

Assessing Student Focus Areas for Self-Directed Metacognition and Self-Improvement

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Abstract. Research in higher education has consistently focused on determining factors that influence student success and retention in academic programs. Successful students also positively impact the effectiveness of teaching practices used in a course. Previous work shows that a recurring set of assignments where students reflect on past work and set a SMART goal to make a specific improvement promotes a growth mindset and is an activity students see value in completing. Promoting student improvement should also make an instructor's teaching efforts more effective. To understand how instructors and institutions can provide more support for student development and retention, students at four universities completed reflection and planning assignments that involved goal setting based on the SMART goal framework. Student submissions were analyzed to categorize the topic areas where students saw the need to work. Results highlighted the importance of many topics, including time management, self-care, course content, and study methods. Analysis of the data also revealed that facilitating exercises requiring students to set goals and report on their progress later in the term greatly enhanced student engagement and fostered behaviors geared towards establishing a growth mindset.

Keywords: growth mindset; SMART goals; student learning; reflection and planning; qualitative analysis.

Preparing students for success in their educational endeavors, careers, and ongoing life pursuits is a primary goal of higher education (Poe et al., 2021). Additionally, having better-prepared students in a class will make an instructor's teaching more effective. However, much progress still needs to be made in equipping students to reach their highest potential in education and beyond. In reality, many students are not continuing their education, thereby not completing their degrees (Kirby & Thomas, 2021). This has been described as a completion crisis among undergraduate students (Kirby & Thomas, 2021). Low-income and first-generation students are hit especially hard, having only a 21% chance of completing a bachelor's degree in six years (Fishman et al., 2021). Students are not only facing challenges with academic performance and struggling to complete their degrees, but they are also experiencing anxieties, life challenges, and distress. According to Deloitte's Center for Higher Education (Fishman et al., 2021), 76% of college students indicate finding it difficult to maintain a sense of well-being.

Motivation

The researchers in this study have noted many of these struggles in students. Students frequently seem to experience difficulties with studying, making deadlines, meeting learning objectives, and coping with the uncertainties and stresses of life. Therefore, a primary motivation for this study is to discover underlying student needs and investigate how to assist students in addressing these needs. A goal of educators is to encourage students to reach their potential, grow their skill sets and knowledge, and develop a passion and perseverance to achieve their educational goals and beyond. Leveraging the results of this study will provide tools to maximize students' growth potential, achievement, and learning using a simple intervention of reflection and planning activities. In these activities, students set SMART goals to identify their most salient needs and identify action items to help them move toward meeting their goals (MindTools, 2022).

SMART goals are defined as goals that are Specific, Measurable, Achievable, Relevant, and Timebound (MindTools, 2022). The different attributes used in defining a SMART goal are believed to assist in developing goals that are, for the individual, achievable or reachable. Students who are taught to set appropriate and achievable goals are more empowered to develop a growth mindset, take accountability for their learning, and be achievement-oriented (Wilson & Conyers, 2020, p. 84). Previous research has shown that students do engage with and respond favorably to reflection and planning activities (Poe et al., 2021).

Reflection and planning papers were developed to promote a growth mindset through setting SMART goals. The research seeks to evaluate the impact of these activities in revealing student needs, influencing growth mindset, and helping students make progress toward their goals.

Growth Mindset

Presuppositions held by individuals or groups of people create a mindset that embodies their beliefs and assumptions (Sahagun et al., 2021, p. 1). According to mindset theory, beliefs and assumptions about individual attributes such as intelligence, skills, and abilities are positioned along a continuum from a fixed to a growth mindset (Dweck, 2016, p. 211). The theory focuses on the degree to which individuals believe such characteristics or attributes can be developed and improved (Sargun et al., 2021). A fixed mindset views such characteristics as being innate, predetermined, and unchangeable, whereas a growth mindset views them as malleable and able to be improved upon through work and effort (Sahagun et al., 2021; Thompson, 2020; Wilson & Conyers, 2020; Dweck, 2016). Students with fixed mindsets are more likely to surrender in the face of adversity, become discouraged by criticism, interpret setbacks as failures, and seek situations where success will come easily. Students with a growth mindset are more likely to persist through challenges, see setbacks as opportunities from which to learn and grow, and view effort as important for acquiring mastery (Thompson, 2020; Wilson & Conyers, 2020).

