration, and empowerment (Fallot & Harris, 2009). Various classroom-level strategies have been described for developing a trauma-informed pedagogical approach based on these five core principles in higher education (Carello & Butler, 2015; Davidson, 2017; Fenner, 2018; Tang & Kiang, 2011).

However, research exploring the impact of trauma-informed approaches on students’ learning experiences is still fairly limited. Some studies assess students’ own reports of their classroom experiences by prompting students to link their experiences to one of the five core principles underlying the trauma-informed approach (Agllias, 2012; Black, 2008; Carello & Butler, 2015). Breckenridge & James (2010) analyzed student course evaluations, investigating students’ self-awareness of their own responses to trauma and their capacity to cope with and respond to traumatic experiences. Other studies have investigated the impact of a trauma-informed approach to courses that involve potentially traumatic content in a graduate student setting (Bussey, 2008; Shannon et al., 2014; Zosky, 2013). There is a call for further exploration of students’ perspectives on trauma-informed practices (Carello & Butler, 2015; Stephens, 2020).

This paper presents the findings of a qualitative study, in which we used a trauma-informed approach to teach content that can be personally traumatic for students (religion and politics) within the context of several intersecting social traumas (e.g., COVID-19 pandemic, racial injustice). We incorporated principles of trauma-informed pedagogy into the course design of an undergraduate, synchronously taught online Religion and Politics course and then evaluated students’ weekly reflection assignments. We investigated how using a trauma-informed lens impacts students’ learning, by asking the following research question: How are themes of trauma-informed principles reflected in students’ learning experiences and growth?

The novelty in our approach lies in the fact that students were not asked to link their experiences to the five core principles underlying a trauma-informed pedagogy in their reflections. Instead, the weekly reflection assignments asked students to connect the course material to current events and their daily lives. Therefore, we analyzed the impact of our trauma-informed approach by examining the themes of trauma-informed principles that were reflected organically in students’ learning experiences. Upon analysis, we found elements of each core principle underlying a trauma-informed approach reflected in students’ responses. In particular, our analysis revealed that students:
(1) co-developed a sense of safety by engaging in respectful peer dialogue; (2) established trustworthiness through self-disclosure of personal beliefs and experiences; (3) collaborated with peers to develop a deeper understanding of course content; (4) developed transferable skills through choice in assessments; and (5) experienced empowerment by recognizing growth in their learning (having their beliefs and/or preconceived notions reaffirmed or challenged by course material and discussion) and their learning potential (using skills developed in the course to continue their personal, intellectual, and academic growth).

Methods

Case Study Selection

For our qualitative case study, we selected a Religion and Politics course at the University of California, Irvine. We selected this particular course for our case study, as the class explored subject matter that may be considered traumatic for students due to their personal, cultural, and/or familial experiences with religion and politics. For example, students read articles, watched videos, and discussed topics related to colonialism and indigeneity, terrorism, slavery, anti-Semitism, Islamophobia, homophobia, and the Israeli-Palestinian conflict.

Students may have experienced discrimination because of their religious identities or because other aspects of their identities (e.g., sexual orientation) are rejected by others in the name of religion. For example, Muslim Americans frequently experience microaggressions due to their religious identity (Husain & Houward, 2017). Lowe et al. (2019) found experiencing religious discrimination increased risks of experiencing post-traumatic stress disorder (PTSD) symptoms for Muslim college students. As another example, students within the LGBTQ community may be excluded and rejected by their family members, due to religious beliefs (Ryan, Russell, Huebner, Diaz, & Sanchez, 2010).

In addition to being paired with experiences of discrimination and rejection, religion can be intertwined with traumas associated with horrific violence (e.g., genocide) and physical and psychological harm (e.g., sexual assault). Adults may experience intergenerational trauma, as a result of familial and social legacies of religious genocide and other atrocities (e.g., the Holocaust) (Dashorst et al., 2019). Others have experienced sexual abuse and assault by religious leaders, as exemplified by the Mormon and Catholic Church’s sex abuse scandals. In these cases, the trauma of sexual violence is compounded by religious beliefs and the egregious abuses of power tolerated within religious institutions and communities; as Goodwin (2020) argues “survivors of religious sex abuse must negotiate their relationship to religious communities, religious spaces and rituals, and to the divine” (Goodwin, 2020, p. 140). While experiences of racism, homophobia, and other forms of abuse do occur in varying forms in a vast majority of spaces, there is something unique about these forms of trauma being perpetrated in religious spaces (Goodwin, 2020). Furthermore, psychological, emotional, and physical traumas with religious implications are amplified by the politics that play out within familial and legal systems (Muldoon et al., 2020). For example, bodily autonomy and abortion access, marriage equality, and gender affirming healthcare access for transgender youth are all highly politicized (Pérez, 2007).

In addition to exploring potentially traumatizing topics, the class took place remotely (due to the impacts of the COVID-19 pandemic) and during the height of the Black Lives Matter protests. In addition to the collective trauma of these events (which may disproportionately impact students of color), the pandemic exacerbated underlying issues of food, housing, and income insecurity (Enriquez & Goldstein, 2020; Linton, Leifheit, McGinty, Barry, & Pollack, 2021; Parekh et al., 2021). For example, in 2020, 39 percent of University of California undergraduates reported experiencing food insecurity during enrollment. Food insecurity was even higher for underrepresented undergraduates.
(e.g., Black/African American, Hispanic/Latino and American Indian) at 50 percent. Furthermore, 5 percent of University of California undergraduates reported experiencing homelessness during enrollment (University of California, 2020).

Course Design

Drawing from literature outlining approaches to and ideas for incorporating trauma-informed principles (e.g., Stephens, 2020; Carello & Butler, 2015), we structured the course with intention to integrate safety (i.e., protected from physical and psychological harm), trustworthiness (i.e., recognizing reliability, consistency, and dependability in others), collaboration (i.e., individuals working together with a shared purpose and toward a common benefit), choice (i.e., allowing for the ability to make decisions), and empowerment (i.e., helping the student discover and develop their own capacities). We structured the course in a way that centered students as capable actors in their own learning process, with a capacity to develop and use tools and resources, to apply the course content to their own lived experiences, and to critically examine their own beliefs. As we describe below, we framed the learning process as dependent on and strengthened by participation of everyone in the course, established clear and consistent expectations, conveyed a welcoming and kind tone, and provided multiple opportunities for support.

Engaging Students in Their Learning Process

Important to the conditions for trustworthiness (i.e., developed through empowering participants), the course syllabus stressed that the course was structured in a student-centered way, meant to guide students as they applied the course content to their own lived experiences and critically examined their own beliefs. The syllabus conveyed that students had agency and responsibility in their learning process and in the course (e.g., making up missing assignments, contributing to course content), which reinforces another aspect of ‘trustworthiness’: establishing positive expectations in others. In addition, the syllabus and course policies explicitly discussed the importance of students being engaged as a key part in their learning (e.g., being clear about exploring their own positionality in their examinations of religion and politics). For example, the syllabus stated that “…all assignments center on how you are drawing connections between the course materials and your experiences.”

Emphasizing Collaboration

The syllabus and course policies signaled the importance of collaboration by framing the learning process as being a shared experience dependent on the participation of everyone in the course. For example, the course description frequently used language that indicated a shared process of learning (e.g., “we,” “us,” “collectively”). Beyond using language that framed the class as collaborative from the beginning, the course design required students to engage with each other through in-class and online discussions. These discussions were described as being an integral part of the learning process and important for all students.

Encouragement to Use Resources and Make Selections

The course structure emphasized empowerment, by encouraging students to use tools and resources to guide their learning process, while providing flexibility and choice. For example, students were encouraged to look at the Q&A discussion board to see if other students had asked a similar question when they needed help, before emailing the instructor. For weekly reflections (which were graded in
terms of completeness/effort as opposed to content), students were asked to use course texts to bolster their arguments; this practice allowed students to engage with scholarship when articulating their ideas as well as gave students practice in reading and applying academic journal articles. In weekly reflection assignments students were also asked to find current media stories and events that illustrated examples of theoretical concepts and themes discussed in class. By reviewing and selecting media articles, students learned how to find and examine examples of concepts learned in class in local and global contexts. Requiring students to engage in their own discovery of current events and to use scholarship in support of their arguments was meant to empower students, by helping them apply course content to explain situations happening in real-world contexts. Reflection assignments also allowed students to make their own choices in terms of topics to investigate, media articles to select, and formats for assessments (e.g., written or video recording). By offering numerous ways to engage in the material, students were able to pursue the topics most interesting to them (within theoretical frameworks discussed in the course) as well as articulate their ideas in whichever format they were most comfortable expressing themselves (e.g., verbally or in written format).

