Conceptualizing Student Mental Health Symptom Monitoring and Risk Assessment for Small Colleges Using Microsoft Power Apps

by
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We certify that in this Final Project all research involving human subjects complies with the Policies and Procedures for Research involving Human Subjects, Saint Mary-of-the-Woods College, Saint Mary-of-the-Woods, Indiana 47876
Abstract

While college remains a pivotal and exciting time for many young adults, the experience may also be stressful, confusing, and emotionally taxing. Exposure to new experiences and people, the availability of contemporary freedoms, and introduction to potentially fraught social climates may increase individuals’ emotional dysregulation. As the body of research documenting increased mental health issues among college students continues to grow, the Covid-19 pandemic has exacerbated these negative mental health experiences to a currently unknown degree. Small colleges in particular are situated on a precipice of decision, needing to balance their resources for reactive measures and proactive planning.

While resources and tools for addressing these growing mental health concerns exist, they are often expensive, require time and resources for staff and student training, and are often inflexible in their application. Using easily accessible software, such as Microsoft Power Apps would eliminate many facets of these hindrances and allow schools to tailor the most appropriate prevention and response. The purpose of this research and project is to conceptualize an easily accessible, affordable tool for small colleges to use as a resource to screen for and plan proactive mitigation of student mental health symptoms.
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Background

This secondary research seeks to address a broad issue of student mental health concerns on college campuses. In order to limit the contributing factors of school demographics, geography, and novelty, the scope of such will be limited to small, four-year, residential college campuses. While many definitions for those qualifiers exist, including differences within resource and referenced materials, the author seeks consistency by using the Carnegie Classification of Institutions of Higher Education (Indiana University Center for Postsecondary Research, 2018). Identifiers of mental health issues or concerns are even greater in nuance. The focus of this research will be on negative experiences of symptoms associated with struggling or poor mental health, rather than the specification of mental disorders. For example, the focus shall be on students experiencing symptoms of depression or anxiety, rather than the prevalence or rates of students clinically diagnosed with major depressive disorder or generalized anxiety disorder. It is recognized that clinical diagnosis is likely applicable to some individuals experiencing symptoms. These classifications provide concise definitions for which this research, concept of tools, and recommendations may be applied.

The Carnegie Classification of Institutions of Higher Education uses data from the National Center for Education Statistics’ Integrated Postsecondary Education Data System (IPEDS) survey. According to their most recent report, there were approximately 2,162 four-year colleges and universities which focused on undergraduate instructional programming (Indiana University Center for Postsecondary Research, 2018). Size categories for four-year institutions include ‘very small’, or less than 1,000 enrolled students, and ‘small’, or between 1,000 and 2,999 enrolled students (Indiana University Center for Postsecondary Research, 2018). The mental health symptom monitoring app and risk assessment matrix later discussed is
conceptualized for application on campuses of both small and very small enrollments. In order for a campus to be considered residential, it must meet the Carnegie Classification by having greater than 25% of enrolled students living on campus at more than 50% full time enrollment (Indiana University Center for Postsecondary Research, 2018). While smaller institutions are more numerous as compared to those larger, the larger institutions enroll the majority of students.

It is recognized that larger institutions often have greater resources, both in financial means and staffing capabilities. The purpose of this research and tool conceptualization is to address the common concern of student mental health issues using scalable approaches that are reasonable for smaller institutions. The difference in student experience depending on the size of the institution is also important for the research concept. Small colleges often create a community mindset among its students, faculty, staff, and other constituents. This community setting may make student anonymity more difficult, but does not prevent student issues or concerns to go unnoticed. Critical events discussed within the literature review, such as a student suicide, sexual assault, or violence are felt more acutely within small college communities given the increased exposure to the event or students directly affected by the aftermath. Empowering smaller institutions to create prevention and mitigation strategies regarding student mental health is paramount in addressing the rising rates of negative student mental health experiences.

**Literature Review**

**Mental Health Issues on College Campuses**

“The prevalence and complexity of mental health disorders remain a serious concern for mental health professionals working in university and college settings in the United States…” (Lee, Ju, & Park, 2017, p. 205). There are marked differences between the demographics of
students who seek services and those who underutilize existing resources. Female students self-report an increased willingness to seek counseling and to refer other students than their male peers (Kalkbrenner & Hernandez, 2017) while students of ethnic minority groups, regardless of gender, were found to be less likely to seek help (Han & Pong, 2015). Regardless of their willingness to seek services, recent metrics suggest that approximately one-third of undergraduate students exhibit significant symptoms of mental health issues; including symptoms of depression, generalized anxiety, suicidality, or non-suicidal self-injury (Eisenberg, Hunt & Speer, 2013). The National Institute on Alcohol Abuse and Alcoholism found approximately 1,519 college students aged 18 to 24 die from alcohol-related behaviors, including vehicle accidents (Hingson, Zha, & Smyth, 2017). Approximately 9% of college students, aged 18 – 22, enrolled full time in undergraduate programs meet the criteria for Alcohol Use Disorder (SAMHSA, 2019).

According to the Centers for Disease Control and Prevention and the National Center for Health Statistics, adults who experience serious psychological distress “were more likely to have chronic obstructive pulmonary disease, heart disease, and diabetes compared with adults without serious psychological distress” (Weissman, et. al, 2015, p. 4) even after adjustments for age. Additionally, fatigue severity has been shown to have a significant positive correlation to emotional dysregulation, anxious arousal, general depression, and post-traumatic stress (Manning et. al, 2019). These symptoms not only impact a student’s quality of life, but their academic performance, ability to engage socially, and their predictive future accomplishments. As such, the provision of adequate resources, engagement, and support of all students to prevent, identify, and treat these symptoms should remain a top priority of the colleges who enroll these populations.
Depression

Major Depressive Disorder, as defined by the Diagnostic and Statistical Manual of Mental Disorders, continues to be one of the most common global causes of disability (Vos et al., 2012), and is considered one of the most common mental health concerns and disorders among college students (Auerbach et al., 2016, 2018). Symptoms of depression among college students are associated with behavioral issues (Alonso et al., 2018), increased risk for withdrawal from college (Gruttadaro and Crudo, 2012), poor academic performance (Acharya et al., 2016), increased levels of clinical and non-clinical anxiety (the JED Foundation, n.d.), physical illness, weight gain, unsafe sexual behaviors (Cranford, Eisenberg, & Serras, 2009), substance use dependency (SAMHSA, 2019), increased risk of non-suicidal self-injury (Lewis et al., 2017), and an increased risk in suicide (Zvolensky et al., 2016).

College students who report symptoms of depression need context to their experience. While studies vary, it has been reported that an average of 30% of students in undergraduate programs experience symptoms of depression at such a level that it interferes with their daily life (Ibrahim et al., 2013). Some depressive symptoms reported by students may be considered a normal or common response to the social challenges typically experienced during this life stage. Contextualizing these experiences is important to develop the most beneficial response and social supports for students. For example, a student experiencing symptoms of depression as a result of new or pre-existing major depression disorder diagnosis would likely require different resources than a student experiencing similar symptoms as a result of academic stress (Barker & Renaud, 2020). Both situations are worthy of institutional attention as either experience can lead to more negative mental, behavioral, and physical health outcomes. No matter the reason for onset, even mild symptoms of depression can cause or exacerbate sleep issues/disturbances.
(Gurera, 2018), substance abuse (Prosek et al., 2018), and negative body-image (Smith, et al., 2015). These behaviors can create a negative feedback loop from which students struggle to escape and further worsens their mental and emotional health. Early identification of students experiencing these symptoms allows colleges to develop preventative interventions and therefore reduce frequency, severity, and prevalence of future symptoms (Ebert et al., 2018).