Mindset ignites motivation to adopt effective strategies and invest energy and effort in the learning process (Wilson & Conyers, 2020) and has been shown to predict achievement outcomes (Sargun et al., 2021). Therefore, as educators, we consider the theoretical foundation of a growth mindset and its practical application to investigate how we can provide the fuel for enhancing a growth mindset in students and help them improve learning outcomes, performance, and their overall educational experience. According to Dweck (2016), personal efforts toward a goal generate qualities that are cultivated to form a growth mindset. The persuasion that individuals' inherent talents, dispositions, interests, and traits can be developed and shaped with the right conditions demonstrates that everyone, regardless of subject matter or background, can grow by applying the learnings gained from experience. Instead of associating performance in the classroom with innate ability, students with a growth mindset connect performance with effort and process (Poe et al., 2021). Therefore, we look for opportunities to provide methods and an environment that promotes a growth mindset for students and enhances their capacity for acquiring and improving knowledge and skills that, in turn, improve their performance. According to Wilson and Conyers (2020), "developing growth mindsets and teaching students effective methods for gaining knowledge and skills go hand in hand" (p. 16). One strategy for helping students develop a growth mindset is goal setting (Wilson & Conyers, 2020). This study focuses on reflection and planning activities designed and assigned in IS courses that ask students to reflect on their performance in the class and then set SMART (Specific, Measurable, Achievable, Relevant, and Time-Bound) goals in areas which they

would like to make improvements. These activities were specifically designed to support a growth mindset (Poe et al., 2021).

This research was inspired after witnessing students struggling in Information Systems (IS) courses and wanting to equip them with practical tools and promote lifelong learning. According to Gibson (2019) and Rohne (2015), most scholars agree that a growth mindset can be learned and developed given the right environment and conditions. This provides an opportunity to discover how to create such an environment that will assist students in developing a growth mindset and empowering them to persist with the pursuits of their education and their goals in life. Our motivation is to investigate ways to create an environment for students that promotes student motivation and persistence to learn through developing a growth mindset.

Approach and Method

Members of the research team include Agile practitioners and researchers, and their Agile influence is reflected in the iterative approach to the student assignments. Agile was the contrivance of software executives in 2001 as a solution to failing projects. The success of Agile over the past two decades has inspired other industry sectors, including higher education, to explore how Agile can positively influence their business. In 2017, a group of faculty members published the "Agile Manifesto for Teaching and Learning," which provides guidance to higher education instructors who want to be Agile educators and use Agile practices in their research, curriculum, and teaching (Krehbiel et al., 2017). Agile teaching focuses on individuals, collaboration, reflecting, and responding to change in short, iterative work cycles (Hulshult & Krehbiel, 2019). When the Agile mindset and practices are used in the classroom, the following changes are seen: student engagement is increased, students are encouraged to take responsibility for their learning, enhanced levels and higher quality of collaboration are realized, and higher quality deliverables are produced (Krehbiel et al., 2017). The researchers applied the iterative nature of Agile to the student assignments so we could monitor a change in their growth mindset.

The reflection and planning activities designed for this study were collected from students as part of assignments given to students across three participating universities. IRB approval was obtained at each university, and an online informed consent form was provided for students through the Learning Management System in each class. Students were not provided with an incentive to participate in the study. The research followed university requirements for human subject research.

The growth mindset assignments were completed by students every three to four weeks to measure their growth toward the goals they set at the beginning of the course. These graded activities prompted students to reflect on their past work and

set a goal to improve some aspect of that work. The reflection assignments were similar to Agile retrospectives and focused on identifying actions that were going well in achieving the goal and actions that were not going well or were impeding success. While the assignments were given for the class, the format and templates could be applied for any class or any goal. Responses were investigated using qualitative analysis of student submissions for reflection and planning activities assigned in selected information systems (IS) classes. As part of this study, two research questions were explored. The first (RQ1) focused on SMART goals, while the second (RQ2) focused on evidence of a growth mindset. The following research questions were evaluated:

- RQ1: What are students' needs as revealed in their SMART goals? A better understanding of the areas where students saw the need to improve should allow instructors and institutions to provide resources to support these efforts.
- RQ2: Are there indications of growth mindset constructs in the reflection and planning papers?

To start these course activities, early in the semester, students completed an assignment where they wrote two paragraphs reflecting on practices that had worked well for them in previous courses and practices that had not worked. Students then used the SMART goal framework to set a goal to continue with a practice that had worked well or work to improve a practice that needed improvement. The initial assignment was supported by course content that explained the SMART goals framework and provided examples, both good and bad.

After this initial reflection and planning assignment, students completed regular, recurring assignments where they reflected on their work since the previous assignment and provided an update regarding work on their goal, especially the measurable aspect of the SMART goal. Students were also asked to set a goal for the following few weeks. The goal could be a completely new goal, an update to the previous goal, or just a goal to continue working on a previous goal. These activities were assigned every three to four weeks or at the end of major course modules. For both the initial goal-setting assignment and the following reflection and planning assignments, instructors provided feedback, including suggestions for improving the use of the SMART goal framework and resources, ideas, and encouragement relevant to the specific goals set by the student.

The courses studied in this work were taught by five instructors at three public universities in the midwestern and southern regions of the United States. The courses taught a wide range of topics in Information Systems (IS) and Information Technology (IT), including introductory IT and software development courses and advanced courses in web application development, cybersecurity, Agile business value analysis, and the second course in a three-semester capstone sequence.