**Setting a “Safe” Tone for Learning**

The course site and syllabus included various imagery that conveyed safety through diversity and friendliness. For example, the image selected for the course syllabus included an image of people from various religious backgrounds, genders, and ethnicities engaging in the same practice (i.e., holding their hands in a position of prayer). This conveyed a commitment to highlighting diversity of religion and identifying shared commonality in the same image. As another example, the syllabus frequently included “smiley faces” to pair a positive emotional connotation with the text outlining the course policies. These images helped to convey a welcoming and kind tone for both the course and the instructor. In addition, the instructor set a welcoming tone through the pre-course survey. The survey not only included self-disclosure from the instructor (e.g., acknowledging that mental health and wellbeing is important), but allowed students the opportunity to share and acknowledge areas where they might need additional support. For example, the survey asked the following questions:

1. Would you consider yourself an introvert or extrovert in classroom settings? (You can skip this question if you’d prefer not to respond.)
2. For students participating in synchronous class discussions: are you more comfortable participating in class verbally or through the Zoom chat?
3. Do you have any concerns about accessing resources, including basic needs (food, shelter, medical care), psychological care and counseling, or access to technology that you wish to share with me?
4. Do you have any accessibility requests or general concerns you would like to tell me about, regarding remote learning, the course subject matter, accommodations, or other? (For example, materials available in a different format, transcriptions, specific approaches to discussion boards, a preference of video discussion vs. discussion boards, etc.?)

Furthermore, to reinforce aspects of trustworthiness during class sessions, the instructor disclosed personal information relevant to positionality (e.g., religious identity and experience) with students. Sharing personal experiences with students during discussions where applicable was intended to foster an environment where students felt comfortable disclosing their experiences and contributing to discussions and peer learning exercises.
Communicating Opportunities for Support

The syllabus clarified that office hours could be used to discuss personal issues, in addition to course content. Important for physical and emotional safety concerns, the syllabus mentioned that students could email in advance, if office hours needed to be held privately to discuss course material and/or personal matters. Additionally, students could make office hours by appointment. As students were participating in the class virtually (and many attending from spaces shared with others), allowing students to set a more private time for office hours allowed them to discuss personal matters in conditions that were suitable for them.

In addition to creating safety through traditional office hours, the instructor also established an optional “muddiest point” or “MP” office hour following one of the biweekly classes. The MP office hour was described as an optional, ungraded space for students to ask any questions about the course content (e.g., authors’ arguments, concepts discussed in class). Importantly the syllabus framed the MP hour as a space for students to ask even those questions they assume are obvious and unnecessary. By making it clear that no questions would be judged, the syllabus and MP hour signaled to students that they should feel comfortable asking for help and clarification.

The instructor also established a student-only discussion board to allow students to ask questions within each topic module (with an option for bringing the instructor into the conversation if necessary). This provided students with another avenue to ask for help as well as the opportunity to communicate primarily with their peers. For those students who feel more comfortable asking peers for clarification (rather than the instructor), having this additional space to communicate could be helpful.

The instructor conveyed that students could seek out additional resources beyond the instructor and their peers if needed. For example, the syllabus referenced a variety of centers on campus that could help them with academic and personal support (e.g., food assistance, writing support, disability services). Attempting to destigmatize seeking out services, the pre-course survey and syllabus also emphasized that being a student can be stressful and that the university offered various forms of support to help in addressing various challenges. This may have been helpful for those students feeling uncomfortable or uncertain in getting support outside of the classroom.

Establishing Consistency

By establishing clear and consistent expectations in the syllabus (and following through with these expectations), the instructor signaled qualities of trustworthiness by demonstrating reliability, consistency, and dependability. For example, the weekly assignments followed a similar formula (e.g., format, word length, grading criteria, due date) that created dependability throughout the class. As another example, students were given a description of how weekly reflections would be graded (completeness rather than content) and given the opportunity to continually practice the same reflective exercise over the weeks and become comfortable with a less traditional grading scheme.

Collecting Feedback

The instructor administered several surveys throughout the course to collect feedback and student information and to “ensure that [their] experience in the course is as positive as possible.” By including the course feedback surveys in the syllabus, the instructor signaled that students would have the opportunity to share their perspectives associated with participating in the class (e.g., positive or negative) and that the instructor cared about assessing their emotional experiences as students. Feedback was collected halfway through the term; one survey asked students to share how well they
have been able to keep up with course expectations while the other asked students to share their feedback regarding the instruction of the class. A final course evaluation survey was administered at the end of the course.

**Communicating Privacy Policies**

At the beginning of the class, students were asked to complete a survey that collected personal information, so the instructor could connect the course content to their diverse backgrounds and experiences (e.g., personal religious beliefs, familial religious affiliation). However, students were assured that their responses would be anonymous. Similarly, students were given assurances that their personal weekly reflections would not be shared with any other students in the course. In addition, the syllabus made it clear that while the instructor-speaking portions of lectures would be recorded, all student discussions would only be recorded with explicit consent from students. This allowed for students to discuss topics openly during class, without worrying that these comments would be recorded and shared without their approval.

**Participants**

Twenty-two undergraduate students enrolled in the course participated in the study. All students were undergraduate students attending University of California, Irvine. Students were notified of the research project at the beginning of the course, verbally and in writing, and were given the opportunity to opt out. No students opted out of the study. This study was approved as exempt by the University of California, Irvine, IRB (IRB#1982).

**Data collection**

We collected weekly reflection assessments from 22 undergraduate students in the course. In addition to discussing the course material within the reflection assignments, students discussed the role of religion in their daily lives. In the final course reflection, students reviewed their initial reflection assignment and color coded their responses to indicate phrases they agreed with, no longer agreed with, and/or were unsure if they agreed with. As students were given the choice to submit written assignments or audio recordings, we transcribed and/or evaluated recordings for two students and written reflections for 20 students. The reflection assignment prompts can be found in the Appendix.

**Data analysis**

The reflections were analyzed using directed content analysis methods, where initial coding categories are developed prior to evaluating the data (Hsieh & Shannon, 2005). We developed a coding scheme based on the literature outlining the following trauma-informed principles: safety, trustworthiness, choice, collaboration, and empowerment. For each code (e.g., safety), we defined the principle (e.g., sense of emotional and physical safety), conditions for development (e.g., co-created by those present and participating), and possible examples (e.g., a student describes the classroom as a “safe space”). Two of the co-authors then coded the reflections using the directed coding scheme; as the coding process continued, the initial coding scheme was revised and refined to develop data themes. Furthermore, both coders reviewed and discussed their respective codes as well as the directed coding scheme, to support the consistency and reliability of the analysis. Reflections were blinded by the instructor prior to data analysis; to provide anonymity to the students in the course, each student was assigned a numbered code. The instructor, a co-author on this paper, did not analyze the data.
Findings

Safety

Analysis of the reflections revealed that students experienced safety as co-developed through (1) engaging in respectful discussions with diverse peers, (2) addressing difficult concepts, and (3) being emotional and sharing their feelings with the instructor and with their peers. Due to the active listening and respect established in class communication, the pedagogical techniques of the instructor (e.g., creating spaces for asking questions), and the opportunity to express feelings in written reflections, the course created an environment where students felt comfortable sharing their personal experiences and divergent opinions as well as discussing difficult topics. Importantly, students were able to apply course material to the lived experiences of their peers as well as explore how course theories might apply to contexts outside of the classroom.