**Anxiety**

According to the American Institute of Stress (2019), like depression, symptoms of anxiety among college students have continued to increase over time. Similarly, occasional and situational symptoms of anxiety are common and do not necessarily require clinical intervention or treatment. Symptoms of anxiety become problematic when they are “persistent, seemingly uncontrollable, and overwhelming” (Anxiety and Depression Association of America, n.d.) and can lead to diagnosable conditions such as generalized anxiety disorder, panic disorder, agoraphobia, social anxiety disorder, selective mutism, separation anxiety, and specific phobias, or be present in conditions such as obsessive-compulsive disorder and posttraumatic stress disorder (Anxiety and Depression Association of America, n.d.). According to a 2019 report for the Center for Disease Control (Clarke, Schiller, & Boersma, 2020), while anyone can experience anxiety at any age or gender, diagnosis of the most common form of anxiety disorder – generalized anxiety disorder – is most prominent in ages 18 – 29 and among women of any age.

A Statista report by John Elfein (2020) found that in 2018, 29.5% of U.S. college students reported experiencing overwhelming anxiety within the past two weeks, though the number dropped to 18.9% when reporting experience over the past year. Thus, showing that even
when symptoms of anxiety are not indicative of a diagnosable mental health disorder, they can interfere with daily life. If symptomology for conditions such as generalized anxiety disorder develop during college, students may experience continued negative health outcomes once they leave campus upon graduation. The Mayo Clinic (2017) notes that people with generalized anxiety disorder may also develop physical health conditions over time such as digestive issues, headaches, migraines, chronic pain, sleep problems, and heart-related issues. Generalized anxiety disorder is also often comorbid with other mental health disorders, such as phobias, panic disorder, post-traumatic stress disorder, obsessive-compulsive disorder, depression, substance abuse, non-suicidal self-injury, and suicide (Mayo Clinic, 2017).

**Non-Suicidal Self-Injury**

Non-suicidal self-injury is an often-misunderstood mental health issue. Typically referred to as “cutting”, the behavior can include any intentional physical harm (cutting, burning, self-hitting) that is self-inflicted by an individual in the absence of intent to commit suicide (Lewis et al., 2017). Though non-suicidal self-injury lacks the intent to commit suicide, it can be an indicator that suicidal ideations may develop (Kaniuka et al., 2020). Though reasons for participating in non-suicidal self-injury vary, studies have shown there are three common themes; most often to alleviate overwhelming negative thoughts and feelings, as a form of self-punishment, and least often as a form of manipulation of others or as an outward signal of distress to others (Klonsky, Victor, & Saffer, 2014). The distinction that non-suicidal self-injury is least likely to be a form of manipulation is important due to the social stereotype that individuals participating in this behavior do so as a way to seek attention. It is important to recognize that even in these rare cases where the self-injury is performative, it is still indicative of a serious underlying mental health issue that deserves care.
It is difficult to identify a commonly agreed-upon percentage of college students suffering from non-suicidal self-injury, as so much misunderstanding exists regarding the behavior. Sometimes students who present with these symptoms are statistically counted among students experiencing depression or anxiety, or among students who engage in suicidal thoughts. Research completed in 2014 by Swannell et al. for the American Association of Suicidology suggested that up to one in five college students may at some point participate in self-injurious behavior. While some non-suicidal self-injury behaviors are episodic and in response to situational intensity, behaviors can also be indicative of a serious underlying mental health disorder; such as severe depression or anxiety, disordered eating, post-traumatic stress disorder, borderline personality disorder; as a response to a serious traumatic event; or as an indicator of an inability to self-regulate emotions (Whitlock et al., 2019).

**Suicide and Other Traumatic and Critical Events**

Beyond the individual effect of significant symptoms of mental health issues, colleges and universities across the United States continue to grapple with critical events that negatively impact the collective campus community. Suicide is currently the second leading cause of death among college-aged students (Eden, 2019). In their research regarding college student exposure to non-fatal suicide behavior, Bottomley et al, (2018) found that individuals with psychological closeness (i.e. a friend, roommate, teammate, or other social connection) “poses a risk factor for developing depressive symptoms and potentially suicidality” (p. 608). Particularly on small campuses, the rate of psychological closeness is greatly heightened due to the small number of students.

Gun violence and mass shootings on college campuses have increased 241% in the five years preceding the 2001-02 through 2005-06 school years (Owings-Fonner, 2018). According to
the Citizen’s Crime Commission of NYC, 190 shooting incidents – in which at least one person was intentionally shot – took place between the 2001-02 and 2015-16 school years. Among these incidents, 437 people were shot, 167 people were killed, and 270 were wounded; with approximately 2.5 million students directly or indirectly exposed to the violence through their enrollment at the 142 campuses at which the events took place (Owings-Fonner, 2018).

Perhaps the most prevalent critical event taking place on college campuses is sexual assault. According to the Association of American Universities’ Campus Climate Survey on Sexual Assault and Sexual Misconduct (2020), 13% of all students experience rape or sexual assault while attending college. This percentage increases to 26.4% of female undergraduate students, and 23.1% of transgender, genderqueer, or nonconforming undergraduate students (Cantor et al., 2020). The tragedy and trauma associated with these events and cultural concerns permeate a small college campus even more than a larger university where the community is larger and more diluted. Students who have experienced sexual assault may develop a variety of negative mental health issues, though the most common include depression, post-traumatic stress disorder, substance abuse disorders, eating disorders, and anxiety (Cantor et al., 2020).

Predictors and Protective Factors

While the literature surrounding mental health in college students is substantial, there are a variety of studies that seek to find correlations and connections in predetermining behaviors. Relationships between childhood trauma and spirituality have been established with increased anxiety and depression among students (Burlaka et. al, 2019). Students who identify with an underrepresented or minority race, ethnicity, or sexual orientation group are more likely to increase student risk for mental health issues (Lee, 2020). This is especially concerning when considering that cultural differences within minority communities often lead to increased stigma
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surrounding mental health care and asking for help. Discrimination, social stereotypes, and isolation experienced by minority or underrepresented groups may intensify pre-existing mental health issues or create new ones (Lee, 2020). In studies by Lipson et al. (2018) and Samuels (2018), the prevalence of mental illness among African American students was approximately 40%, and 53% among Arab American students. Research has also found discrepancies between genders and their susceptibility to mental health concerns; though women are reported to experience higher rates of anxiety, the data may be influenced by the decrease in stigma for women to ask for help or self-report symptoms (Corrigan et al., 2018).