Students in these courses included lower and upper-level undergraduates along with graduate students.

The courses used a variety of instructional modalities, including in-person, blended, online synchronous, and online asynchronous formats. There were seven courses in the study taught during the Spring semester of 2020 when the Covid-19 pandemic disrupted instruction; this forced in-person courses to move to online formats with little advance notice.

Research questions were investigated through qualitative analysis of the student reflection and planning activities assigned in IS classes described in the previous section. The number of responses for each of the papers in the courses is provided in the following Table 1; the number of papers varied across courses due to differences in semester length and course structure.

Table 1
Details of courses involved in the study

Course	Paper 1	Paper 2	Paper 3	Paper 4	Paper 5
Introduction to Software Development	17	16	16	N/A	N/A
Advanced Web Development	36	39	38	N/A	N/A
IT Tools and Techniques	21	21	20	19	8
Fundamentals of Programming and Problem Solving	24	23	21	10	N/A
Security Analytics	20	20	N/A	N/A	N/A
Cyber Security	12	12	11	N/A	N/A
IT Project Life Cycle	9	9	9	N/A	N/A
Business Value Analysis	14	14	13	N/A	N/A
Total Responses:	153	154	128	29	8

Conventional content analysis was used to analyze the data to address the first research question of identifying student needs revealed in their SMART goals. A better understanding of the areas that students feel they need to improve will allow instructors and institutions to provide better resources to support students and provide an environment that will help foster a growth mindset. With conventional

content analysis, categories are identified both inductively and directly from an analysis of raw data (Lune & Berg, 2018). To identify categories for developing a theory of student needs, the reflection and planning papers were evaluated by multiple researchers independently and collectively to derive categories for building a theory of student learning needs. Collective agreement among researchers was sought in coding the types of student needs (McCardle et al., 2017) with the following resulting list of categories identified in Table 2.

Table 2
Categories used in the analysis of student goals

Category - Student Needs	Notes
Course content	Mention of specific content for the course. Study videos, practice coding, study group, go for tutoring and break assignments into smaller pieces.
Course - general	General comments on the course going well or not going well without details about specific content.
COVID	Masks, gloves, hand washing, social distancing, staying healthy. Also, use for items that are a response to Covid.
Motivation, work ethic, focus	Managing distractions
Personal	Family issues, family health issues, financial issues
Self-care - exercise	Exercise, working out.
Self-care - diet	Eating well, etc.
Self-care - mental	Mental health, stress management, etc.
Self-care - other	Sleep, daily routine, rest, time with friends and family, health in general
Student skills	Note-taking, communication, being prepared for class
Teamwork	Collaboration with others
Time management - general	Time management, but no specific problem, or

Category - Student Needs	Notes
	one not covered by another category
Time management - procrastination/scheduling	Mentions procrastination, putting off work, not leaving things to the last minute, scheduling, etc.
Work quality, rushing	Rushing work, not getting things done completely, forgetting details
Workload	Mentions workload, amount of work, etc., with no mention of more specific issues like leaving things to the last minute
Work / Life Balance	Work, job and school, work schedule/shift
Too vague to categorize	

Direct content analysis was the qualitative approach chosen for analyzing the second research question and entails identifying words in the data indicative of categories and codes derived from existing research and theories (Lune & Berg, 2018). Categories of fixed mindset and growth mindset were selected from existing mindset theories (Dweck, 2016; Dweck, 2008; Wilson & Conyers, 2020; Sahagun et al., 2021). Indications of a fixed mindset, according to theory, would be words that communicate not having the ability to make progress, forgetting about goals, being stuck, frustrated, failing, or giving up. In contrast, indications of a growth mindset would include words and phrases that communicate goal achievement or mastery, learning something new, resilience, adaptability, making accomplishments, and conveying how the student benefitted in the process of working toward their goals. A Mixture category was also selected to account for student papers that included words and phrases in their papers that indicated a combination of both growth and fixed mindsets. Table 3 shows a summary of the categories along with the words and phrases for each one.

Table 3
Words and phrases used in assessing growth vs. fixed mindset in student submissions

Category - Growth Mindset	Words and Phrases
Fixed Mindset	Words that indicate a fixed mindset such as forgetting about the goal, not being able to achieve it, being stuck, failure, giving up etc. Phrases may include "I have not....," "... has gotten worse," "I have not accomplished....," "I am stuck."
Growth Mindset	Works that indicate a growth mindset such as achievement of the goal, signs that the student benefitted, adaptability, mastery, learning, resilience, etc.... Phrases may include "I have...," "... has gotten better," "I have accomplished..."
Mixture	May have failed to achieve a goal but learned something to update the goal or try a different goal. Words indicating students have taken action to overcome a setback.