Engaging with Peers

Students framed the course as providing a space where they felt safe to share their ideas, beliefs, emotions, and fears in an environment free of judgment. A sense of safety related most prominently to in-class discussions; importantly, safety was characterized as being co-created by peers and through the process of engaging in respectful, open, and honest dialogue with each other. In particular, students appreciated the opportunity to have conversations with peers of differing religions and identities: “With my classmates sharing those experiences and what they believed in, I was able to expand on my knowledge of the various religions even within our school.” Having a safe space to engage in discussions with peers from diverse backgrounds and perspectives not only helped students understand the material but allowed students to practice engaging in respectful dialogue with people with different cultural backgrounds: “It is really nice to be having conversations with other people who have completely different values and trains of thought in a non-aggressive and genuine manner… I really wish I could take those conversations and replay them and just smile and appreciate how great they are.”

Exploring Difficult Topics

Students also described the instructional methods (e.g., exploring contentious topics rather than shying away from them, allowing multiple avenues for students to share their questions/perceptions) as creating a safe space for delving into topics that might cause emotional distress in other contexts. Furthermore, students felt safe to share their challenges in understanding the material as well as share perspectives that differed from those explored in the texts or shared by the instructor. In addition to feeling safe to engage with peers with different ideologies, perspectives, and experiences, the course was characterized as a unique space to discuss topics that are considered “off limits” or more difficult to discuss in other spaces (e.g., with friends or family). For example, one student said: “[The instructor] didn’t avoid controversial or sensitive topics; that created a safe space that made me feel like I could ask questions, share my opinions, or discuss any interpretations. This approach to teaching taught me the importance of not shying away from overwhelming topics and that breaking down the factors can provide a whole picture of the topic.”
Sharing Emotions

Due to the format of the assessments and the grading methods, students also discussed feeling safe to express themselves genuinely and with emotion. Overall, reflections indicated that students felt safe to discuss difficult topics that might not be discussed or explored in other contexts and in ways that felt emotionally authentic and manageable. The freedom to express themselves with a sense of authenticity, both with each other and the instructor, was also reflected in their opinions about their classwork: “I learned that when I speak about things that cause me profound inquiry, I get very emotional, and perhaps that isn’t the best. I found that I can do this and be taken seriously by my grader, but that this also feels more genuine to me than perhaps any other paper that I’ve written.”

Trustworthiness

In the student reflections, the theme of trustworthiness appeared primarily through self-disclosure in reflections. Self-disclosure reinforces a dependability in others, by signaling investment in relationships and a closer connection with the instructor (Henry & Thorsen, 2021; Cayanus et al., 2009). In reflections students freely disclosed highly personal information about their experiences, their beliefs, and their perceptions. Having students share their experience with religion not only provided an opportunity for students to explore, discuss, and reflect on their personal relationship with religion, but provided students the opportunity to practice developing connections between their own positionalities and the themes explored within course texts.

Participating in Self-disclosure

Disclosures pertained to a variety of topics that indicated trust in the instructor, in peers, and in the process of reflection (e.g., admitting intolerance toward others due to their beliefs, discussing feeling stereotyped for their own beliefs, discussing familial conflicts due to religion, sharing consternation about their spiritual or non-spiritual identities being in conflict with other values). For example, students shared how religion reinforced or exacerbated family tensions (e.g., not feeling accepted by Christian parents due to identifying as LGBTQ) and shaped their experiences as first-generation Americans (e.g., experiencing cultural and religious tensions). Students also shared their beliefs and fears about death, life, and afterlife as well as explained how these conceptions related to their sense of morality (e.g., connotations of ‘sin’). Students shared how religion shaped their relationship with gender norms, sexuality, and choice in pursuing particular lifepaths. Students also shared how religion provided them with comfort (e.g., grieving the passing of family members, dealing with anxiety and depression, finding purpose in life) as well as presented uncomfortable aspects to grapple with (e.g., acknowledging implications of and/or history of religious oppressions and their personal prejudices and biases). Those students with more secular beliefs disclosed personal information across similar topics, juxtaposing their personal beliefs and worldviews with their ideas of how religious individuals viewed similar topics differently. We note that representative quotes exemplifying self-disclosure are omitted due to the personal content of those quotes. We also note that the themes of safety and trustworthiness seem to be mutually reinforcing; students must have felt safe to disclose personal beliefs with their instructor and their peers, and disclosure of personal views contributed to a sense of safety.
Collaboration

Perhaps unsurprisingly, the theme of collaboration appeared most prominently in the context of in-class and small group discussions and group exercises. The collaborative process primarily pertained to students collectively helping each other examine course content as well as their own belief systems and positionality. Collaborations were primarily impactful in two ways: (1) students were able to engage with diverse views via collaboration, and (2) collaborations helped deepen students’ understanding of material.

Engaging with Diverse Views

Based on reflections, students openly shared their personal experiences (e.g., experiencing intolerance due to sexual orientation, gender, religion, race/ethnicity, immigration status) with each other in their smaller groups. Sharing among peers exposed students to different perspectives, ways of thinking, and world views. Some students described the divergent perspectives in interpretation as an interesting aspect of the co-learning process: “I found it interesting that more often than not in these five weeks I was contrasting with my fellow classmates, but in the most beautiful way. Contrast in interpretation, but a lot of commonalities in overall experience and feeling.” Students also shared how learning with peers encouraged them to re-evaluate and challenge their own beliefs and preconceived notions: “The whole class discussions and the breakout rooms were really eye-opening experiences for me...I really enjoyed this course as a whole because it gave me the opportunity to see things in a different perspective and change my perception on religion and society.” To a lesser extent, collaborations were also impactful by reaffirming students’ existing views on religion, secularism, and spirituality.

Deepening Understanding of Material

Importantly, in addition to having the opportunity to share different views and interpretations, students discussed how these peer discussions helped deepen their understanding of the class material. Students were able to explain concepts to each other and provide supporting examples from their own lives to help illustrate concepts explored in the class. Peer discussions also reassured students having difficulty in understanding a concept, as other students helped to explain concepts or shared their uncertainty in understanding the material as well. Students frequently discussed the importance of collaborative discussions for their learning. For example: “It was always insightful to get a different perspective on my own religion and learn new things about their religions and how it relates to class. It's one thing to learn about religion from media, articles, and readings, and it's so insightful to learn it from others. So it's always helpful to hear the perspectives of my peers.”

Choice

The theme of choice emerged primarily in relationship to the flexibility within the reflection assignment itself. While prompted to reflect on certain topics, students were given a choice in terms of what content to discuss and what information to share. Furthermore, students had a choice in selecting current events and media stories that related to the theoretical concepts being discussed in the course texts. Choice in these contexts was experienced in four ways: (1) flexibility broadened students’ perspectives, including those on the course material, (2) flexibility encouraged students to develop transferable skills, (3) flexibility allowed students to feel included, and (4) flexibility was an enjoyable aspect of the class.
Broadening Perspectives

Overall, students felt the choice to explore certain topics in greater depth made the course more challenging; however, the challenge was framed positively as intellectually stimulating and engaging. Students also shared that selecting particular topics/stories to explore in greater depth allowed for deeper engagement with and exploration of course material and of topics with personal resonance. For example, one student said: “Being able to supplement a current event to the readings and understand the theme in a different way made it easier for me to understand the phenomena and themes that the readings discussed. I think the challenging part was connecting the source and reading to my own personal views... so it was interesting to challenge myself into building an opinion regarding religion, spirituality, and secularism.” Other students shared how the process of the reflection assignment (i.e., having the flexibility to investigate different current events in relation to the course material) helped them to learn more effectively: “Weekly reflections allowed me to make connections between the current events and course materials. In addition, having to reflect on what we learned gave me a chance to revisit what I learned and apply the learning to my own world. I found it helpful, and a much more efficient way of learning than a quiz or a test, because a quiz or a test makes you remember ‘who said what’ but in this case, I had to think about ‘why who said what’ and ‘how’ it applies to the world now.”

Developing transferable skills

Some students indicated that the flexibility of the assignments allowed them to develop certain skills that they could apply in other contexts. For example, students learned skills for reinforcing their learning of course concepts, by finding examples that illustrated key issues discussed in the course and within course readings. Furthermore, engaging in the process of choosing topics and finding relevant content provided students with practice in developing research skills: “[applying concepts discussed in class] to a reading... prepared me for conducting research and writing a dissertation.”