The number of significant life events and stressors have also shown a positive correlation with increased negative mental health symptoms in students. These events can include the death of a family member or close friend, parental divorce, financial hardships, sexual assault, physical assault, the diagnosis of an illness, major change in a living situation, among others (Lee, 2020). The regular use or overuse of alcohol and the use of illicit substances as a way to cope with stress is another predictive factor of great concern within the collegiate population (Prosek et al., 2018). “The empirically supported association between depression, anxiety, and substance abuse corresponds with affect regulation principles of drug use. Indeed, neurobiological studies revealed that drugs of abuse impact the reward pathway or mesolimbic dopamine system in the brain releasing neurotransmitters associated with pleasure” Prosek et al., 2018, p. 1915). For students with anxiety or symptoms of depression, the quick access to ‘feel-good’ chemicals are more likely to lead to addiction. Depending on the substance being used, the depressant or manic qualities of the intoxication will likely worsen the pre-existing symptoms.

In spite of the many predictors of student experiences with mental health issues, there are several protective factors and practicable habits that can increase students’ resilience. Both
informal and formal social supports, alongside higher reported rates of self-esteem, have shown to positively affect a student’s ability to adapt to change or to handle crises (Lee, 2020). Social support may indicate how readily a student can seek or accept help from other people, and how likely they are to benefit from that help (Shi, 2021). Self-efficacy, particularly that associated with a student’s ability to provide themselves with regular sleep, can counter the link between decreased sleep time and quality and symptoms of depression and anxiety (Johnson, 2019). The presence of resilience, defined as intrapersonal tenacity, tolerance of stress and negativity, positive acceptance of change, and the belief that things will work out, is also a protective factor in student mental health outcomes. In addition, common methods of reducing negative mental health issues outside of collegiate settings apply to students; including mindfulness practices, staying active, volunteering, eating a balanced and nutritious diet, avoiding alcohol and other substances, and setting achievable goals (National Alliance on Mental Illness, n.d.).

**Current Campus Practices**

It is often assumed that small colleges are more capable of addressing student needs than larger institutions. While their size does grant unique benefits, limited staff, budget restrictions, and lack of research specific to their demographics often hinder small colleges’ ability to provide adequate resources to all of their students. Particularly in the area of student mental health, small college campuses acutely experience the effects of rising depression and anxiety within their insulated communities, leading to reactive responses after critical events. However, many methods – both clinical and non-clinical in nature – have been used to address mental health concerns among students and are accessible to these smaller campuses.

Brunner, Wallace, Keyes, and Polychronis (2017) laid the foundation for the most widely adopted model of college student mental health centers. “Clinical work, consultation, outreach
and prevention programs, and trainings are viewed as the four pillars of college counseling center work” (Mitchell, Oakley, & Dunkle, 2019, p. 90-91). In the Center for Collegiate Mental Health’s 2017 Annual Report, researchers reviewed 161,014 unique college students seeking clinical mental health treatment, participating in 1,255,052 appointments with 3,592 unique clinicians across 147 college and university counseling centers. Highlights from their findings included that treatment provided by the counseling centers was effective, the average length of clinical treatment was 4.5 session (the majority of students received between two and ten sessions), a substantial number of students participated in longer-term clinical treatment that included 20 or more session, anxiety and depression were the most common concerns among students seeking clinical treatment, and the majority of students did not receive psychiatric treatment or begin taking medication during their clinical treatment (Center for Collegiate Mental Health, 2018). It is important to note that though the majority of students sought treatment for episodic or situational mental health symptoms, reflected by the average number of sessions attended, the substantial number of students who participated in twenty or more sessions were often categorized as victims of sexual assault, students with suicidal ideations, and students of a gender and/or sexual minority who faced discrimination, with the prevalence of non-suicidal self-injury and suicidality increasing for the seventh year in a row (Center for Collegiate Mental Health, 2018).

While access to clinical treatment can be critical for students experiencing significant mental health issues, college campuses often struggle to meet the growing demand for services. Institutions often rely on triaging student needs upon intake and deferring those who do not appear to be in the greatest risk for self-injury or harm against others. The system of triage can lead to waitlists which in some cases delay services for students seeking clinical treatment,
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especially around stressful academic events such as final exams or the ending of a semester (Reetz et al., 2016). Wait times for services average anywhere between two days and nine weeks depending on the number of students seeking services and the availability of staff (Reetz et al., 2016). According to the International Association of Counseling Services, Inc. (n.d.), it is recommended that institutions not exceed the ratio of 1,000 to 1,500 students per full-time clinician. In cases where student need exceeds the availability of campus-provided clinical treatment, referrals to off-campus mental health services can be practiced (Wesley, 2019). However, these referrals can be limiting as the student needs sufficient insurance coverage, time, and transportation to participate in treatment off-campus. Students still on parental insurance may decline to participate if privacy is a concern for them.

An emerging clinical solution for stressed campus services and hesitant students is telemental health services. There are benefits to institutions providing options for remote clinical services, including expanding access, providing scheduling flexibility, and providing an alternative avenue for students who are intimidated or feel stigmatized by attending traditional, face-to-face clinical treatment (Wesley, 2019). Most traditional mental health and clinical therapeutic services have transitioned to telemental health during the ongoing Covid-19 pandemic, expanding the practicality and exposure to clinicians outside of a college or university setting. Additionally, the emergence of increasingly popular platforms such as Talkspace and BetterHelp, telemental health services will likely continue to grow. While these services are useful and provide access to a larger population, it is important for institutions to properly vet any services offered through their student health portal or by their recommendations. There is little data available that proves the same level of efficacy as in-person clinical treatment practices, and its virtual setting makes it more prone to security breaches (Wesley, 2019).
While clinical treatment is the most effective for students experiencing mental health symptoms that disrupt or negatively affect their daily lives, there are educational and preventative campus programs that may support or prevent the need for clinical services. In 2017, researchers Dominique Giroux and Elisa Geiss evaluated a student-led mental health awareness campaign at Olivet College in Olivet, Michigan with an undergraduate enrollment of just under 1,000 students. The purpose of the mental health awareness campaign was to decrease community stigma surrounding mental health and increase social supports among students. The awareness campaign took place over five days and included student-led and sponsored activities including an open mic night that encouraged students to speak openly regarding personal experiences with mental health. This event was also attended by the campus counselor (clinical staff) who was introduced to students and provided information on mitigation strategies when students feel overwhelmed (Giroux & Geiss, 2017). The University of Minnesota-Morris, a rural college of roughly 1,500 students, created a meditation room within their Briggs Library that provided students with a quiet, serene relaxation space away from their dorm rooms and crowded student centers (Bremer, 2019). Other colleges have started using apps and other digital wellness software such as TAO Connect (Paul, 2020), YOU at College (McKenzie, 2018), and even college-created platforms like MiTALK at the University of Michigan (Asidao and Sevig, 2014). These platforms offer a variety of services including inter-student connectivity, access to pre-existing campus resources, information regarding mental health concerns, advice on how to self-manage situational and episodic symptoms, and outside crisis resources.