Note that in the content analysis, each assignment submission could register in multiple categories. The nature of the assignment, with separate reflection and goal-setting discussions, resulted in tallies for the categories mentioned in both parts of the assignment. Additionally, some students discussed several different topics in the reflection, and a few students set multiple goals. Overall, a total of 472 student submissions were analyzed, and a total of 1136 tallies were recorded across all the categories, indicating that, on average, 2.4 topics were discussed in each submission.

The reflection and planning activities integrated into each course enrolled in this research project measured students' perception of the value, effort, and effectiveness of reflection and planning activities, along with the enjoyment of completing the goals they set for themselves. Initial observations of these reflection and planning assignments indicate that students were engaged in these assignments, as the majority of the submitted papers were several pages in length. The most likely reason for this level of engagement is that the assignments were personal in nature and therapeutic. Students provided in-depth details about personal situations in their lives and outlined specific goals they were trying to achieve along with their current challenges. A review of the reflection and planning assignments indicated that student populations and the different schools involved in

this research study were not consistent in their survey results except for the time management category. For example, one asynchronous Introduction to Programming course received a high number of course content mentions. Another university's Introduction to Information Technology synchronous courses did not receive survey feedback regarding course content. The differing responses based on course delivery method provided awareness for course improvements to the faculty members involved in this research.

Results and Analysis

The findings related to the study's research questions provide useful insights into student needs and the benefits of introducing reflection and planning assignments based on SMART goals. Each research question is discussed in the following section, with specific examples from the qualitative analysis highlighted.

The researchers applied the iterative nature of Agile to the student assignments so we could monitor a change in their growth mindset.

Research Question 1: Student Needs as Revealed in SMART Goals

A summary of the major categories and subcategories identified in the qualitative analysis is provided in Table 4. The top four categories are discussed in detail. Additionally, Figure 1 shows the number of times that each major category was mentioned in the student submissions.

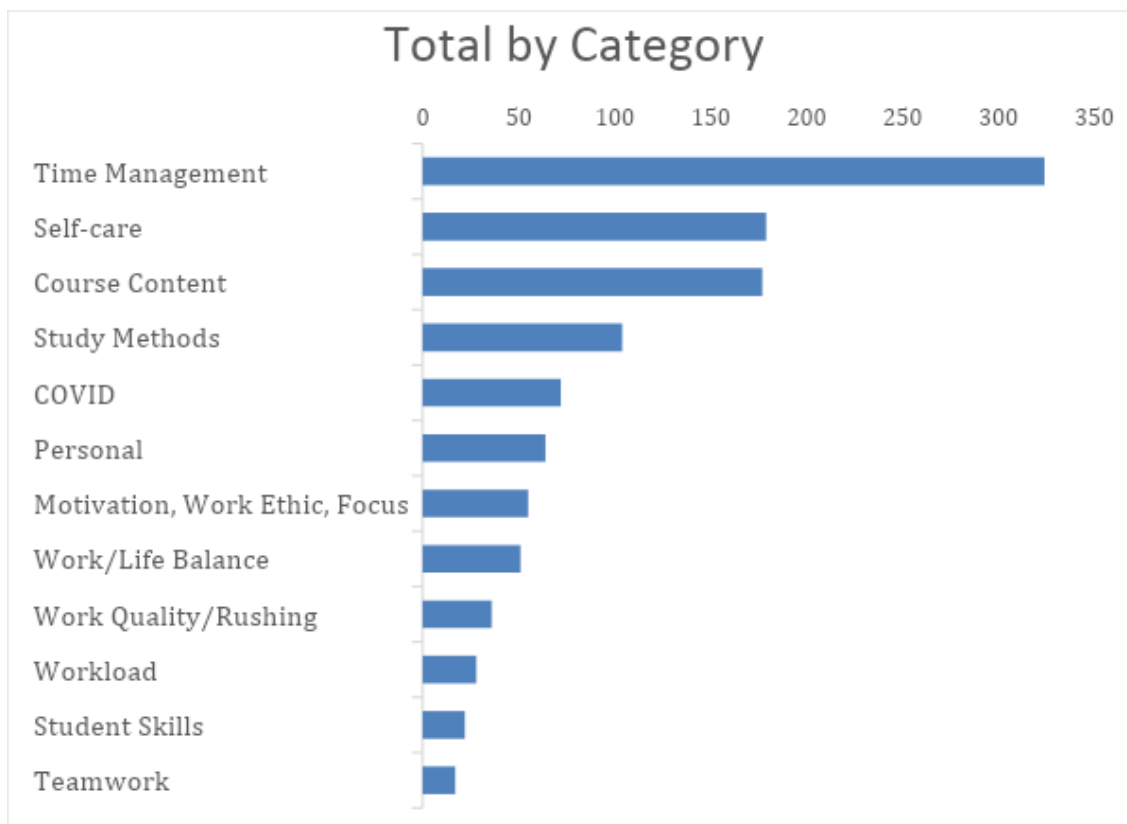
Table 4

Counts of mentions of different categories from analysis of student submissions

Category	Subcategory	Subcategory Count	Category Count
Time Management	Procrastination/ Scheduling	217	324
	General	107	
Self-care	Other	77	179
	Mental	44	
	Exercise	36	
	Diet	22	
Course	General	57	177
	Content	120	