Inclusion

Providing choice and flexibility in pursuing different topics provided students with the opportunity to explore topics and current events that personally resonated with them. In turn, having agency in selecting different topics to explore made students feel more invested in their learning and more included in the learning process: “[finding current events associated with the readings and theme of the week] was my favorite part of writing reflections. In my Week 4 reflection, I found an article on Korean American Christian women and learned so much through that one article. I never felt so included and heard, and I’m sure that I would have never found that article if it wasn’t for deep diving into the theme.”

Enjoyment

Finally, the flexibility of assignments was described by some students as a particularly enjoyable aspect of the class. This was felt even when students also found the assignments challenging, and outweighed any negative feelings associated with the difficulty of the assignments: “I think weekly reflection is not only homework, but also an exploratory process, because the knowledge learned in class is limited, and you can only learn it if you take the time to explore. In general, although this is a stressful class, the joy of exploration is greater than the stress.”
Empowerment

Above all, the student reflections frequently conveyed empowerment by recognizing their growth in relation to four primary areas: (1) their personal beliefs and perspectives; (2) their understanding of the course material; (3) their learning; and (4) their ability to use academic tools to support their personal, intellectual, and academic growth and/or to explain their previously held beliefs and understandings.

**Growth in Relation to Previously Held Personal Beliefs and Perspectives**

Through the comparison reflection exercise, students were able to recognize how their assumptions about personal beliefs (their own or others’) had changed or grown over the course of the class. When examining their initial reflection in their final reflection, 64 percent of students highlighted previous statements they had made concerning their own beliefs and/or perceptions regarding the importance of religion and secularism in shaping their own lives as statements that they now disagreed with or were unsure about. More interestingly, students were also able to reflect on what they had learned, and how the learning experience allowed them to more critically evaluate how religion/secularism has influenced their lives and how these issues might influence others’ lives as well. In particular, students frequently used emphatic or forceful descriptors when elaborating on their growth in relation to previously held personal beliefs and perspectives. For example, growth in this respect was described as “eye-opening,” “mind blowing,” and previously held beliefs were described as having been “turned upside down.”

**Growth in Relation to Previously Held Beliefs about the Course Material**

In addition to personal growth, students also recognized their growth in understanding the course material and concepts (i.e., role of religion and secularism in shaping democracy and human rights, perceptions of race and ethnicity, understandings of gender and sexuality, and conflict and peacebuilding). Sixty four percent of students highlighted previous statements they had made concerning the role of religion in politics as statements that they now disagreed with or were unsure about. Furthermore, through their reflections, students elaborated on why they now disagreed with their previous statements, recognizing statements that mischaracterized relationships between religion and politics or that were overly simplistic in their framing of complex issues.

**Growth in Relation to Learning**

Strikingly, 91 percent of students recognized growth in their learning of the material from week to week, as well as over the course of the term, and felt empowered by discovering learning as a process. Students frequently reflected on how they hoped to change in the future as a result of the course: “I do believe that I need to instead become more open-minded in regards to whom I associate and become close with. Religious barriers have existed in my past as there were some significant distinctions, but there is a lot to learn from other religions and individuals.” Also, students frequently expressed excitement in uncovering their learning, as well as in having the opportunity to continue to learn more about the themes and topics explored in the class: “I also want to learn more about and respect others’ religions and spiritualities (both I knew about before this course and those I learned during this course)… Sharing my perspective was invigorating and piqued my interest in continuing my studies on these topics.”
Using Academic Tools

Throughout the reflections, students discussed their growth in using academic tools to guide their learning process. Students recognized how their interpretation of real-world situations and theoretical framings of issues had evolved through the process of participating in course discussions, writing weekly reflections, reading/reviewing course materials, and identifying real world events. Students were able to apply theoretical course concepts to real world situations that they had uncovered through their media searches for current events. In addition, students used course texts (e.g., articles, podcasts) to bolster and support their arguments. Interestingly, when students did not disagree much with the points made in their initial reflection, they were able to use course texts and materials to support their initial interpretation and explain why their thinking had not changed. For example, one student said: “My response has not changed since Week 1. Again, referencing Kizito, there are clear indications as to how American politics has been affected by these issues. What is more important here is the way in which society has viewed these issues to be acceptable.” Other students expressed that the course helped them develop skills in evaluating and interpreting academic articles as well as in conducting research.

Discussion

Our findings indicate that incorporating trauma-informed principles into course design could be an important avenue through which instructors can support students in their learning as well as bolster their capacity to succeed in other areas inside and outside of the classroom (e.g., engaging in difficult conversations, seeking out support, using transferable skills in other contexts, applying course content to their own lives). As such, using a trauma-informed design is another tool available to instructors to not only advance learning, but to be a part of the holistic and comprehensive support systems that undergraduate students increasingly need – especially in the context of growing mental health problems among undergraduate students (Lee, Jeong, & Kim, 2021) and collective trauma and anxieties (e.g., COVID-19, climate change, racial and economic inequality (American College Health Association, 2020; Pihkala, 2020; Correia et al., 2022).

As we demonstrate in this paper, the students noted the importance of not shying away from controversial and potentially traumatic topics and reflected on developing skills for engaging with one another in respectful dialogue. All of this said, the trauma-informed approach used in this course is not only for courses that deal with sensitive and controversial topics, as a trauma-informed approach addresses student trauma beyond the topics covered in a course. However, using this Religion and Politics course as our case study, we demonstrate that there are tools for instructors teaching similar topics on fostering an environment that encourages students to engage in respectful dialogue.

For instructors who seek to incorporate a trauma-informed approach to their course design, we emphasize the importance of empowering students, which can be done in several ways, as empowerment underlies other trauma-informed principles (Stephens, 2020). First, instructors should be intentional about showing care for their students by using a welcoming tone and pre-course surveys to collect information and get to know their students. This indicates to students that the instructor is actively listening to their needs and is willing to support them during the course as needed. Second, instructors can build trust through disclosing instructor positionality with students. Trust should be modelled from the instructor before asking students to engage in deep and sensitive dialogue; this also gives students a pathway of how to engage in difficult dialogues, especially if they have not learned those skills yet. Third, instructors should allow opportunities for choice within the course (e.g., choosing assignment modality, voting on the topic of one lesson). This allows students to be seen as knowledge-producers within the classroom and addresses inequities that render students
as mere recipients of information rather than active participants in a learning environment. Ultimately, we encourage instructors to be intentional in carving out opportunities for students to have voice and agency in their learning and model vulnerability and openness with students, especially when delving into contentious topics (despite being uncomfortable for instructors). There are numerous practices, policies, and facilitation techniques that embody trauma-informed principles. Though, importantly, these principles can be interpreted in different, innovative ways and can be applied in numerous contexts (Stephens, 2020).

**Trauma-informed Principles as Mutually Reinforcing**

We suggest that the intentional incorporation of all five principles underlying a trauma-informed approach contributed to aspects of each principle being amplified in students’ reflections and rich descriptions of their experiences. We justify this contribution by drawing on existing research connecting students’ learning experiences with trauma-informed pedagogy, power inequities, and feminist theory. In particular, we suggest that students reflecting all of these dimensions—in both distinct and overlapping ways—reinforces underlying notions that (1) each of these principles were directly experienced in some capacity and (2) that these principles are mutually reinforcing and determinant factors. This is consistent with pedagogy research suggesting that relationships exist between different trauma-informed principles. For example, Carello & Butler (2015) explored how dimensions of trauma-informed principles are interrelated factors contributing to students’ experience as learners: when students feel powerless, they do not feel safe, and when students do not trust the instructor, they do not feel safe. Thus, elements of empowerment and trustworthiness may be necessary for cultivating safety. Without experiencing the former, students cannot experience the latter.

Carello & Butler (2014) recommend compassion and responsibility on behalf of the instructor, that instructors recognize that many students have histories of trauma, and that instructors integrate this into their educational practice, in order to cultivate an emotionally safe environment for students. Our findings suggest that these recommendations are determinant factors of a safe and trustworthy classroom space. The design of the course incorporated similar resources, and intentional care on behalf of the instructor. Within student reflections, we uncovered themes that demonstrated that students trusted the instructor and their peers, by engaging in the process of self-disclosure and open dialogue. In turn, these experiences contributed to themes of empowerment (e.g., recognizing expansion in their knowledge as a process of engaging in dialogue and reflection).