**The Cost of Mental Health Issues on Campuses**

Most small colleges have a vested interest in supporting student needs beyond their moral integrity. Because the funding sources for private colleges – for which the bulk of small college
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Campuses are—come from student tuition and fees, donations, and endowments, the financial health of the institution depends on the relationship between it and the students and alumni. When students experience moderate to severe symptoms of mental distress there is a cost accrued by the college. These costs may be associated to students needing healthcare or to loss of attendance funds as students drop out or take leaves of absence from their studies. A survey by Gruttadaro and Crudo (2012) found that mental health issues were the most common reason that students elected to drop out of college. In their study and interviews of eleven students who took a leave from absence from college for mental health reasons, Story et. al found that though these students “reported increasing stress, inability to meet the demands of the college, and symptoms” (p. 40) they withdrew from their social and academic lives without seeking support or counseling services. Though only providing anecdotal evidence, this interview series shows how impactful some college experiences may be on student mental health. Increased withdrawal or drop-out rates may harm an institution’s public image and make new student recruitment more difficult.

Beyond the immediate student experience, institutions also often rely on substantial alumni and constituent donations to support capital, program development, and to grow endowment. Former students who potentially struggled during their collegiate experience and felt unsupported by the institution are much less likely to be philanthropic in their favor. Beyond financial donations, alumni with poor collegiate experiences are less likely to engage in other important engagements; such as recruitment, volunteering, serving on boards, offering internships opportunities, and general good advocacy on behalf of the institution.

In a Higher Education Today, 2019 survey of college presidents (Chessman & Taylor, 2019), 78% of respondents cited student mental health is a bigger concern now than three year ago. Seventy-two percent of the same respondents cited the allocation of new resources, mainly
financial, to mental health services (Chessman & Taylor, 2019). When asked what they would do with unlimited resources, over half of the presidents said that they would hire more clinical or mental health-focused staff (Chessman & Taylor, 2019). Average salaries for clinical mental health therapists or counselors in a college setting vary across states, with ZipRecruiter citing $48,267 per year in Indiana. According to the Association for University and College Counseling Center Director’s 2018 annual survey, 44% of college counseling centers added staff between the 2018 – 2019 academic years (LeViness, Bershad, Gorman, Braun, & Murray, 2018).

The Covid-19 Pandemic and New Concerns

In the interim of the Covid-19 pandemic, small colleges were uniquely poised to invite students to participate in in-person learning in a safer environment than larger universities. However, in addition to ensuring the physical safety and health of their community, rising rates of depression and anxiety among the student body became an additional area of focus. In their recent survey of undergraduate and graduate students, Wang et. al (2020) found that out of 1994 complete responses, 80.57% of respondents reported some level of depression or depressive symptoms since the start of the pandemic. Of the 2014 complete responses regarding symptoms of anxiety, every respondent indicated some experience of symptoms, with 28.25% reporting minimal anxiety, and 71.75% reported mild to severe symptoms (Wang et. al, 2020). It is unclear yet how pervasive these feelings of depressive symptoms are over-time, or what impact extended lock-downs, other mitigation tactics, or the cold-weather months have on their prevalence. Even more, it is unclear how a diagnosis and/or the experience of symptoms of Covid-19 may affect students’ mental health. Early studies indicate there may be as much as double the chance of Covid-19 patients developing a mental health issue within three months of their diagnosis.
(Taquet, et al., 2020), though the general age of college students is a protective factor given the
decreased likelihood of severity of illness.

In Kecojevic et. al’s (2020) cross-sectional study of undergraduate students, it was reported that the majority of students understood the seriousness of the pandemic and took professional guidance seriously – modifying their behaviors largely out of concern for social good. However, the reports of academic and personal struggles increased dramatically. A majority of the students within the study reported an increased inability to focus on academic work at 73.5%, and 58.6% reported difficulties with online learning (Kecojevic et. al, 2020). These academic difficulties are positively associated with an increase in levels of depression, anxiety, somatization, and stress (Kecojevic et. al, 2020).

While an increased need for mental health services is not unique to the pandemic, social isolation, the canceling of athletics and limit to community exercise, tumultuous social rhetoric, and pervasive uncertainty expounded the stress placed on students. The length at which these isolating mitigation efforts persist continues to deprive students from experiencing the social benefits that coincide with their education. With operating budgets already strained under the resources needed for regular disinfecting, viral testing, and other pandemic-related requirements, most schools are not in a position to finance more robust mental health services. The Covid-19 pandemic requires institutions to reimagine not only the resources needed, but the format in which resources are developed and implemented. Any resources developed are only as beneficial as the tools for use allow.

**Problem Statement**

With the reliably documented rise in mental health concerns among college students, combined with the psychological and social stressors of the Covid-19 pandemic, small schools
must adapt to meet the increased mental and emotional needs of students. As social perception and financial health of small colleges are positively correlated with the success of their alumni, it is in the best interests of these institutions to provide preventative and supportive resources; which may be developed and assessed using a mental health symptom monitoring app and risk assessment matrix. The development of these tools would give schools assessment in areas specific to student mental health, such as student self-reported rates of isolation, self-regulation, hopelessness, and/or stress. This data, combined with the number of students currently seeking counseling services, the number of service providers available on campus, campus health and safety data that includes information related to assault or other violent crime, and other appropriate indicators, would provide a more holistic understanding of the acute needs of the institutions when considering student mental health. The use of a risk assessment matrix would allow institutions to plot the self-reported student data on an axis of probability and severity.

Conceptually, data relevant to student experiences could be self-reported via a mental health symptom monitoring app. A survey related to emotional and behavioral symptoms of hopelessness, stress, self-regulation, and isolation could collect relevant aggregate data and plot results on a risk assessment matrix. The location of each response on the risk assessment matrix could provide each student taking the survey with a specific recommendation for recourse. Similar methods have been employed since the beginning of the Covid-19 pandemic and serve multiple purposes for campus safety. First, the Covid-19 symptom monitoring app provides students with suggestions or directions based on their self-reported symptoms. Second, these symptom monitoring apps provide institutions with data that may indicate spread of the illness on campus, or the increased rate of symptomatic students. As most of these apps were created efficiently in order to address the rapid increase in need, many institutions were able to develop
them in-house, rather than be purchased through a third party. This experience has likely increased many small colleges’ comfort in developing and implementing such tools.

The development of a similar application specifically focused on student mental health experiences could be recommended for routine, systematic use. This could provide similar insights as the Covid-19 symptom monitoring apps. First, in real time, it may be used to offer students varying levels of suggestions for addressing identified mental health concerns. Second, it may be capable of gauging the overall campus climate for emotional and/or behavioral risk indicators; such as high rates of stress and low rates of self-regulation, but high rates of social connectivity among the student body. This could allow institutions to identify and create, strengthen, or reallocate resources where they may better serve student needs. While the data collected would not be entirely anonymous, given the requirements of the recommended application software discussed later in the paper, the information gathered may still be kept private and only accessible to appropriate staff who would otherwise have access to student health data. Bi-yearly (twice per school year) or quarterly may be the most productive schedule for capturing such data, and may help campuses identify if risk indicators increase with scheduled events such as the start of a new academic year or occurrence of final exams. However, it would be recommended that students have continuous access to the app while on campus, as it may provide helpful or necessary suggestions upon identifying a student who may be struggling. Likely, the most productive campus-wide data would be collected after at least two years of regular use by students, becoming an accepted cultural norm of student life at key points in the academic year.