Study Methods	104
COVID	72
Personal	64
Motivation, work ethic	55
Work/Life balance	51
Work quality, rushing	36
Workload	28
Student Skills	22
Teamwork	17
Too vague to categorize	7

Figure 1
Visualization of categorical needs identified by students



Time Management

Time management was the most frequently cited issue among students participating in this study; it was highlighted three hundred and twenty-four times (324) across the reflection assignments submitted. Two subcategories of time management evolved from the data provided: 1) procrastination and scheduling and 2) general.

It appeared that students were thoughtful and honest regarding consideration of their approaches to completing coursework. Several noted that they procrastinated until a day or two before an assignment was due or even until the day it was due to begin working. This acknowledgment of procrastinating was directly linked to the student's desire to fix the problem resulting in a common goal being to schedule time to work on course requirements, read the required material, etc. A majority of comments given specifically listed the need to set aside a day of the week or time of day to work on course requirements. Several even mentioned creating calendars and using scheduling software to accomplish what was needed in the course. Three students in the study commented they were using timeboxing to help improve their focus on their schoolwork by setting a timer while doing homework. They reported that this helped them to focus and get more accomplished. Others mentioned using a whiteboard or other support to help them with the course and associated requirements. Additionally, students in the Agile course applied skills learned in the course to improve time management. Specifically, timeboxing was noted as helping students focus their efforts on specific tasks; time limits were used to improve focus on the student's coursework and limit unrelated conversations.

Time management was also mentioned as it related to other areas of the students' lives. Some mentioned the difficulty in managing their time for class alongside their responsibilities to family and/or to work. One student noted that timeboxing also helped in managing family-related issues. These statements appeared across both undergraduate and graduate submissions. Additionally, students associated poor time management with increases in stress and exhaustion.

While time management ultimately is the responsibility of the individual, instructors do have the ability to suggest approaches and solutions to scheduling coursework. Typically, instructors focus on deadlines for course requirements. Students receive a calendar, reminders on learning management systems, email reminders, etc. Where there is additional opportunity is to show students how to manage what they are doing between deadlines. Instructors can assist students in dividing tasks that need to be done for an assignment or explaining approaches to help them focus and complete course requirements in a timely manner. Research shows that student success and performance are linked to time management skills (Stewart et al., 2020). Learning these skills and developing time management habits should be a consistent part of the classroom experience, regardless of discipline.

Self-Care

The second most frequently mentioned category was self-care, with 179 mentions - about 15% of the total. Of the four self-care subcategories (mental, exercise, diet, and other), the most frequently mentioned was other, with over 40% of the mentions. Items commonly mentioned in the other sub-category included sleep, quality time with friends and family, and time to recharge. Topics mentioned in the mental self-care category included stress and the recurrence or worsening of mental health issues. In the exercise sub-category, students discussed starting, resuming, or being more consistent with exercise programs, both gym-based workouts and simpler activities like going for a walk. Finally, the diet subcategory included comments about eating better and establishing more consistent eating habits.

In all the subcategories except mental health, the goals students set were generally fairly simple. They included things like setting a goal for a specific number of hours of sleep each night or a consistent bedtime. For exercise and diet, goals included going to the gym or taking a walk for a specific amount of time or number of times each week or eating a healthy meal a specific number of times a day or in a week. In the mental health subcategory, some goals were also straightforward, like doing meditation or mindfulness activities on a regular basis to help manage stress. Others might have been more challenging for students. For example, going back on medication, re-engaging with a therapist, or seeking mental health help for the first time. In most cases, it was easy for the instructors to provide encouragement and suggestions in the assignment feedback, such as mentioning that many smartphones have tools for tracking sleep and exercise. The mental health area posed more challenges, reflecting the severity of the concerns expressed by some students, but instructors could provide encouragement, links to campus mental health resources, and, where appropriate, could contact campus student affairs offices for assistance.

Course Content

The course content category was mentioned 120 times in the student papers and was the third most frequently mentioned category, accounting for about 11% of the total. Comments related to course content were predominately made in the Introduction to Software Development (C# programming) course, with 31 mentions, and in the Cyber Security course, with 35 mentions. These higher numbers of comments related to course content may indicate that students need additional guidance, tools, and resources for more technical classes. Students frequently mentioned needing or seeking other resources and planning to take actions to aid in understanding course content. Students would also mention specific concepts and topics in the programming class that they found challenging or problematic. These issues with the content included complex decision structures,

loops, and arrays. Students also mentioned several strategies for addressing their struggles with course content, such as meeting in study groups, studying course-embedded videos, scheduling time with a tutor, searching for and watching YouTube videos, reviewing examples, practicing course activities (such as working through additional programming examples) and asking questions in the course discussion forum.