Our findings are also consistent with recent research on the interplay between classroom safety, trust, and collaboration. Qualities of instructors that support positive engagement and facilitated authentic classroom relationships included acceptance of where students are at, sensitivity, compassion, and empathy (Morgan, Pendergast, Brown, & Heck, 2015). Brunzell, Stokes, and Waters (2019) have echoed these sentiments more recently, arguing that instructor behavior that makes students feel that they are worthy of care and attention can facilitate the formation of classroom relationships. Our findings corroborate the idea that safety, trust, and collaboration are mutually reinforcing. Themes of safety, trust, and collaboration often appeared together in student reflections, where students spoke about engaging with their peers in a respectful and honest way, exploring difficult topics together, and sharing emotions with both their peers and the instructor.

Prior research has also explored the relationship between collaboration, trust, and empowerment. Institutionalized roles in society and educational practices often results in power imbalances between instructors and students (Mitra, 2008). For instance, level of expertise is an example of an asymmetry that exists between instructors and students (cf. Lave & Wenger’s (1991) concept of legitimate peripheral participation). Asymmetries in expertise are even required for learning...
to take place (Rogoff, 1990; Vygotsky, 1978). However, collaboration can help build trust, even when there is a risk of power imbalance (Arai et al., 2021; Sheriff et al., 2019). We saw this reflected in students’ experiences of valuable conversations both with the instructor of the course, and with their peers, where despite the asymmetry in expertise, students felt like equal participants in their learning.

Furthermore, empowering individuals by helping them learn how to identify power structures and inequities can be beneficial for survivors of trauma (Gutierrez & Lewis, 1999). In this context, power refers to “the right to determine choices in life and to influence the direction of change through the ability to gain control over crucial material and nonmaterial resources” (Moser, 1989, p. 1815). Thus, recognition of power dynamics influences an individual’s ability to make choices (Enns, 2011), which in turn can empower individuals (Kabeer 2001). In a classroom context, power brokers (e.g., instructors) can provide students with a voice in the classroom and choices regarding their education, by promoting self-advocacy skills and self-efficacy in relation to learning (Harper & Neubauer, 2021). We saw this reflected in students’ experiences of choice, particularly in how the flexibility of assignments encouraged students to broaden their perspectives and develop their personal beliefs/beliefs about course material. We note that the latter was also typical of student experiences that reflected empowerment.

Limitations

Due to the methodology guiding our research, we are not able to infer causal relationships between the integration of trauma-informed course design principles and students’ experiences of a trauma-informed approach. We also recognize that other factors may have contributed to students’ experiences (e.g., a smaller class size, the teaching style of the instructor, the content explored in the course). However, we hope to have shown what is possible, when attention is paid to the design of a course that involves potentially traumatic topics. Furthermore, we have illuminated how teaching with attention to trauma-informed principles does not change the nature of the content explored, but changes how instructional techniques may be provided (Wright & Laurent, 2021).

Conclusion

We provide preliminary support that embedding trauma-informed principles into course design and facilitation can improve students’ learning experiences and empowerment. Through student reflections, students demonstrated a recognition in their own learning potential and their personal and academic growth. In addition to learning the course material, students learned more about their peers, themselves, and engaging in difficult topics with people with divergent views and perspectives. By providing students with a safe space for discussion, tools for exploration, and choice in expression and investigation, students left the course with an accounting of their growth as well as tools for continual learning, reflection, and dialogue. Furthermore, our case study demonstrates potential for trauma-informed design to support and enhance student learning despite engaging with difficult, contentious, and potentially re-traumatizing topics and within a social context of collective trauma. Future research should explore the impact of trauma-informed design on courses that explore less inherently traumatic topics, but still recognize prevalence of trauma within the undergraduate students. In addition, we recommend a greater exploration of how designing and implementing trauma-informed courses impact experiences for instructors.
Appendix

Appendix 1: Week 1 and Final Student Reflection Questions.

Week 1 Reflection

Week 1 Reflection Prompt (500-750 words OR 5 minutes):

1. How significant has religion, spirituality, and/or secularism been in your personal life? Has it changed over time? What influence have your family/community/country of origin/language/etc. had on your views?
2. In your view – is religion/spirituality/secularism:
   1. important in the US? (If you’re from somewhere else, you can reflect on that context here.)
   2. important in the world (international politics)?
   3. becoming more or less important in the US and the world?
3. Has this week’s sources raised new questions on the role of religion, spirituality, and/or secularism for you? How? And if not, why not? (refer to the Week 1 Roadmap)

Directions to upload:
(1) write your responses on the word processor of your choice and save the file as a .doc, .docx, or .pdf
OR (2) record your audio/video on a platform of your choice, and save the file in order to upload the media recording
Then click "Start Assignment" to "Choose File" to upload, include a note to me if you choose, and finally click "Submit Assignment."

Note about grading rubric: For this reflection, the substance of your response will not be graded. So long as you have answered all five questions, followed the word limits, and demonstrated some thought in your response, you will be given full credit. Please answer the questions as honestly as you feel comfortable doing so.

Final Reflection

Final Reflection Prompt (1,500 words or 10 minutes):

Directions:

Step 1: Copy & paste your Week 1 reflection from this course onto your final reflection document.
Step 2: As you are rereading your Week 1 reflection, color code your responses:
   - red for statements you no longer agree with;
   - green for statements you still agree with;
   - blue for statements you’re unsure about.

Step 3: Respond to the first four (4) reflection questions, which are almost identical to Week 1’s questions. Each answer should have the following two parts and cite at least one class resource for each of the four questions.
   - Part 1: Write a new 100-word response to the question (you can answer before color-coding!)
Part 2: In an additional 150 words, using your reflection color-coding, answer: has your response changed since Week 1? If so, how? If not, why not? (Be sure to mention how at least one reading/material/discussion has impacted your response)

(If you submitted a video/audio file for your Week 1 reflection, you would need to have it transcribed. I can send you the transcription of your reflection – just email me. For the final submission, please submit your color-coded transcription and an audio/video file with your final reflection.)

Part One: Reflecting on changes from Week 1’s responses (250 words each)

1. How significant has religion, spirituality, and/or secularism been in your personal life?
2. Based on your observations, how significant has religion, spirituality, and/or secularism been in domestic politics? (This can be the US, or your own country of origin. Be sure to specify.)
3. Based on your observations, how significant has religion, spirituality, and/or secularism been in international politics?
4. How do you think the futures of religion, spirituality, and/or secularism are changing in domestic politics, and/or international politics?

Part Two: Reflecting on the class as a whole (150 words each)

For the questions below, please be specific and reflect on relevant readings, lectures, class discussions, discussion boards, reflections, teaching method(s), peer comment(s)

1. What are you curious to know more about (what are some remaining questions) as a result of completing this course?
2. Did the readings/discussions/materials/assignments from this course enlarge/enhance your understandings of religion, spirituality, and/or secularism? If so, how? If not, why not? Explain with specifics.
3. How do you think what you have learned through the weekly reflections will stay with you beyond this course? (Use these questions to help you: What was rewarding about the weekly reflections in this class? What was challenging? What was your favorite of the reflections?)
4. Overall, what part of the course was most influential in changing or reaffirming your perceptions about religion, spirituality, and/or secularism? Explain with specifics.

Directions to upload:
(1) write your responses on the word processor of your choice and save the file as a .doc, .docx, or .pdf
OR (2) record your audio/video on a platform of your choice, and save the file in order to upload the media recording
Then click "Start Assignment" to "Choose File" to upload, include a note to me if you choose, and finally click "Submit Assignment."

Note about grading rubric: For this reflection, the substance of your response will not be graded. So long as you have answered all the questions, followed the word limits, and demonstrated some thought in your response, you will be given full credit. Please answer the questions as honestly as you feel comfortable doing so. (1 point per question; 2 points for Week 1 color-coding step)
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Curating, Community, Collaboration: The Incidental Outcomes of One Library Collection Development Lesson

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Abstract: What began in a library science course as a collection development assignment serendipitously transformed into varied learning experiences for students across disciplines and program levels. This article shares the journey of how a singular lesson idea blossomed into an unintentional, multidisciplinary project that led to unexpected learning outcomes for all involved.