*App Description and Creation*
This vision of a symptom monitoring app could serve two main purposes: to provide immediate feedback to students completing the survey, and to provide the institution with aggregate data relating to trends of mental health symptoms among its students. Though the symptom monitoring questions may be distributed in a survey format, there are marked benefits for using a mobile app for such a project. The current generation of undergraduate students are the most technologically adept generation in history and are used to using apps for most data intake purposes. Most students are likely to have a mobile device, though the same survey format available on the app may also be housed in a desktop version on the institution’s SharePoint or other student portal. Using an app decreases the need for resources to print, distribute, and collect paper responses and allows for an increased level of privacy while the student is completing their symptom questions. This also provides flexibility for when and how often students may participate and interact with the app. Additionally, the speed at which the app can collect and interpret the data significantly reduces the amount of time a staff person would need to review, score, and plot the responses within the risk assessment matrix.

Though many apps and app development software exist, the Microsoft Power App platform was chosen to conceptualize this project based on the availability, low to no cost, and relative ease of development and use. Power Apps is a service of the Microsoft Office 365 package that allows organizations to build mobile apps to run on Android, iOS, and Windows. Apps created through Power Apps essentially run through the Power Apps app, eliminating the need to develop separate apps for each operating system. This same premise applies to the web version, which allows any web browser to run the app contents. Because it is a Microsoft product, Power Apps works with all other Microsoft services, including SharePoint, Flow, and Power BI to host, automate, display and analyze data collected through the app. Apps developed
through this platform will work with anyone under the institution’s licensure with Microsoft, but is inaccessible to those without proper credentials. This ensures that no outside or third party can access the app or symptom monitoring questions and compromise the data by submitting false or irrelevant responses. However, this is also the reason that the self-reported student data cannot be considered truly anonymous, as their institution credentials are required for app access.

The main benefit of using Power Apps is that it allows for ultimate customization for the needs of each specific institution. While third-party platforms and apps may be able to provide broader services and resources, they lack flexibility and high priority of protection of student data. Third-party apps thrive on data and use it to improve the user experience. However, that data is stored separate from the institution and may be collecting information on students that is unrelated to the needs and outcomes requested by the institution. Data breaches would be an additional concern and could prevent students from using the application. Additionally, the use of third-party apps requires a delayed response if issues arise. A dysfunctional product or necessary change requires communication with and action from a representative of the third party. Creating an in-house solution allows for greater efficiency in implementing changes or addressing malfunction.

Examples for potential app design and flow are included for further visualization. For the user experience, students may be asked to download the app to their smart phones, tablet devices, or access the symptom monitoring survey from a web browser. In order to access the app, students would be required to log in using their institute credentials. Once logged in, students may be

![Figure 1. Concept App Welcome Screen](image-url)
Conceptualizing Mental Health Symptom Monitoring and Risk Assessment

greeted with a welcome screen, stating the app’s purpose and the appropriate note of confidentiality (Figure 1). The next screen might state the estimated time to complete the app and directions to fill out the demographic questions on the following screen. The demographic questions could be housed on a single, scrollable screen with radio button selection options (Figure 2).

All demographic questions might be required before accessing the next screen. The next screen could be the instructions to complete the survey questions. With sixteen total survey questions suggested, the next four screens might include four questions each, such as in Figure 3. Once all sixteen questions are answered, the data could communicate via dashboard to the risk assessment matrix and direct the app to provide the appropriate end screen. Question and response plots on the risk assessment matrix can be seen in Figure 11.

There could be four options for the end screen based on user response. The first could be a no-to-low risk screen. This screen could display a green background with a message of encouragement for the user to continue practicing good mental health habits (Figure 4). The second option could a mild risk
Conceptualizing Mental Health Symptom Monitoring and Risk Assessment

<table>
<thead>
<tr>
<th>Screen Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low to No Risk Screen</td>
<td>Keep doing what you’re doing! We’re happy to see that you’re doing well! Continue to stay connected and utilize campus resources whenever needed. If something changes, do not hesitate to reach out for support.</td>
</tr>
<tr>
<td>Mild Risk Screen</td>
<td>Let’s take a pause. It looks like you may be experiencing some extra stress or struggles. That’s okay! Reach out to a friend or a peer to talk about what you’re going through. Consider joining a social club, or check out some of the wellness activities around campus. Remember to take care of your body and spirit as well. Be sure you are eating well, being active, and getting enough sleep. Please reach out to the counseling center if you are experiencing difficulties in daily functioning, and talk to your academic advisor if you are struggling academically.</td>
</tr>
<tr>
<td>Moderate Risk Screen</td>
<td>Let’s take a pause. It looks like you are experiencing significant mental health struggles. It is completely normal to go through more intense periods where stress and/or isolation make it difficult to function at our best. You are not alone. Please consider reaching out to the Counseling Center and schedule a visit. Sometimes just a few sessions of expressing your emotions or experiences can help lessen the intensity of what you are going through. In the meantime, please reach out to a friend, family member, or peer for support. If you ever feel that you are overwhelmed and in danger of hurting yourself, please call XXXX for campus services, or the National Suicide Prevention Lifeline at 800-273-8255 or by visiting the suicidereventionlifeline.org.</td>
</tr>
<tr>
<td>High Risk Screen</td>
<td>Let’s take a pause. It looks like you are experiencing significant mental health struggles. You are not alone. If you feel that you are at risk for hurting yourself, please call XXXX for campus services, or the National Suicide Prevention Lifeline at 800-273-8255 or by visiting the suicidereventionlifeline.org. Please consider reaching out to the Counseling Center and schedule a visit. There are services on campus that can help support you during this time. Please reach out to a friend, family member, or peer for support.</td>
</tr>
</tbody>
</table>

Additional campus resources may be displayed on this screen, such as mindfulness practices, yoga sessions, or other specific services that provide mental health supports without clinical treatment (Figure 5). The third option could be moderate risk screen. This screen may display an orange background and encourage the user to reach out to clinical treatment services on campus or through other institute supported methods and provide the contact information to do so. This screen may also encourage the user to reach out to family, friends, and other supports in the case of worsening symptoms (Figure 6). The final option could be the high-risk screen and would be reserved for responses that indicate a high risk of self-harm or suicidality. This screen may display a red background and encourage the user to reach out immediately to on-call services if they feel they are at risk. This could include the pertinent institute contact information, as well as...
phone numbers and links to crises resources. This screen would also encourage the user to seek clinical treatment as soon as possible (Figure 7).

Because of the personalization of the Power App platform, each institution can make the user experience for their population unique. Including school branding, colors, mascots, quotes, services, and contact information increases the familiarity with the users and creates a better experience. It is important that, if applicable, the contact information provided on the end screens be consistently updated. For example, if including the institution’s counseling center’s contact information on the moderate and high-risk screens, it would be more effective to include the general office contact information rather than the information of an individual staff person. As staff changes or contact information is updated, it may be disheartening for a user to attempt to reach out and not hear back based on outdated contact information. Additionally, the resources for crisis response should be properly vetted and may include local, state, or national services such as the National Suicide Prevention Lifeline or the Crisis Text Hotline.