Although course content was the third most frequently mentioned topic by students overall, this ranking varied depending upon the delivery method. The course content was the most often mentioned category for blended course delivery and for courses that started in-person and then moved to remote (Zoom) mid-semester due to COVID in the Spring 2020 semester. It is logical that the disruption of changing course delivery during the pandemic would result in students struggling more with course content. Both students and teachers who were accustomed to a face-to-face learning environment had to adapt quickly, and instructors had to develop online and remote class content in a short period of time. In addition, when looking at the categories by term, the course content is mentioned most frequently for both Spring 2020 and Fall 2020, which were the semesters most highly impacted by COVID.

Students in courses taught completely in-person did not mention course content as frequently as students who were taking classes taught online asynchronously and remote (via Zoom). In courses taught asynchronous online and remote, the course content was the third most frequently mentioned category (which is consistent with the overall ranking). However, the course content was ranked sixth for classes taught face-to-face. Students may be more inclined to ask questions and address concerns about course content in the classroom than online or remote. Therefore, it may be even more important for classes taught remote and online for instructors to request student feedback about the course content. Also, it affirms the importance of the quality of course content delivery in online and remote courses.

Study Methods

The fourth most frequently mentioned topic was study methods, with mentions in about 9 % of the student submissions. In this category, students discussed a range of topics. One set involved being organized and prepared to work on course assignments, including comments like keeping notes and papers for a class organized, so they were easy to find. Another area of discussion was the environment of their study spaces. This encompassed things like finding a quiet place to study, making sure all the materials and supplies needed were available, and removing distractions. One student even mentioned the idea of giving their phone to a parent when they were studying.

Research Question 2: Growth Mindset Constructs

A motivation in this study was to create an environment for students that promotes learning through developing a growth mindset. Growth mindset constructs emphasize the process of metacognition by creating an outward awareness of how individuals view their own goals and progress. Previous research indicates that assisting students in setting appropriate goals helps them adopt a growth mindset (Wilson & Conyers, 2020). Therefore, we included SMART goal activities for students in the reflection and planning papers to help students set the right goals to facilitate their development of a growth mindset. In analyzing the second research question, we were interested in investigating the papers for indications of students developing a growth mindset. To accomplish this, we evaluated student responses in the reflection and planning papers to see if phrases were used that suggested a growth mindset, fixed mindset, or mixed. The keywords and phrases searched in each of these categories are shown in Table 3.

An analysis of the data indicates that students predominantly showed a growth mindset. Of the 397 submissions assessed for mindset, 66 % (261) used terms indicative of a growth mindset. Only 22 % (89) indicated that the student had a fixed mindset. The remaining 12 % (47) were mixed, with the student using both growth and fixed mindset terms. It is important to note that while 22% appeared to fit the fixed-mindset category, many of these students expressed a positive association with the activity and improved outcomes. Even in cases where students did not meet the goal or goals provided, they noted that the exercise helped them improve in the related area. Specifically, students highlighted in the reflection and planning papers how setting SMART goals helped them both academically and personally. One student mentioned that setting a scheduled time every day to work on assignments helped with being more productive and improving academic performance.

Actions taken by students based upon their SMART goals included making checklists, keeping electronic or paper planners, and organizing work on whiteboards and sticky notes. Students also actively set goals to seek out ways to help them learn course material. One student mentioned that the reflection and planning papers with setting SMART goals helped them understand that they could ask for help when they were struggling with class content. Setting the goals in the reflection and planning papers helped them to realize that they could ask questions either in the course discussion forums or by emailing the instructor or tutor. Students mentioned that in setting goals, they also discovered additional resources and learning strategies, such as using YouTube videos or additional websites and meeting with a tutor.

On a personal level, the goals helped students in areas such as spending more time with family and friends, improving nutrition, exercising, sleeping more, and

reducing stress. Below is a sample of quotes that further illustrate how setting goals empowered students to address their needs and improve their productivity and performance in the classroom and personally. Additional student comments can be found in the Appendix.

- Scheduling time to do assignments early in the week has helped reduce stress.
- Overall, with my SMART goal system I have successfully prioritized and executed all my tasks such as my assignments and personal assignments.
- Overall, my SMART goal system is doing well, and I will continue to implement them during the semester and after. It has saved me time and increased my productivity.
- Specifically, my goal was to spend at least an hour and a half each day for at least 6 days a week on materials related to the course. I can say with confidence that I have exceeded this goal, and it has certainly been reflected in my performance.