Keywords: School librarian, Intentional learning, Incidental learning, multidisciplinary collaboration

Seeking ways to meaningfully engage students in the authentic application of new knowledge and skills is the ultimate goal of educators. With this in mind, a professor of School Library and Information Science (SLIS) created an assignment that optimized the meaningful application of the course content through the development of a specialized book collection. Knowledge of how to develop a library collection is foundational to meeting the needs of students and teachers by providing access to collections of rich and relevant resources. This assignment called upon candidates to curate a collection of book titles that would be of interest to a given demographic, inclusive of ethnicity, grade level, reading interest, and age considerations. This article shares the journey of how an intentionally designed course assignment blossomed into an unintentional, multidisciplinary project that led to unexpected learning outcomes for all involved. Those incidental outcomes include a community partnership, multidisciplinary collaborations, and experience with indirect service-learning. We hope that sharing this experience not only encourages others to tap into the hidden collaborative potential of their own projects and the meaningful learning outcomes afforded by them, but also serves as a guidebook for librarians as they create projects that reach beyond the stacks of their library.

Incidental Learning

Foundational to the story of this experience is the discovery of unforeseen outcomes (incidental learnings), which brought depth to a singular course assignment. Incidental learning is defined as unexpected learning that occurs when the intentional goal is to learn something else (Long, 2017). This kind of learning is, essentially, the learning that happens as a by-product of intentionally planned learning experiences (Bisson et al., 2014; Kelly, 2012; Marsick & Watkins, 1990/2015). Understandably, incidental learning is often overlooked as educators are engrossed in the success of their students in achieving the intentionally designed learning outcomes of any given learning experience. The illumination of unexpected learning outcomes within a lesson provides the educator insight into the holistic nature of learning and an understanding that, at times, students may not get the entirety of the objective of a lesson, but learn other lessons throughout the process.
Incidental Learning Incident #1

Community Partnership

The SLIS collection development assignment was created to engage librarian candidates in the development of highly specialized collections that cultivate interest in literature via authentically connected texts. This microcosm experience was designed to promote the skills required of a librarian as the curator of book collections for specific student populations in individualized school settings. The product of the assignment produced a collection of books designed for a specific demographic within a given scenario. The SLIS professor realized that this assignment could not only be used to educate school librarian candidates in the collection development process, but could also be used to provide real-world experiences while serving the community. Thus, the SLIS professor redesigned the scenario in the assignment to challenge the candidates to curate another collection of books that could be given to a specific family in need. The SLIS professor contacted the community regional director for Habitat for Humanity to garner their interest and secure a partnership. Realizing that funding was needed to purchase these books, the professor wrote a nominal grant to support the acquisition of the book titles. Once funds were awarded, the Habitat for Humanity regional director was contacted for the purpose of identifying a family and specific demographics to guide in the selection of books. The selected Hispanic family of seven had five children under the age of eight. Librarian candidates were provided specific information that offered meaningful insight into the family as a whole, and the children more specifically, including ethnicity, age, grade level, and interests. Informed by the family and children's profiles, candidates made personalized book selections for inclusion in a home library. These candidate-curated collections were gifted to the identified family and an incidental incident occurred when a community partnership project was born - Habitat for Reading.

The partnership with Habitat for Humanity and the creation of Habitat for Reading generated an experience that moved beyond a single semester and beyond a single course. What started as a simple SLIS course assignment developed a university/community partnership that places books in the hands of children beyond the school day and in their home environment. This project has contributed to the building of a strong foundation for the development of early literacy within the children of many Habitat for Humanity families.

Supporting Literature

_Early Literacy Experiences_

Strong foundational experiences with literature early in young learners’ lives build a sound foundation for a literacy-rich life. Early exposure to reading is an indicator of overall success in school and nurtures a love of reading that extends beyond the classroom into adulthood. Therefore, early experiences with literature within the home are imperative for children (Fives, 2016; Goldfeld et al., 2021; Lamy, 2013; Leseman & Jong, 1998; Silinskas et al., 2020; Skwarchuk et al., 2014; Su et al, 2017). It has been proven that book ownership and early exposure to books can have a positive effect on learning (Tadesse & Washington, 2013; Towell et al., 2021). Sadly, not all children have access to books at home (Bracken & Fischel, 2008; Ness et al., 2020; Neuman, 2001; Raz & Bryant, 1990).

A growing number of children, particularly those from low-income families, begin kindergarten far behind their peers in terms of literacy development (Neuman & Moland, 2019; Whitehurst et al., 1994; Whitehurst, 2014). The socioeconomic status (SES) of families has been shown to have a substantial impact on the reading abilities of learners. In their study of the long-term educational consequences of summer learning differences on ninth-graders, Alexander et al. (2007)
found that two-thirds of the reading achievement gap could be explained by unequal access to summer learning opportunities during the students’ elementary school years. The absence of those opportunities likely correlates with parental education and income, which are two strong predictors of academic achievement in children (Duncan & Murnane, 2011; Luo et al., 2020; Reardon, 2013). Several family characteristics are subsumed under SES or family income: there is less availability and use of printed materials in the home (Feitelson & Goldstein, 1986; Froiland et al., 2016; McCormick & Mason, 1986); children from low-income families are read to less frequently (Feitelson & Goldstein, 1986; Harris & Smith, 1987; Niklas et al., 2020); there is a limited amount of shared picture book reading to young children in the home (Crane-Thoreson & Dale, 1992; Hindman et al., 2013; Luo et al., 2020; Neuman & Moland, 2019; Rowe, 1991); and one in five children in lower-income families do not read any books at all over the summer (Scholastic, 2016). The characteristics of SES families are often insurmountable in the face of life’s challenges. More broadly, at the neighborhood level, substantial structural inequalities exist. This creates book deserts in communities that significantly limit low-income families' direct access to books resulting in widening academic gaps among communities of varied means. For those living in high-poverty areas, the book desert poses an additional layer of challenge for the literacy development of children from SES families (Neuman & Moland, 2019).

**Reading Development**

The road to reading literacy is thought to start at an early age. Young children acquire knowledge and skills intuitively during interactions with their environment without specific direction from a parent. Building on children’s acquisition of words from environmental print, parents are encouraged to read aloud to their young children. Reading aloud to children and interactions with storybooks have been long recognized as positive influences on reading interest and development (Flynn, 2011; LaCour et al., 2013; Sénéchal & LeFevre, 2002; Neuman & Moland, 2019; Snow et al., 1998).

**Motivation to Read**

The motivation to read is greatly influenced by having easy access to books. Allowing young children to explore and make choices about their reading material increases effort and commitment to reading, as well as increases the likelihood that they would engage in reading more (Guthrie et al., 2000; Reedy & De Carvalho, 2021; Worthy & McKool, 1996). Providing access to collections that include both fiction and nonfiction selections potentially increases reader motivation and interest, and provides daily opportunities for independent reading (International Reading Association, 2014). Key to reader motivation and interest is offering books that are of special interest to children and reflect their image/identities. Additionally, Pappas (1993) found that children showed a preference for informational text, and Mohr (2006) noted that nonfiction books were the overwhelming choice of first-grade students. Being able to browse and choose books of interest to children is essential in laying a strong foundation for reading literacy.

**Incidental Learning Incident #2**

**Multidisciplinary Collaboration**

The richness of the SLIS assignment was the catalyst for the professor to exuberantly share the resulting *Habitat for Reading* project with others. As a result, the power of the learning experience inspired other professors to seek ways to align their course assignments with the heart of *Habitat for Reading*. In the end, four professors, across three content areas and two program levels (undergraduate
and graduate) became coincidental collaborators in this project, establishing the impact of the high value placed on educators sharing their practice with one another. With this in mind, librarians stand at the forefront of being leaders in the inspiration for such literature-based learning experiences within their learning communities.