**Symptom Monitoring Questions**

The survey’s envisioned purpose is to assess the severity at which the student respondent may experience negative symptoms of mental health. Based on their responses, students could be provided with recommendations for next steps upon completing the survey. Each suggested question is annotated below with a symptom category used in the risk assessment matrix discussed next. Students may be asked to answer all questions honestly and to the best of their ability. Participation in the survey should remain elective, and a student may choose to withhold their responses. In order to further protect student privacy, no easily identifiable personal information should be collected in the demographic questions. The demographic questions are included to assist institutions in understanding if responses within feedback are over-represented
in a specific group, such as younger students, women or non-binary students, or students of a minority group experiencing more severe symptoms. Institutions can compare the demographic responses to their student body data to identify if it is representative. The demographic questions representing a student’s potential diagnosis and treatment may act as a deterrent for more critical responses as a result of the survey. This provides institutions with more data, indicating if those experiencing more moderate to high risk symptoms are already receiving treatment, or conversely if those already receiving treatment experience more mild symptoms.

**Demographic Questions:**

What is your current age?

What is your ethnicity?
- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White

What is your identified gender?
- Male
- Female
- Nonbinary
- Other
- Prefer Not to Answer

What is your current year in school?
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○ Freshman
○ Sophomore
○ Junior
○ Senior

Have you been diagnosed with a mental health disorder?

○ Yes
○ No
○ Unsure
○ Prefer not to answer

If you answered ‘Yes’ to the above, are you currently receiving medication or other treatment for the diagnosed condition?

○ Yes
○ No
○ Unsure
○ Prefer not to answer

Survey Questions:

Please read each of the following questions carefully. Indicate the frequency that you experience the stated symptoms over the past two months by selecting ‘Very often’, ‘Often’, ‘Sometimes’, ‘Rarely’, or ‘Never’.

1. I feel stressed and overwhelmed. (Stress/Restlessness)

○ Very Often
○ Often
○ Sometimes
2. I talk to my friends and family about the things that cause me stress. (Isolation)
   - Rarely
   - Never

3. I feel unmotivated and have very little energy to complete my assignments. (Hopelessness)
   - Very Often
   - Often
   - Sometimes
   - Rarely
   - Never

4. I have problems sleeping because my mind is racing. (Stress/Restlessness)
   - Very Often
   - Often
   - Sometimes
   - Rarely
   - Never

5. I feel grateful for the opportunities I have. (Hopelessness)
   - Very Often
   - Often
6. I feel restless and have a hard time being still. (Stress/Restlessness)
   - Very Often
   - Often
   - Sometimes
   - Rarely
   - Never

7. I have a difficult time controlling my emotions. (Self-Regulation)
   - Very Often
   - Often
   - Sometimes
   - Rarely
   - Never

8. I enjoy spending time with people. (Isolation)
   - Very Often
   - Often
   - Sometimes
   - Rarely
   - Never

9. I use alcohol and other substances to help me relax or de-stress. (Self-Regulation)
   - Very Often
10. I feel hopeless. (Hopelessness)
   - Often
   - Sometimes
   - Rarely
   - Never

11. I feel present and capable of focusing on tasks. (Self-Regulation)
   - Very Often
   - Often
   - Sometimes
   - Rarely
   - Never

12. I feel that I have social supports and people I can turn to if I have a problem. (Isolation)
   - Very Often
   - Often
   - Sometimes
   - Rarely
   - Never

13. I make goals that I look forward to achieving. (Hopelessness)
14. I take care of my body by eating well and exercising. (Self-Regulation)
   - Very Often
   - Often
   - Sometimes
   - Rarely
   - Never

15. I participate in clubs and activities on campus that interest me. (Isolation)
   - Very Often
   - Often
   - Sometimes
   - Rarely
   - Never

16. I feel that there isn’t enough time in the day to do all of the things I need to do. (Stress/Restlessness)
   - Very Often
   - Often
   - Sometimes
   - Rarely
Never

**Risk Assessment Matrix**

The risk assessment matrix, shown in Figure 7 was conceptualized as a color-coded scale to quickly assess both individual and campus-wide mental health risks identified in the symptom monitoring app, connecting to the data using a dashboard. This matrix plots response points on an axis of frequency of symptoms and symptom categories. The symptom categories are denoted as four categories “stress/restlessness”, “hopelessness”, “isolation”, and “self-regulation”. Each category has four corresponding questions within the symptom monitoring app to indicate the severity of each symptom. The five colors present within each category indicate the severity of symptoms based on frequency. The symptom category of self-regulation is slightly different as it is a protective factor and positive indicator of resilience. Therefore, a “high severity” of self-regulation is seen as a positive experience, as indicated by the color gradient in the risk assessment matrix in figure 8. The frequency of symptoms is marked by indicators of “very often”, “often”, “sometimes”, “rarely”, and “never”.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Often</td>
<td>Stress/Restlessness</td>
</tr>
<tr>
<td>Often</td>
<td>Hopelessness</td>
</tr>
<tr>
<td>Sometimes</td>
<td>Isolation</td>
</tr>
<tr>
<td>Rarely</td>
<td>Self Regulation</td>
</tr>
<tr>
<td>Never</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 8, Risk Assessment Matrix*

The frequency indicators on the symptom monitoring app’s questions are not necessarily synonymous with the probability indicators on the risk assessment matrix. For example, a response of “very often” to the question “I make goals that I look forward to achieving”, indicates a low severity of the symptom in the category of hopelessness. However, the response
of “very often” to the question “I feel hopeless” indicates high severity of the symptom category of hopelessness. The four responses for each category can be viewed in a scatter-plot method on the risk assessment matrix, indicating average severity of symptoms within each category. Indications of severity can prompt different responses through the symptom monitoring app. For example, an individual whose responses indicate medium severity of the stress/restlessness symptom category, but high severity of self-regulation (positive) may illicit an app response of mild risk, recommending stress reduction techniques. This response recognizes that stress is common, the answers do not necessarily indicate the respondent is in immediate distress, and the respondent has high protective factors. However, an individual whose responses indicate high severity of isolation and hopelessness symptom categories may illicit an app response of high risk, providing the contact information for campus resources and encouraging the respondent to reach out immediately, alongside numbers for crisis intervention. This response recognizes that symptoms of isolation and hopelessness are of the most common predictors of suicide or other self-injurious or harmful behaviors. A full model of questions and responses can be found in Figures 9 - 11, with the responses plotted on the risk assessment matrix in Figure 12.

While students using the symptom monitoring app would not see their responses plotted on the risk assessment matrix, as envisioned, a dashboard connected to the model will provide immediate individual feedback with recommendations. The aggregate data plotted on the risk assessment matrix may also provide the institution with a gradient map of the most common mental health issues experienced by the students. While the symptom categories are inherently too vague and non-diagnostic, and therefore cannot indicate the presence of common mental health disorders, it may show common symptoms experienced by students by severity. This
Figure 9, Questions and Set 1

Figure 10, Questions and Set 2

Figure 11, Questions and Set 3

Figure 12, Response and Plot on Matrix
information can inform decisions regarding the allocation of resources intended to help mitigate and prevent the prevalence of negative mental health symptoms, as well as understand opportunities to increase supports for positive and protective behaviors. Depending on when the symptom monitoring app is deployed by the institution, changes in symptom reporting may coincide with the occurrence of stressful academic experiences, such as finals, or the ending of semesters. This can further support the development and use of temporary campus-wide stress reduction strategies around such times.