SMART goals were particularly helpful for students who were struggling with specific development needs such as procrastination and time management. Metacognition requires self-reflection and changing the inward image to one of progression and achievement. Students who recognized their individual limitations and needs in specific areas and used these needs to generate goals were able to create plans with action items that focused on specifically improving in these categories. Having the support of the professor encouraged accountability to the action plan and increased student motivation to maintain focus on individual improvement and progress.

Based on the evidence provided through qualitative analysis and student comments for this second research question, the SMART Goals set through the reflection and planning activities have, for the most part, promoted a growth mindset and resulted in students becoming empowered to make improvements in learning and in their personal lives. Using growth mindset activities results in higher levels of student achievement and can be adopted for any course, regardless of subject matter. Additionally, the activities support metacognition by motivating students to set goals and generate meaningful practices that can be applied for general goal setting, inside or outside of a classroom setting.

Limitations and Future Research

While the results were positive and support the use of reflection and planning assignments to improve student performance, we want to recognize the limitations of the study and suggest directions for continued future research. First, as with

most studies involving data collection, it is necessary to reflect on the potential impact of timing on the research. The data collected was obtained during the spring 2020 semester, which was directly impacted by Covid. In order to have a deeper understanding of the influence of the pandemic on the results, additional data will need to be collected and reviewed. It is the intention of the researchers to continue this study. Even with the uncertainty surrounding the timing of the data collection, the impact of the reflection and planning exercise and the introduction of setting SMART goals were positive.

Additionally, the results point to opportunities to expand research in this area and to work on continuing to improve issues related to student retention. For example, it would be beneficial to include grit in future studies related to goal setting and academic performance. Grit encompasses the combination of perseverance and passion for achieving goals (Duckworth, 2016) and can be developed by taking on a growth mindset (Gibson, 2019). Many experts acknowledge that both grit and a growth mindset can be learned and developed (Rohne, 2015; Gibson, 2019). Research in the area of growth mindset has also incorporated the examination of grit (Pueschel & Tucker, 2018; Tang et al., 2019). According to Duckworth (2016), grit and a growth mindset are closely connected by suggesting that grit is cultivated through a growth mindset. The results of this study show that students are exhibiting aspects of a growth mindset through their reflection and planning papers. It would be interesting to see if the level of grit is shifting across the time students are working on their SMART goals. A survey could be administered at both the beginning of the semester, before the first reflection and planning assignment, and then administered again at the end of the semester to see if there is an impact on grit after completing a semester of reflection and planning activities.

Because time management was the predominant need identified by students in their reflection and planning papers, there is a call for future research to investigate the role of the resource of time in growth mindset theory. According to Wilson and Conyers (2020), the formula for growth is $\text{Mindset} + \text{Methods} = \text{Growth}$. Based on the results of this study, future theoretical research needs to investigate the role of the time resource in this equation. This formula may have a multiplicative impact on the time in which students may exhibit a growth mindset. Still, there may be a dependency upon the time that students feel that they need to be able to exert the work and effort required to attain their learning goals.

Conclusion

The research community in education continues to affirm that competencies of all types can be learned and developed. The experience for the students was positive, regardless of the categorization (growth, fixed, or mixed). We, as educators, have a unique opportunity to create an environment that is conducive to learning and

provide students with practical strategies for increasing their capacity to acquire new knowledge and skills and become lifelong learners (Wilson & Conyers, 2020). Including reflection and planning activities in the classroom requires moderate effort on the part of instructors; however, identifying SMART goals reveals areas in which students are struggling that instructors may otherwise be unaware of. The data presented in this work also gives instructors and institutions insight into the areas where students seek to improve themselves.

There was a direct impact on student success by completing the planning and reflection activities. Students identified time management and self-care as key development areas, and the goals helped students to create plans for dividing time among academic goals, social time with family and friends, and physical goals to improve overall health and stress-reduction. This data can be used to prioritize efforts to provide additional resources and instruction to support student development. Instructors are recommended to include SMART goals planning and reflection activities in their courses to motivate students to achieve specific goals. Students lacking core study habits or who need structured activities for increasing motivation and accountability can leverage the SMART goals and reflection activities for developing goals, creating supporting activities for achievement, and using the reflection activities for self-assessment. Overall, including reflection and planning activities is a simple yet high-impact practice that can lead to significant positive outcomes for students and promote lifelong learning.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