**Accidental Ally #1: Undergraduate Survey of Children’s Literature**

The *Habitat for Reading* project provided a perfect opportunity for the professor of a children’s literature course to extend children’s learning activities aligned to specific books to include activities for parents to use while reading aloud to their children. Armed with the list of titles from the home library collection provided by the school librarian candidates, the teacher candidates each selected a book for which they would create a reading packet of relevant read-aloud activities. The original expectation for the assignment was for candidates to create a list of strategies and activities for parents to use when reading the books to their children. However, the candidates were so excited about the project, they not only created guidelines for parents, but they went above and beyond to also develop learning activities for the young readers that would help them in learning the concepts and reading skills for the chosen books. The activities were designed to engage children in critical thinking, fun, and creativity.

As an example, the packet created for the book, *BIG CAT, little cat* (2017), by Elisha Cooper, included a copy of the book and the following materials:

- A set of upper-case and lower-case letters for children to
  - compare and contrast;
  - spell words;
  - craft sentences.
- A box of crayons to
  - color a picture of them doing something with a friend.
- Three stuffed cats of different heights to
  - understand the difference between big, bigger, and biggest.
- A water-color set and paper on which to
  - paint a scene from the book;
  - paint a picture of a favorite pet.
- A journal in which to write
  - a story or poem about a pet;
  - a description of a favorite pet;
  - an entry about a time when they were sad about the loss of a pet or friend;
  - an entry about how they felt when they got a new pet or friend.
- Sponges in the shape of cat paw prints with 6 stamp pads of different colors to
  - create patterns;
  - complete graphing, counting, and sorting activities.
- A decorated stage was designed from a science board and cat finger puppets to
  - act out a play.
- A package of colored Goldfish crackers (representing cat food) to
  - complete graphing, counting, and sorting activities.
Accidental Ally #2: Undergraduate Social Studies Methods

The Habitat for Reading project provided a learning experience that aligned with the foundational objective framing the elementary Social Studies methods course. Candidates applied knowledge gained in the course regarding the mindsets required of a critically engaged citizen by curating children’s literature and designing teaching activities that foster those dispositions and skills.

In groups, Social Studies candidates selected a children’s book supporting themes related to the cultivation of critical citizens. These topic-specific titles extended the book collections of the librarian candidates and were funded by the Habitat for Reading grant. Social Studies teacher candidates developed a folder with activities for parents and children to strengthen family shared-reading time at home. At the end of the semester, the final product was donated to the home library of a selected Habitat for Humanity family with elementary-aged children. The companion folder for each personally selected book included the following:

- Title Page- Title, author, illustrator, and image of the book;
- Peek in the Pages- An engaging synopsis of the book that excites the family about reading the book;
- Book Banter- 3-5 conversation starters for parents to engage with their children before, during, and after the book is read for parents to facilitate;
- Wonderful Words- Four words and pictures that match and link to the concepts/vocabulary of the book;
- Beyond the Book- Simple ideas of how the parent and child can connect the book to life and self. This may include links to things around the house, the grocery store, or other;
- Practical Pursuits- A hands-on activity related to the book, age-appropriate, and practical places the family may frequent;
- Supplementary Suggestions- Two additional related book titles with the following information: Title, author, image of the book, and a brief synopsis of the book that excites the reader.

Accidental Ally #3: Graduate Survey of Reading

One of the best ways to expose children to books and nurture a love of reading is to read books aloud to them. Reading aloud to children not only models good reading through fluent and expressive reading, but also builds critical language and literacy skills, encourages independent and confident readers, and broadens students’ views of the world (Towell et al., 2021). The professor of a graduate reading course used the Habitat for Reading project as a vehicle for her candidates to apply their gained knowledge of reading strategies while teaching parents how to use these strategies when reading aloud to their children. Candidates selected a popular classic children’s book, then created short tutorial videos for parents in which they modeled the use of a read-aloud strategy for parents. A series of sample tutorial videos for mini-lessons on read-aloud strategies include the following:

- Expressing the Emotion: https://www.youtube.com/watch?v=BOOWrg_57oE
- Linger Finger: https://www.youtube.com/watch?v=FPL8KTxI3QM&t=4s
- Characters Do - Characters Say: https://www.youtube.com/watch?v=Bn7fmlwLGBQ
- Move to Remember Action Words: https://www.youtube.com/watch?v=gec-6m-9l8s
- The Teeny Tiny Details: https://www.youtube.com/watch?v=Y7S7BxW8NH0&t=60s
- Point and Read: https://www.youtube.com/watch?v=270TLEMAgZQ&t=20s
The development of the Habitat for Reading project generated an experience that was built upon multidisciplinary collaborations across the College of Education. While collaboration across the college was not an intentional expectation of the initial collections assignment, the inclusion of the resulting Habitat for Reading project within multiple courses enriched the curricula and deepened the learning objectives of each course involved. For the candidates, the experience shifted the purpose of the course assignments from a mere course completion task to a task with an immediate real-world influence and contribution. The professors involved were reminded of the power of collaboration and were inspired to seek out additional, equally meaningful, collaborative assignments/projects. The inclusion of these accidental allies expanded and enriched the original vision of the collections assignment and made a grander impact on the professors, candidates, and Habitat for Humanity families. In the end, the overall experience of the coincidental collaborations extended the depth and overall trajectory of Habitat for Reading, proving the power of collaboration.

Supporting Literature

Multidisciplinary Collaboration

Rich collaborations are imperative to bridging learning to real-world application. The Association of Teacher Educators promotes collaboration as a required focus of teacher education programs in the United States, “Accomplished teacher educators adopt a collaborative approach to teacher education that involves a variety of stakeholders…” (2008, p. 4). Collaborations that bring together different perspectives and expertise from multiple disciplines are imperative for strengthening programs, enriching curricula, and fostering creativity and innovation (Roper et al., 2021). In the case of the Habitat for Reading project, multidisciplinary collaboration extended the original vision of an assignment in the school librarian preparation course, enriching the curriculum and providing new learning opportunities for candidates in other disciplines.

In each course connected to the SLIS project, new approaches to the learning objectives of the course were inspired, deepening each course’s curricula. For example, within the Social Studies course, the collaboration offered an exercise in the application of the skill of identifying children’s literature connected to a specific Social Studies theme (development of the dispositions of a critical citizen). Additionally, it provided Social Studies candidates an experience in generating individualized and engaging reading activities. Compared to other assignments, candidates’ engagement with the Habitat for Reading project was distinctively higher. Based on instructor observations and final grades, candidates went beyond the expectations of the assignment (the only assignment of the semester in which this was evident for ALL candidates). They supplemented their final products with personally funded extension materials, demonstrating their ability to select meaningful materials to accompany engaging content-based activities in support of understanding Social Studies concepts. Typically, candidates generate lesson plans for “imagined” students, as most are not teaching in classrooms. The final product of this assignment provided candidates an opportunity to translate the skills required to create and engage in meaningful activities for specifically identified children, making the experience meaningful and, to some extent, personal.

Beyond enriching the curricula and program overall, this collaborative project promoted candidates’ awareness of and ability to recognize the value of other disciplines. As the heart of the project began as a collection development assignment in the School Library and Information Science program, the opportunity arose to educate pre-service teachers about the role of a school librarian as an indispensable resource and partner in teaching and learning. This is a lesson that is traditionally absent within most undergraduate programs. Based on course discussions and reflections, the pre-service teachers who participated in this multidisciplinary collaboration will enter practice armed with
the knowledge and desire to collaborate with the school librarian, enriching their curricula and teaching practices.

Incidental Incident #3: Exposure to Indirect Service-Learning

As the result of a course assignment, the Habitat for Reading project included a community partner and organically developed into a collaborative indirect service-learning project. As defined, an indirect service-learning project benefits the community as a whole without direct connection to individuals (Kaye, 2010). Engagement in the project provided all learners the ability to transition the theory of their coursework into real-world contexts. Within each of the courses, candidates synthesized their understanding of children’s literature, literacy development, and citizenship cultivation through literature within the context of Habitat for Reading as an indirect service-learning project.

Despite the absence of an intentionally designed service-learning project, all stakeholders were enriched by the resulting experience. A clear indication of the impact of the service element within the project was the extraordinary quality of the final projects across all of the courses. Each professor was surprised and elated by the unexpected depth of passion exhibited in the candidates’ work, which went well above and beyond the original objectives of the assignments. These resulting displays of work reiterated the power of learning experiences grounded in real-world contexts. Participation in this indirect service project shifted the purpose from simply being a course assignment to being a meaningful and impactful gift to families in the community.