**Financial Impact**

The creation of the described symptom monitoring app would require Office 365 and the Power Apps, SharePoint, and Flow services. These tools are free to all academic institutions under Microsoft’s Office 365 A1 plan. Schools participating in the Office 365 A3 or A5 packages will pay up to $2.50 per student user/$3.25 per faculty/staff user and $6.00 per student/$8.00 per faculty/staff member respectively (Microsoft.com). The plans with additional costs do provide more services that could be of use for this app, particularly the Power BI service included in the A5 package. However, this is not required for the app or risk assessment matrix to function and therefore should not be considered a necessary cost for development.

The creation of the app through Power Apps could be done by staff in the current Information Technology department. Because the creation and maintenance of the app would be minimal, it would not require the creation of a new position or full-time salary. Additionally, because of the interface used by Power Apps, the creation and maintenance could even be delegated to a student or class project, providing benefit as a hands-on learning experience and useful product for the institution. If done in such a way, it should be required for a staff member
to have ultimate access and control over the app to ensure continued use after the student developers have moved on.

While the cost for the development and implementation of the app itself is relatively small, the resources required to address concerns captured via the app would be the greatest cost concern of such a project. If institutions, particularly after the increased stress on students during and immediately after Covid-19 pandemic, find that students need more clinical resources than available, hiring new staff or purchasing outsourced resources may be of significant cost. Additionally, while outsourcing clinical resources can be an alternative solution, there is still a significant cost associated. Though every telemental health service has different costs or package options, founder and CEO of telemental health service Uwill, Michael London, estimated that the minimum cost for Uwill’s service is often around $25,000 per academic year, or around $10 to $20 per student per year (Anderson, 2020). This financial requirement comes at a time when many colleges are budget cuts and reduced donor support in the wake of the Covid-19 Pandemic.

There are ways that institutions can help offset the costs of additional services. For those who do not include a student wellness fee (that covers the cost of mental health services) into their yearly tuition may opt to do so, or those who already factor those costs may increase the amount charged yearly. Private donors who may have a special interest in student mental health could be solicited to establish an endowed fund that could financially support additional services in the long term. Endowed funding would be preferred due to the recurring need for services and the focus on carrying funding into perpetuity rather than the short term. However, it is also possible for intuitions to create funds that would accept monetary donations of any size with the hope that it would grow overtime to be large enough to eventually endow. State, federal, and
private grants are also options for funding, though the institution would likely have to tailor their project goals and measures to the specifications of the grant.

**Project Feasibility**

The institutional reactions to the Covid-19 pandemic provided excellent framework for implementing similar approaches to other physical and mental health events on campuses. Particularly the Crisis Communication template provided through Power Apps provides a robust foundation for not only symptom monitoring, but the potential for push notifications, communications strategies, and crisis response. Formations of campus task forces, the development of symptom monitoring apps, and community-wide expectations of self-surveillance and responsibility prove that such efforts can be made during public health crises. Given the typical longitudinal nature of mental health symptoms, including the recognition that some symptoms are responses to situational events that may change over time, the proposed development of such tools would be a reasonable undertaking for most small college campuses.

Support for such a project is important from nearly all areas of the institution, however buy-in from highly influential stakeholders, such as the Board of Trustees or similar governing body, is imperative for adequate resources. These resources need not only be financial, but include acknowledgment that mental health is an important priority of the campus, attention to mitigation and prevention strategies, and pressure for institutional policy makers to advocate for community change. It is also critical that students understand the purpose of such tools – i.e. the reason for the app, the resources it provides, and the importance of the data for addressing student needs. The current generation of students attending college have grown up with technology like no other generation before them. This makes the use of an app appropriate given their technical prowess, however they can also be more cautious when sharing information.
Student feedback should always be an important consideration when implementing new student services.

The adoption of such a project could be useful to new student recruitment and admissions priorities. As mental health care becomes less stigmatized in society and parents and caregivers become more literate with the mental health concerns of young adults, institutions that place a priority on the mental health of their student body will become more enticing. Parents of students with pre-existing mental health issues may feel comforted knowing that the institution pays close attention to the symptoms and experiences of students, while parents of students without pre-existing mental health issues may feel reassured that there is an extra layer of protection as new students encounter the inevitable life changes associated with attending college. While a symptom monitoring app may not appeal to the general population of potential or incoming students, it may serve as some relief to them that there is an easily accessible, non-invasive, mobile method of screening for negative mental health symptoms.

The formation of a task force comprised of key campus players and partners is an important first step for such a project. Once buy-in from institutional leadership and the student body is achieved, representatives from academic affairs, student affairs, counseling services, faculty, student-facing staff (such as athletics), information technology, communications and marketing, campus ministry, campus diversity, and students should be included in the creation of such a task force. The primary goal of this group should not only be the development, implementation, and regular review of the app and its concurrent data, but also the development, implementation, and promotion of community strategies to combat student mental health concerns.
While direct clinical services are most important for prolonged and severe symptoms of mental health issues, there are other strategies that can be adopted by a campus community at a nominal cost. For example, creating a culture of connectivity and social outreach – through activities such as peer mentoring, social clubs, or social events – can reduce student feelings of isolation and increase their knowledge and access to social supports. The creation of a mindfulness hour can encourage students to adopt practices that reduce stress and symptoms of anxiety. A communication strategy that promotes pre-existing campus resources and/or wider community resources available to students may increase access and feelings of hope for students who need help but are unsure where to start. New and continued support for activities that increase self-regulation and efficacy, such as regular physical activity, healthy eating, regular sleep, and limited consumption of alcohol, is important not only to address immediate symptoms but to also increase protective habits among students.

Though it is up to the individual institutions on when they recommend students participate in completing a symptom monitoring app survey, it should be open to students at all times as a reference to understanding their experiences with mental health issues. Additionally, it can provide another resource point for individuals who feel they are experiencing a crisis. Still, quarterly or bi-yearly campus-wide participation is suggested to establish baselines and track the trends in students’ mental health symptoms. Student participation may be encouraged by entering respondents into a raffle or offering extra credit points within certain classes upon completion. In order to respect student privacy, a confirmation email or other non-specific receipt of completion may be developed. The aggregate data collected may be provided to certain stakeholders or even the larger campus community as a report on the effectiveness or progress achieved by the collective efforts to address mental health issues on campus.
It is worth considering if an institution is willing to enact such a project on its campus that mental health literacy becomes a more tangible presence within the campus culture. For example, most colleges offer a life skills/introduction course to their incoming freshmen and new students. It may be in the interest of the mental health task force to ensure that mental health literacy, mitigation and prevention strategies, and protective behaviors be included in such a course’s content. The symptom monitoring app and risk assessment matrix are only tools to measure the occurrence of symptoms of students, and are most useful as measures of efficacy when an institution is investing time, attention, and resources to addressing such issues.