References

- Duckworth, A. (2016). *Grit: The power of passion and perseverance*. New York, NY: Scribner.
- Dweck, C. (2008). *Mindset: The new psychology of success*. New York, NY: Ballantine Books.
- Dweck, C. (2016). *Mindset*. Random House, Inc.
- Fishman, T., Fleurimond, B., Ludgate, A., Peterson, K., Malik, N., Roberts, R., & Reed, S.L. (2021). Five strategies for student success. Deloitte Insights. Retrieved January 25, 2023, from <https://www2.deloitte.com/us/en/insights/industry/public-sector/student-success-best-practices.html>
- Gibson, K. A. (2019). *One Year Later: A Study of the Motivational Profiles of Students Who Participated in a Grit and Growth Mindset Themed First-Year Experience Course at an Urban Community College*. Ed.D. dissertation, Florida State University. http://purl.flvc.org/fsu/fd/2019_Spring_Gibson_fsu_0071E_15008
- Hulshult, A. & Krehbiel, T. (2019). Using eight Agile practices in an online course to improve student learning and team project quality. *Journal of Higher Education Theory and Practice*, 19(3), 55-67.
- Kirby, L. A. J. & Thomas, C.L. (2021). High-impact teaching practices foster a greater sense of belonging in the college classroom. *Journal of Further and Higher Education*, 46(3), 368-381. <https://doi.org/10.1080/0309877X.2021.1950659>
- Krehbiel, T., & Hulshult, A. (2019). Agile teaching. *The Journal for Quality and Participation*, 42(2), 30-32.
- Krehbiel, T. C., Salzarulo, P. A., Cosmah, M. L., Forren, J., Gannod, G., Havelka, D., Hulshult, A. R., & Merhout, J. (2017). Agile manifesto for teaching and learning. *Journal of Effective Teaching*, 17(2), 90-111.
- Lune, H. & B. L. Berg. (2018). *Qualitative Research Methods for the Social Sciences*. Pearson India Education Services Pvt. Ltd.
- McCardle, L., Webster, E. A., Jaffey, A., and Hadwin, A.F. (2017). Examining students' self-set goals for self-regulated learning: Goal properties and

- patterns. *Studies in Higher Education*, 42(11): 2153-2169.
<https://doi.org/10.1080/03075079.2015.1135117>
- MindTools. (2022). *SMART Goals: How to Make Your Goals Achievable*. Accessed June 21, 2022, <https://www.mindtools.com/pages/article/smart-goals.htm>
- Poe, L., Brooks, N. G., Korzaan, M., Hulshult, A. R., & Woods, D.M. (2021). Promoting positive student outcomes: The use of reflection and planning activities with a growth-mindset focus and SMART goals. *Information Systems Education Journal (ISEDJ)*, 19(4): 13-22. <https://isedj.org/2021-19/n4/ISEDJv19n4p13.html>
- Pueschel, A., & Tucker, M. (2018). Achieving grit through the growth mindset. *Journal of Instructional Pedagogies*, 20: 1-10.
- Rohne, S. (2015). Developing true grit and a growth mindset. *Law Practice: The Business of Practicing Law*, 41(4): 12.
- Sahagun, M., Moser, R., Shoemaker, J., & Fortier, J. (2021). Developing a growth-mindset pedagogy for higher education and testing its efficacy. *Social Sciences & Humanities Open*, 4(1).
<https://doi.org/10.1016/j.ssaho.2021.100168>
- Stewart, B., Miertschin, S., & Goodson, C. (2020). COVID-19 Transitions to Online Formats and Pre-Pandemic Foundations for Student Success: Time Management and Lifestyle Variables. *Journal of Higher Education Theory and Practice*, 20(10): 173-189.
- Tang, X. Wang, M., Guao, J., Salmela-Aro, K. (2019). Building grit: The longitudinal pathways between mindset, commitment, grit, and academic outcomes. *Journal of Youth and Adolescence*, 48: 850-863.
- Thompson, B. (2020). Profiling the successes and failures of prominent leaders: A primer for developing a growth mindset and enacting a job crafting. *Business Education Innovation Journal*, 12(2): 57-61.
http://www.beijournal.com/images/V12_N2_late_update.pdf
- Wilson, D. & Conyers, M. (2020). *Developing Growth Mindsets: Principles and Practices for Maximizing Students' Potential*. ASCD.

Appendix

Additional Student Comments:

- The first reflection and planning assignment was a helpful readjustment for me to prioritize and plan my assignments, reading and testing more realistically around my employment, social life (as much as possible in a quarantine situation), and exercise schedule.
- I talked about making sure to set aside time on specific days to complete the homework and assignments I have for the week. I am pleased to say this is something that I have been able to do more faithfully. In fact, doing this has made working on assignments much more controlled and enjoyable as I have scheduled the time to work, not frantically finding a quick moment to finish assignments.
- Compared to the last two weeks, I have felt better about completing my assignment in a manageable way. I decided to disperse reading articles, watching videos, and completing assignments over the course of a week or two. This has helped me manage my workload and life balance compared to the schedule I was following before the last reflection.
- My smart goal was to review the homework assignments on Saturday to mentally prepare for the week and to start working on the assignments on Monday evenings. I have found these two goals rather easy to implement, but extremely helpful in holding myself accountable and ensuring I complete my assignment earlier.
- Additionally, to complete the course assignments since the last time, I have been paying more attention to the details and it has helped me to complete them far more accurately. This strategy is working well for me, and with one more assignment to go in this course, I will not be making any changes or doing anything differently.