Service-learning was a topic of exploration within the objectives of the Social Studies methods course. Participation in this indirect service-learning project presented a connection to prior readings and class discussions, offering candidates a deeper understanding of the typologies and implementation of service-learning within their practice. This insight was supported via candidates’ reflections about the experience: “I realized that there are all kinds of service-learning projects and it isn’t as hard to connect to the content as I thought” (Candidate, Fall 2019); “Given how easy it was to implement a service-learning project in our classes, I can’t wait to add service-learning in my own practice (Candidate, Spring 2019). In addition, Habitat for Reading presented an in-practice example of how a teacher (SLIS professor) unearthed a connection between her curriculum and the community, easily generating an incidental service-learning project. Such exemplars present the notion that the integration of service-learning does not have to be an arduous and complex task and can promote candidates’ confidence regarding their ability to infuse such learning experiences within their own practice.

Within the context of teacher and librarian education, service-learning, as a pedagogy, is an invaluable tool in bridging the gap between theory and practice (Lin & Bates 2015). Such connections allow candidates to envision the integration of service-learning, at any level, within their own teaching, further extending the transition of theory to practice.

Supporting Literature

Service-Learning

Service-learning, as a pedagogical approach, echoes the work of Dewey (1916; 1938) through the intentional marriage of learning and community service. As a form of experiential learning, service-learning offers layered opportunities for learners to deepen, connect and expand knowledge in natural settings - providing meaningful connections that move beyond the confines of a university course.

Effective service-learning projects possess similar elements that lead to meaningful experiences. Chambers and Lavery (2012) suggest the first element of a strong service-learning project
design is addressing the needs of the community in genuine ways. Secondly, there is a balance between
the learning and service aspects of the project; both receive equal attention in design and
implementation. A focus on mutual benefits for all parties involved in a project is the third element
of effective service-learning. This relationship is an authentic partnership where all are supported and
all learn. The final element possesses a structured design cycle that includes preparation, action,
reflection, and demonstration.

The impact of service-learning on learners is multi-layered. Lin and Bates (2015) declare that
service-learning adds value to students’ own learning while exposing them to possible actions
illustrative of impactful citizenship participation. Other positive learning impacts include the
improvement of social skills, increased academic success, cultivation of dispositions linked to social
justice and social action, and the development of lifelong learners (Baldwin et al., 2007; Celio et al.,
2011; Lin & Bates, 2015). In a study done by Chambers and Lavery (2012) service-learning encouraged
the dispositional development of empathy, leadership, contemplation, and confidence. The research
on service-learning collectively echoes the range of positive impacts of participation in an authentic,
well-designed service-learning project.

Lessons Learned

Upon reflection on this experience, all faculty involved walked away with a deeper appreciation of the
power of collaboration. Unique to this collaborative experience was that it was serendipitous. Without
the library science professor sharing about a classroom assignment, it would not have expanded
beyond her own singular course. For us, this is one of the greatest takeaways of this experience. It is
a lesson for all university faculty to engage in conversations about their pedagogy in both informal
and formal ways, allowing unsuspecting partnerships to emerge. We have an informal group at our
university, Purposeful Pedagogy Partners, that engage professors from all disciplines in discourse
about their pedagogy, promoting the exchange of ideas and collaborative projects. Such forums
encourage professors to think deeply about their course assignments to unearth ideas for meaningful
interdisciplinary collaborations.

If we had intentionally designed this experience, we would have created formal working
partnerships between pre-service teachers and school librarian candidates. Such partnerships are
powerful when developing collaboration skills, building relationships, and deepening learning. For
pre-service teachers, these partnerships would help them gain an understanding of the role and
expertise of school librarians and how they can support them in their practice. Additionally, librarian
candidates would model criterion-based book selection, deepening pre-service teachers’ ability to
purposefully select quality books for their own classrooms. For the school librarian candidates,
working with pre-service teachers allows them to apply what they’ve learned in their program and
practice what they will be doing in the field.

The ability of the library professor to lean into an organic opportunity that expanded a course
assignment into courses within other programs illuminated an area of improvement needed within
teacher education courses - a lack of attention to the idea of risk-taking and capitalizing on organic
teaching opportunities. We busily teach our candidates to plan, plan, plan; however, we do very little
to cultivate their ability to take advantage of organic opportunities with their students or colleagues.
The challenge of this goal is the prescribed nature of most day-to-day classrooms. Therefore, we
question how, or even if, teaching our candidates to consider unplanned experiences such as this
project is warranted.

As an indirect service project, candidates produced final products that exceeded expectations.
In the end, these assignments provided candidates with the realization that integrating service-learning
into their classroom curriculum need not be an overwhelming and complex endeavor. Additionally,
this experience served as a model for candidates to see the ease with which interdisciplinary
connections can be made. The practice of identifying links between content areas is a skill that
heightens candidates’ ability to meaningfully create integrated curricula. As a result of these specific
incidental learnings, the next iteration of this project would be redesigned as a direct service-learning
project.

Finally, the experience provided subsidiary lessons. First, sharing this idea led to the discovery
of a department within the university that provides support for cultivating community partnerships.
Specifically, University Advancement at our university provided seed money to establish the Habitat
for Reading project. Second, the exploration of an existing project that placed books in the hands of
children led to the expansion of ideas for the initial assignment that enriched its objectives beyond its
original design.

**Conclusion**

Habitat for Reading is the start of building early literacy habits in children who may have not had book-
rich lives outside the school setting. This project, which began as a singular assignment within a library
science course, continues to serve Habitat for Humanity families. Through one librarian educator’s
sharing of an assignment idea, unexpected learning emerged beyond her classroom. The incidental
outcomes that emerged from the library collection development assignment included a community
partnership, multidisciplinary collaborations, and experience with indirect service-learning.

The partnership with Habitat for Humanity offered an increased level of meaning for an ordinary
in-class curating assignment, giving rise to the indirect service-learning project Habitat for Reading. The
creation of this long-lasting initiative highlights the importance of seeking partnerships that enrich the
learning experiences that bring renewed purpose to university coursework.

The library collection development assignment brought together candidates, faculty from
various disciplines, and a community partner. The coincidental collaboration aspect of this initiative
was generated through the open enthusiasm of a School Library and Information Science professor.
As a result of her sharing her instructional ideas, other professors were inspired to be a part of the
project. The strength of the multidisciplinary collaboration extended the vision of the project and the
impact of the endeavor beyond the original intent of SLIS assignment. In the end, the university
community learned the power of sharing pedagogical designs with others and the simplicity of
serendipitous collaborations.

The unintentional outcomes related to the service-learning nature of Habitat for Reading,
generated rich and meaningful learning. Learning that extends beyond the theoretical and becomes a
practical experience positioned within real-world contexts, cultivates intrinsic motivation within
students to perform at the highest levels (Levesque-Bristol et al., 2011). The incidental service project
provided a space for candidates to apply and deepen the intentional learning objectives of their
courses. Finally, engagement with Habitat for Reading established a learning experience that modeled
the ease with which service-learning can be integrated into curricula. The impact of service-learning
on student learning emphasizes the need for intentionally designed service-learning projects that move
educators in closer proximity to community organizations and the populations they serve.

The incidental outcomes of an intentionally designed assignment are often beyond our line of
vision. This article unveils an example of the full learning potential and unexpected reach of a singular
assignment. A librarian educator created a typical assignment. She saw an opportunity for her
candidate-curated book collections to be shared. She sought out a community partner who would
assist her in gifting the collections to families in need. She excitedly shared the project with others.
Professors in other disciplines were inspired to participate in the project. Candidates across disciplines
engaged in the project with great passion and innovation. Families embraced their new home collections. Young children began their life-long journey to reading.

The ripple effect of one initial assignment is evident within this learning community. An indirect service-learning project, *Habitat for Reading*, became a beloved initiative within the college. And, as it all began with an idea from a librarian, this should serve as a reminder of the impact a librarian’s voice offers within a community, as the librarian is a conduit of information, teaching, and leadership for the school community and beyond.

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