**Protection of Student Data**

Though the symptom monitoring app as described does not request personal information within its question, the use of Microsoft Power Apps does link the user’s institutional credentials with their responses to the symptom monitoring questions. While Microsoft 365 maintains a robust security and compliance center, it is up to the institution to ensure that student data is protected in accordance with the Federal Education Rights and Privacy Act of 1974 (FERPA) and the Health Insurance Portability and Accountability Act of 1996 (HIPPA). Only appropriate staff should have access to the data and student records associated with such an app. Those who would not already have access to student records containing health information should not have access to the complete data collected by an app. A release form detailing the purpose, use, and security of the collected data should be signed and obtained by each student before requesting that they participate in a symptom monitoring app survey. Data records that detail individualized response records should be regularly deleted, while the aggregate campus data may remain for longitudinal study and resource support as long as the user identification is not included in response scores.
**Constraints**

Several limitations and constraints exist within the concept of this project, particularly surrounding the app questions and risk assessment matrix as described. The survey was created in an attempt to capture general symptoms of depression and anxiety among college students, which could lead to more extreme mental health outcomes such as non-suicidal self-injury, suicide, or homicide. However, the survey has not been statistically validated, and it should not be viewed or used as a diagnostic tool. Similarly, the risk assessment matrix is a tool to visualize the data provided by responses through the app. It should not be used or viewed as a diagnostic tool or as a statically valid indicator of negative mental health experiences.

The plans for this project were developed to collect and interpret data, however there are limits to the reliability of the information. Though the survey was developed with attempts to reduce bias, compromises were made in length and complexity of questions due to the format of its presentation as an app. Depending on how institutions would elect to distribute and encourage participation, sampling bias and non-response bias could be an issue. Additionally, there is the possibility that students will respond untruthfully.

**Project Concept SWOT Analysis**

The concepts for the symptom monitoring app and risk assessment matrix tools have several benefits and potential concerns. Considering the SWOT analysis model, both internal and external considerations can be weighed prior to the development and use of these tools on small college campuses. Internal strengths for the symptom monitoring app and risk assessment matrix include their ease of development, ease of use, flexibility, adaptability, and potential for internal benefit. Depending on the time, capacity, and creativity of the teams assigned with developing the tools, nearly unlimited possibility exists for the tools’ scope and reach. Conversely, the
internal weakness of the tools is parallel to its strengths. Small colleges often consist of faculty and staff professionals who are serving in numerous roles outside of their assigned positions. Staff involved in the development and implementation of such an endeavor may be already stretched too thin and unable to provide the time and bandwidth necessary for the success and maximum benefit of these tools. Additionally, student buy-in is paramount to the success and efficacy of the tools. If a campus culture is too reluctant to adopt such practices, the use and benefit of the tools may be greatly reduced. Finally, there must be adequate resources for the app to recommend or direct students to.

![SWOT Analysis Table]

*Figure 13, SWOT Analysis*

Though the concepts were developed for internal use only, there are still possibilities for opportunities outside of the institution. If the tools are developed, successfully implemented, and begin showing accurate trends in student experiences, the institution may find opportunities for new funding streams to support additional preventative or supportive resources. Alumni donors, corporate or foundation grantors, or other financial opportunities may become apparent or successfully established. Additionally, the successful use of such tools may provide the
institution with opportunities within larger research or professional development for the faculty or staff associated with their development and implementation. Similarly, with students, involvement in the process may provide opportunities outside of the institution in the form of internships or career opportunities. However, external threats also exist, particularly among the ever-changing technological landscape. Any crucial changes to the Microsoft platform, particularly Power Apps, PowerBI, or other supplemental services would cause serious disruption in the tools as they’ve been conceptualized. Additionally, changes to student information privacy laws/acts may influence the way that student data relating to mental health is collected. Finally, depending on the institution’s needs, the tools as outline may not be sufficient to address the full scale of their concerns, in which a third-party app or other software may be more beneficial. A SWOT analysis diagram may be found in Figure 13.

**Future Research**

There is vast opportunity for future research on the efficacy and use of a mental health symptom monitoring app and risk assessment tool, particularly in its ability to provide adequate prevention solutions and quicker access to clinical treatment when needed. Not only the use of the app and risk assessment matrix, but the effectiveness of a mental health focused task force could provide insight to any potential shift in campus culture regarding mental health discussions or institutional services. Student participation, response bias, trends in responses, and app maintenance over time would be interesting benchmarks to review. Internalized institutional study on such an undertaking could provide invaluable data to important stakeholders who control allocations of resources that may improve outcomes. The right data monitoring paired with the most interested potential donor may result in a new funding stream or the establishment of an endowed fund to continually address student mental health concerns. As interest in mental
health and student experience increases with larger societal understanding, more opportunities for funding via private, corporate, foundation, or government agency donors or grantors may become available. Small college advancement offices should prepare to present potential donors with funding opportunities in these areas.

As research keeps its eye on the long-term effects of the Covid-19 pandemic and college student mental health, it will be interesting to see what chances occur in reports of mental health concerns among students. Considering the already increasing rates of depression, anxiety, non-suicidal self-injury, and suicidality, what kind of anomalies might be found in the data moving forward? Does the occurrence of a once-in-a-century public health crisis skew data trends research has been monitoring? Will the eventual return to “normal” campus life demarcate a significant decrease in mental health issues as students feel relief at the return of normalcy?

The methods for which institutions combat and address increased need for services will likely influence the need for additional research of the efficacy of telemental health services. It would be anticipated that much study will be done regarding the effects that such a sudden shift from in person to virtual engagement might have on individuals. Questions to consider include how effective is virtual learning as compared to in-person learning and does the lost time attributed to the pandemic negatively impact students in their chosen academic or career pursuits? If there is a negative impact to those in college during the Covid-19 pandemic, how does their experience effect their mental health as they graduate and enter the workforce? If more institutions regularly monitored student mental health experiences, especially moving forward from the Covid-19 pandemic, the response to these questions may be observed more broadly, yet more cohesively. The experience of students on a small college campus as compared to those on a larger university were already markedly different prior to the Covid-19 pandemic. The ensuing
response and ability to return to even modified social settings will likely only continue to diversify that experience. Though many large-scale studies of college student mental health concerns take place within larger university settings, it is important to consider how the size and scale of the institution affects the student experience.

Conclusion

The Covid-19 pandemic disrupted the lives of nearly every individual in the world. While unprecedented, the need to use technology in order to adapt to unusual circumstance opened new opportunities for creative technological solutions to more sustained social problems. The speed with which colleges were able to develop symptom monitoring apps and trackers proved that self-reported student input can help to minimize the spread of infection, particularly on small college campuses and communities. If the same idea were applied to student symptoms of mental health issues, then prevention and intervention may help to keep students emotionally and mentally healthy. Additionally, such services may provide more immediate resources to individuals who are experiencing moderate to severe mental health issues. Until the root causes of mental health issues present and growing within this population are identified and addressed by larger society, institutions who house and educate these students have a duty to provide services to assist in the management and treatment of symptoms.

There is no single, simple solution for addressing the growing rate of mental health concerns among college students. Institutions of varying sizes, demographics, and resources will have different means to implement a wide variety of care. Even among smaller schools, there are many resources and tools that could be developed that are specifically tailored to the unique experience of each community. The goal of this research is to provide a concept of just one method and example of easily accessible resources than can be used to address prolific and
deeply important issues. In this instance, the most valuable strength of the small college is not in its financial capabilities or its academic prestige. It is its human resource that is its greatest asset. The ability to identify, develop, and facilitate true community response to mental health issues among its students is what uniquely positions them to set the example for other institutions.
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